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Nutrition and Sociodemographic Characteristics of Montreal Food Bank Provision Recipients

by

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ABSTRACT

Parallel to the widening gap between high and low income status in Canada has been the increasing number of individuals and families accessing community food banks. In the 1990's, food security reached the national agenda for action, yet no study had described the nutrition and sociodemographic characteristics of a random sample of food bank provision recipients, specifically their nutrient intake throughout the month or at the end of the month when food and money are thought to be most limited. Preliminary studies at two sites identified the contents of food bank provisions and the clientele to be surveyed. Thereafter, 490 food bank users were randomly selected from a stratified random sample of 57 Montreal area food banks. A dietitian-administered sociodemographic questionnaire and 24-hour dietary recall were completed upon client enrolment at the food banks; following this, three further in-person 24-h recall interviews were conducted, week-by-week over the month. Sixty-two people did not complete all interviews. The 428 people completing four interviews were primarily healthy, well-educated adults (overall mean age 41.5±12.6 years; men 41.4±12.2 and women 41.4±13.0 years) who perceived the food banks as a necessary community service. The frail elderly and single parents with large families did not use food banks. Mean energy intake was similar to the general Quebec population (10.2 and 7.9 MJ for men and women, respectively) and macronutrient intake was stable throughout the month. With the exception of calcium, mean nutrient intakes met recommended levels and were not influenced by income-week nor by energy intake variability. Intakes of several nutrients were related to frequency of food bank use,

household size, smoking, education and country of birth. When intakes expressed as food group servings were compared to the number of servings recommended in Canada's Food Guide to Healthy Eating, no age or sex group met the Milk Products group minimum recommended servings; mean intake of Vegetables and Fruit by women age 18-49 years was also below recommended levels. In both nutrient and food group evaluations, high variability around the mean reflected very low intakes by some food bank clients. Montreal recipients of food bank provisions achieved a dietary status similar to the general Quebec population.

RÉSUMÉ

L'accroissement de l'écart entre les revenus au Canada s'est accompagné d'une plus forte utilisation des banques d'alimentation communautaires par les particuliers et les familles. Durant les années 1990, la sécurité alimentaire est devenue une question d'importance nationale; aucune étude n'a pourtant décrit les caractéristiques nutritionnelles et socio-démographiques d'un échantillon aléatoire de clients des banques alimentaires, particulièrement en ce qui a trait aux rations alimentaires au cours ou à la fin du mois, lorsque la nourriture et l'argent se font plus rares. Des études préliminaires à deux emplacements ont identifié le contenu des rations alimentaires ainsi que la clientèle à l'étude. Quatre cent quatre-vingt-dix clients de banques alimentaires ont donc été sélectionnés par randomisation à partir d'un échantillon aléatoire stratifié de 57 banques alimentaires de la région de Montréal. Un questionnaire socio-démographique et un rappel diététique de 24 heures ont été administrés par un diététiste au moment de l'inscription des clients auprès des banques alimentaires; trois autres entrevues de rappel de 24 heures ont été menées en personne, à une semaine d'intervalle, durant le mois. Soixante-deux sujets ont mis fin à leur participation sans s'être prêtés aux quatre entrevues. Quant aux 428 participants qui se sont prêtés aux quatre entrevues, ces derniers étaient principalement composé d'adultes en bonne santé et instruits (âge moyen 41,5±12,6 ans; pour les hommes 41,4±12,2 et les femmes 41,4±13,0 ans); ces derniers perçevant les banques d'alimentation comme un service communautaire indispensable. Les personnes âgées frêles ainsi que les grosses familles monoparentales n'ont pas utilisé

les banques alimentaires. La ration énergétique moyenne se compare à celle de la population générale du Québec (10,2 et 7,9 MJ respectivement pour les hommes et les femmes) et l'apport en macronutriment est stable durant le mois. Sauf en ce qui a trait au calcium, la ration alimentaire moyenne est conforme aux niveaux recommandés et n'est pas influencée par le revenu hebdomadaire ou la variabilité de l'apport énergétique. L'apport de plusieurs éléments nutritifs est toutefois lié à la fréquence d'utilisation des banques alimentaires, la taille du noyau familial, la consommation de tabac, le niveau d'instruction et le pays d'origine. Lorsqu'on compare ces apports au nombre de portions recommandées par le Guide alimentaire canadien pour manger sainement, on constate qu'aucun groupe d'âge de l'un ou l'autre sexe n'atteint le niveau minimum des portions recommandées pour le groupe des Produits Laitiers; l'apport moyen en légumes et fruits par les femmes 18-49 années était sous les portions recommendées. Au niveau de l'évaluation tant des nutriments que des groupes alimentaires, une grande variabilité dans la moyenne réflète des apports très bas par quelque clientèle des banques d'alimentation. Les récipiendaires montréalais des banques d'alimentation parviennent à un status nutritionnel similaire à celui de la population québécoise en général.

STATEMENT OF ORIGINALITY

Contribution to Knowledge

Food bank proliferation had begun and Canadians were becoming sensitized to the issue of food security at the time the research was planned. It was with these phenomena in mind that the protocol was developed with the goal to investigate the nutrition and sociodemographic characteristics of the growing number of recipients of food bank provisions. This was the first study of a large random sample of food bank users to: 1) define who uses food banks; 2) to assess their nutritional status as measured by diet and self-reported anthropometric data; and 3) to report nutrient intake by week over the entire month. These data were not available in any previously published work. The socio-economic and demographic characteristics of Canadian food bank users were reported for the first time, and the generally accepted characterization of food bank users as the elderly, people with disabilities, single parents with large families, and people with limited education was refuted. The belief that food bank provisions offer 'emergency' food relief was not supported. The perception that food assistance recipients' intake declines as the month progresses was not substantiated. This research served to characterize, for the first time, the people who use food banks and their dietary status. It revealed that food banks do not serve the people considered to be the "poorest of the poor". Finally, recipients of food bank provisions described here achieve levels of nutrients and food groups not unlike the general Quebec population.

Guidelines for Manuscript-Based Thesis

The Faculty of Graduate Studies and Research, McGill University provides guidelines for "an alternative to the traditional thesis format" such that "the dissertation can consist of a collection of papers that have a cohesive, unitary character making them a report of a single program of research" (Http:www.mcgill.ca/fgsr/gso/thesis.htm). The structure for the manuscript-based thesis follows.

Candidates have the option of including, as part of the thesis, the text of one or more papers submitted, or to be submitted, for publication, or the clearly-duplicated text not the reprints) of one or more published papers. These texts must be bound together as an integral part of the thesis.

The thesis must be more than a collection of manuscripts. All components must be integrated into a cohesive unit with a logical progression from one chapter to the next. To ensure that the thesis has continuity, connecting texts that provide logical bridges between the different papers are mandatory.

The thesis must conform to the requirements of the "Guidelines for Thesis Preparation", including the following: a table of contents; and abstract in English and French; an introduction which clearly states the rationale and objectives of the research; a comprehensive review of the literature (in addition to that covered in the front of each paper); and a final conclusion and summary. The reference list may appear with each manuscript or as a separate comprehensive list.

Where appropriate, additional material must be provided (eg. In appendices) in sufficient detail to allow a clear and precise judgement to be made of the importance and originality of the research reported in the thesis.

When co-authored papers are included in a thesis the candidate is required to make an explicit statement as to who contributed to such work and to what extent. The supervisor must attest to the accuracy of this statement at the doctoral oral defence. Since the task of the examiners is made more difficult in these cases, it is in the candidate's interest to clearly specify the responsibilities of all the authors of the co-authored papers.

CONTRIBUTIONS OF AUTHORS

The candidate was responsible for developing the research protocol, development and pretesting of the measurements tools, training of the dietitian-interviewers and implementation of the sampling strategy. The candidate visited all participating sites prior to and throughout the data collection phase, and met all dietitian-interviewers individually and as a group throughout data collection and coding. The candidate entered and cleaned the data, managed the project budget and prepared the drafts of funding agency progress reports.

Two manuscript texts in the thesis are co-authored by the research supervisor, H.V. Kuhnlein, and a committee member, K. Gray-Donald; the third is co-authored by the research supervisor only. The conception of the papers, all analyses and the initial interpretation and documentation of the work was the responsibility of the candidate. The co-authors guided the candidate toward depth and clarity in the work, recommended additional analyses to support observations, and thoroughly critiqued each manuscript draft. Their collaboration supported the candidate's progress throughout the manuscript submission process.

ACKNOWLEDGEMENTS

Sincere thanks is extended to Drs. Kuhnlein, Gray-Donald, Ghadirian and Patel who agreed to an extended association with a part-time doctoral candidate. The value of their sustained interest cannot be overestimated. Dr. P. Ghadirian and Dr. V. Patel, committee members, guided the candidate during the development and pre-testing of the food security questionnaire, through directed readings, discussion and facilitation of interactions with members of their research teams. Appreciation is also expressed for their critique of the thesis draft.

Dr. K. Gray-Donald's willingness to discuss the research findings at each stage of the work was a constant encouragement. Her insistence on saying it clearly and saying it strongly contributed greatly to preparation of concise, coherent manuscripts and this thesis.

Dr. Harriet Kuhnlein, as research supervisor, was both a guide and mentor, offering support and challenge throughout the doctoral process. She fostered the critical thinking and reflection necessary to plan the research and interpret the nutritional and sociodemographic data provided by the study participants. With her contagious enthusiasm for research that links people, their food and nutrition, Dr. Kuhnlein was a role model for commitment and productivity. Thank you.

DEDICATION

..... to family and friends,

for durability

for always asking how it's going

for understanding.

..... to John,

for only ever looking forward

for endless encouragement

for keeping it in perspective

for being there.

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CHAPTER 1.

PROBLEM STATEMENT AND PREAMBLE

Health as a resource for every day living was the goal of *Achieving Health for All*, the working document of Health and Welfare Canada programs for the 90's (Health and Welfare Canada, 1986). Nielsen (1989), in summarizing the nutrition component of this framework, reiterated the World Health Organization definition of health as "the extent to which an individual or group is able, on the one hand, to realize aspirations and satisfy needs and, on the other hand, to change or cope in the environment". Of interest to this research was the nutritional health of food assistance program participants, specifically urban food bank users.

The thesis begins with a review of the literature around the issues of hunger and food security in the economic context similar to North America and a review of research pertinent to the development of the tools for assessing sociodemographic and nutritional characteristics. Following this review, three preliminary studies are described; realization of these projects led to successful integration into the milieu for the research and to articulation of the objectives and methods of the main work for the thesis. The sociodemographic and nutritional characteristics of Montreal recipients of food bank provisions are presented as the text of three manuscripts concerning sociodemographic and nutritional characteristics; nutrient intake and correlates of intake; and comparison of intake to recommended food group servings. Additional analyses are provided for each

segment, including an assessment of urban food assistance provisions. A discussion section links all the work and leads to the concluding remarks. Supporting materials are provided in appendices. Financial support for the research was provided by the Ministère de L'Enseignement superieur et de la science, Direction générale de l'enseignement et de la recherche universitaire and the Dairy Bureau of Canada (for the preliminary work) and by Health Canada through the National Health Research Development Program (NHRDP) Grant #6605-4092.

LITERATURE REVIEW

1.1 Food Security

1.1.1 Defining and Differentiating Hunger and Food Security

Brown (1987) states that a "hungry person" is chronically short of the food and nutrients necessary for good health. Anderson (1990) defines nutritional health as "the assimilation and utilization of nutrients by the body plus interactions of environmental factors such as those that affect food consumption and food security". Many authors have tried to define food security or to develop indicators to assess hunger.

Zorilla (1998) defines hunger in four ways, as: deprivation of food, a group of subjective sensations, a physiologic mechanism that motivates us to eat, or a "motivational state" regarding food acquisition. A different meaning arose in the early '90s when the term hunger was used to describe the emerging condition of people living in urban poverty and seeking food assistance. Using a phenomenological approach to define this new hunger, Travers (1993) collected and categorized women's statements about what hunger meant to them. The narrow view of hunger described a physical sensation that came from going without food for a specified period of time; this strict definition did not, however, fully encompass the women's experiences with hunger. Indirect measures of participants' perception of hunger were found to be more descriptive of their reality: participating in food assistance programs, changing food choices, or decreasing food intake. Radimer,

Olson and Campbell (1990) developed indicators to describe hunger at the household and individual levels. An indicator of hunger at the household level was reduced food quantity and quality, reflected as depletion of, or unsuitable, food stores. At the personal level, hunger was a condition of both insufficient food intake and inadequate variety. Psychological and social components of hunger included food anxiety, lack of choice, disrupted eating patterns and unacceptable means of food acquisition. The authors conclude by defining hunger as "the inability to acquire or consume an adequate quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so". It was noted that such indirect indicators of hunger may lack sensitivity, missing some hungry people because of periodicity of missed meals or coping strategies such as family help with food. Two-thirds of Canadians polled in 1990 felt that hunger was a problem in Canada; the result was 63% in Quebec (Oderkirk, 1992a).

Upon further exploration of hunger issues, Campbell (1991) reported that 'food security' may be a more appropriate term than hunger to describe people's experience with anxiety about food availability and variety, ie., it is the term 'food security' that means people would live with neither overt hunger nor involuntary food shortages (of any duration, intensity and cause). Hunger by the dictionary definition would then be a potential consequence of food insecurity. The Canadian Dietetic Association (1991) adopted a definition of food security as: a condition in which all people at all times can acquire safe, nutritionally adequate and personally acceptable foods that are accessible in a manner that maintains human dignity. In the Canadian Contribution to the World Food Summit (Agr

and Agri-Food Canada, 1996) food security is said to exist when "all people at all times have physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life". The recently revised American Dietetic Association position paper on domestic food and nutrition security reiterates these concepts, stressing the notion of 'sufficient food for an active and healthy life' (Kendall and Kennedy, 1998). Badun et al. (1995), in Canada, reported parents depriving themselves of food to provide for their children. Food insecurity has an important component of anxiety about having enough food (Fitz, 1998; Tarasuk and Maclean, 1990a; Travers, 1996).

The Cornell/Radimer Questionnaire to estimate the prevalence of food insecurity is now widely used (Radimer et al., 1990). Questionnaire items center around participants' agreement with perceptions about food, for example, "I can't afford to eat properly", "We eat the same thing for several days in a row because we only have a few different kinds of food on hand", et cetera (Kendall et al., 1996). Use of indirect methods such as this to describe food security was supported by Dietz (1991) who stated that new approaches to determining food insecurity would improve the assessment of risk in vulnerable populations. Questions intended to measure food insecurity have been included in the NHANES III data collection protocol (NCHS, 1991) and the Community Childhood Hunger Identification Project (CCHIP) (Wehler, 1987). In the CCHIP study, a positive response to 5 out of 8 questions was considered indicative of food insecurity. Habicht and Myers (1991) stated that the effectiveness of a survey depends on the contribution of the information to decision-makers' understanding of the problem. To this end, the use of

questions to measure food insecurity is becoming increasingly important. In 1995, the US Bureau of the Census incorporated a food security measure in the questionnaire, revealing 11.9% of families with food insecurity: 7.8% without hunger, 3.3% with hunger and 0.8% with severe hunger (Vozenilek, 1998). Reporting upon analyses of NHANES III data, Alaimo et al. (1998) found ethnicity, age <60 y, less than high school education, and participation in a Food Stamp program positively related to food insecurity.

Food security has been called an investment in community wellbeing (Campbell et al., 1988). Actions to achieve this investment have already been proposed; these have included sensitization of health professionals and government to the issue (Aitken, 1994; Gauvin et al., 1997; Jacobs Starkey et al., 1995; Kendall and Kennedy, 1998; Power et al., 1998), education (Rose et al.,1990; Singleton, 1994), money or equivalent food (Zellner and Traub, 1987), and monitoring of food supply coupled with legislative and community actions (Schuftan,1989; Riches, 1989). Hay (1994) cautions that it is not yet clear whether maximum nutrition impact will be achieved by money, supplementary feeding, education or food knowledge.

Having explored the meaning of the term food security, it is important to consider what factors affect a person or household achieving or retaining food secure status. Factors that aggravate food security are: impaired physical and mental health, limited food access, low income, decreased socialization, fixed and unexpected expenses, and food management strategies (Wolfe et al., 1996). Access to food is determined by income

(Caraher et al., 1998) which in turn is related to physical resources. Distance from the supermarket and problems of transport ie., reduced access to affordable food, have been documented (Campbell and Desjardins, 1989; Lang and Caraher, 1998). Travers (1996) found that food prices were consistently higher in inner city stores. Oderkirk (1992a) reported that 61% of food bank users had moved an average of 2.1 times in 12 months. Gauvin et al. (1997), reporting on Quebec community nutrition concerns, added housing costs and insufficient knowledge of nutrition to the list of factors aggravating food security. All of these authors say that food security is an issue of poverty.

1.1.2 Socioeconomic Trends, Poverty and Food Security

Emergence of the global market has derived from and led to technological progress and intense financial competition, declining employment in the manufacturing sector, and increases in services such as banking and insurance (Spitz, 1996). One effect of this de-industrialization is a widening gap in earnings among the sectors. National economic principles concerned with the allocation of scarce resources are replaced by world wide financial activity, disconnected from local socio-economic reality. In Canada, increased competitive pressure and short term profitability have led to increased employment hours for highly skilled workers while those of lower paid workers have decreased (Morissette, 1997).

Morissette (1997) further described the trend of declining earnings that has been growing in Canada in the 1990s. Over a seven year period, average earned income of men in the top quintile rose 9% while it fell 4% for those in the bottom quintile. The proportion of low earners age 35-44 years rose by 9% while for younger workers it was even higher, at 17%. Both the incidence and duration of low earnings has increased. These changes, since the pressure of the 1981-1982 recession, led to individuals and families not having the resources to meet their economic, social and psychological needs: poverty (Spector, 1992).

Poverty exists when there is a "lack of resources to meet such basic human needs as education, health, food and nutrition, water sanitation and shelter"; poverty "is a cause of food insecurity but food insecurity reinforces the cycle of poverty; food insecure people tend to be members of resource-poor households" (Agr and Agri-Food Canada, 1996). A number of methods have been used to define poverty. A 'relative income' approach to describe resource-poor households defines low income as living with less than the median Canadian family income (Picot and Myles 1996; Spector, 1996). The number of 'adult equivalents' in the household is determined and the family income is divided by this number of adults; using this method, half the population in Canada is relatively resource-poor. In 1987 the national poverty rate (percent of people living below what was then called the poverty line, ie., income below the cost of basic needs) was 15.6%, 3,912,000 Canadians, excluding native people and those in institutions. Former 'poverty line' incomes were similar to what is now called the low-income cutoff. In 1990, nearly one-

third of the 3.8 million Canadians living in a low income household were children (Oderkirk, 1992b). Lone parent families comprised 47% of all low income families with children compared to 14% of all families with children. In March 1991, 2.3 million Canadians received income from social assistance, 23% more than in 1989 and 71% more than in 1980. Unattached individuals accounted for 57% of recipients, lone parent families for 28%.

Canada's low-income cutoff (LICO) defines a set of income cutoffs below which people may be said to live in 'straightened circumstances'. The LICO assumes that a low income family spends 20% more of their income on food, clothing and shelter than the average family (Natl Antipoverty Org, 1989; Statistics Canada, 1994). The low-income cutoff for a Canadian family of four in 1989 was $26,619; 30% of families with low incomes were $5,000 - 9,999 below this cutoff. For individuals the poverty line was $13,414. In 1990 welfare incomes ranged from $2,215 to $13,859 below the low income cutoffs, depending on family size and province; in Quebec, this gap was $6,003 for an unattached individual, $5,700 for a lone parent with one child, and $9,459 for a couple with two children (Oderkirk, 1992b). Thirty-one percent of Quebec's children living in poverty are reportedly from poor working families, and the incidence of low income among Quebec elderly is 27.5% (Can Council Soc Dev, 1988, 1989). A Statistics Canada report (1993) notes that while 13.2% of all Canadian families were in the low-income category, this number was highest for the province of Quebec (16.2%); looking at cities, Montreal has the highest proportion of low income families in Canada (22%).

The average Canadian expenditure for food is 13% of gross income; the recommended maximum is 25%. A US study found food expenditure at 24% of income in 267 clients whose median income was 77% of the poverty level (Clancy and Bowering, 1992). Households in Quebec spend a significantly greater percent of the family budget on food than the rest of Canada (Horton and Campbell, 1992). In Quebec, for a family of four subsisting on social assistance benefits or minimum wage, these figures are 44 and 42.5%, respectively (Gauvin et al., 1997). These food costs are similar to the 43% observed for the lowest income group in the United Kingdom (Shepherd et al., 1996). Food security and adequate nutrition may be of great concern for these groups.

1.1.3 Socioeconomic Considerations are Related to Health

As reported by many authors, living in a household with low income is related to having lower health levels and higher risk social factors (Baker, 1994; Catalano, 1991; Freeman, 1989; Hogg et al.,1994; James et al., 1997; Johansson, 1994; Lynch et al.,1994; Roberge, 1995; Singleton, 1994; Smith, Johnson and Wang, 1997; Stitt et al., 1995; Winkleby, 1992). In 1993, a Canadian government report stated that "when comparing their health to that of other people their age, the poor have the lowest health status ..." (Manga, 1993). Lower income Canadians experience higher morbidity rates and fewer disability-free years, and have fewer behaviours which protect their health (Millar and Wigle, 1986; Roberge et al., 1995; Shah et al.,1987; Welsh, 1989). The subsequent metabolic effects of inadequate food quantity or quality can lead to underdevelopment,

weakness and lethargy (Catalano, 1991; Miller and Korenmen, 1994). Survival following HIV infection is shorter (Hogg et al., 1994) and rates of cancer (Freeman, 1989) and cardiovascular disease (Baker, 1994) are higher in low socioeconomic groups.

Hancock (1995) reported that status in the social hierarchy and sense of control are linked to health, and that overall population health is better where the gap between rich and poor is narrow. Similar findings have been reported for the United States (Baker, 1994; Brown,1987; Freeman, 1989; Luder et al.,1989; Roe, 1990; Winkleby et al., 1992). Each change in the level of socioeconomic advantage is associated with a positive change in health (Blane,1995). The more advantaged groups, whether defined by income, education or social class, tend to have better health than their disadvantaged peers (Blane, 1995). Canadian men and women in the highest income bracket live longer than those in the lowest; health was found to increase at each step up the scales of income, education or social status (Adams, 1993).

Najman (1993) defines five social categories that comprise the majority of those living in poverty: single parents and their children, the aged, the unemployed, racial and ethnic minorities, and the disabled. These groups have a persistant pattern of higher mortality rates. Ongoing demographic changes do not suggest this will change, even with the benefit of government policies and interventions. Numbers of single parents continue to increase, we have an aging population, and declining incomes make higher education beyond the means of many.

Najman (1993) argues further that prospects for health require policies to decrease the income gap between rich and poor. Ill health and impaired physical and cognitive performance have been demonstrated for children in developed countries (Gibson, 1994; Lobosco, 1994; Miller and Korenman, 1994; Offord et al., 1985). Combined with socioeconomic, cultural, educational and other factors, nutrition is an important issue of poverty.

1.1.4 Poverty and Dietary Status

The 1973 Nutrition Canada National Survey report opened with the statement that "Canadians need to know their nutritional status because nutritional health is fundamental to normal general health and the prevention or reduction in the severity of disease" (Nutr Canada, 1973). Dietary information on intakes of nutrients was stated as essential in determining whether eating patterns and trends are leading to or causing malnutrition. Results are briefly presented. Folate intake was below recommended levels for both men and women age 20-64 y; thiamin was also low for both sexes age 40+ and marginally adequate for women age 20-39 years. Womens' iron intake was a consistent problem, being low for the younger age group and marginally adequate among women over age 40 years. The reverse trend was seen for calcium intake of women. Median vitamin A intakes of women aged 40-64 y were also borderline. Low protein intake was found among the elderly.

Early analysis of the survey data revealed no consistent effect of income on nutritional status of adult Canadians. The observation that communities classified above the 'poverty line' experienced the same nutrition problems as those in the poverty zone suggested that the critical factor was not the number of food dollars that were spent. The Nutrition Canada report cautioned that this observation did not exclude the possibility that families on very low incomes were adversely affected (Nutr Canada, 1973).

Subsequent analysis of Nutrition Canada data by Myres and Kroetsch (1978) did reveal an income effect on nutrient intake. In the adolescent group, for both boys and girls, mean calcium intakes in the lowest income households were below recommended levels. Mean thiamin intake of adolescent girls in this group was borderline. Intakes of folate and vitamin C increased with income. Among the 20-39 year old females, only the highest income group met recommended calcium intake levels. For women age 40-64 years, mean intakes of energy, protein, calcium and vitamin A increased with income, and mean intakes of vitamin C and folate were highest in the highest income group. For both sexes age 65+ there were only small differences in nutrient intake associated with income. Vitamin A intake was below the recommended level in the lowest income group. Again, vitamin A, vitamin C and folate intakes showed a positive trend with income. Lastly, among pregnant women, mean intakes of calcium, vitamin A and folate were lowest in the lowest income group; calcium and vitamin A were also below recommended levels. The proportion of energy from protein, fat and carbohydrate was not influenced by income group.

Twenty-one percent of participants in the Quebec Nutrition Survey were classified as low income (Santé Québec, 1995). Calcium intake was lower, and below the recommended intake level, in the low income group, otherwise there were no nutrient intake differences by income. Two important observations were made by the authors: 1) 11% of the sample were in the 'revenue unknown' group and these people had the lowest nutrient intakes, and 2) the variation around intake decreased with increased income. The percent of the whole sample meeting the minimum recommended number of servings from Canada's Food Guide to Healthy Eating was 58% for Cereal Products, 43% for Vegetables & Fruit, 33% for Milk Products and 62% for the Meat & Alternatives group.

Data from the recent Ontario Health Survey, which used a semi-quantitative food frequency, found mean intakes meeting the minimum recommendation of Canada's Food Guide to Healthy Eating (Hedley et al., 1995). Ten percent of the sample were categorized as low income; income did not influence the number of food group servings consumed nor nutrient intake.

The convenience sample of low income families in Emmons (1986) study participated in multiple food assistance programs yet mean intakes of magnesium and zinc were <67% of recommended levels. Soft drink intakes of children age 6-11 years and males ≥19 years, and cereal intake for the males, were lower at the end of the month compared to the week when public assistance benefits were received. Nutrient intake did not differ in the two time periods.

James et al. (1997), in the UK, reported lower calcium, iron, magnesium, folate and vitamin C in the diets of lower socioeconomic groups. The authors stated that "cheap energy" from whole milk, fats, sugars, preserves, potatoes and cereals was prevalent, with limited selection of vegetables, fruit and whole grain products. In the US, fruit and vegetable consumption was 20% lower in rural households identified as 'food insecure' (Kendall et al., 1996). Only potato consumption remained stable as food insecurity worsened. This finding is in contrast to the earlier report in Canada where potato consumption was highest in the lowest income group (Myres and Kroetsch, 1978).

Heiser (1990) found that 92% of households served by the US Food Stamp program lived below the federal poverty line and the majority contained children, the elderly or disabled persons. It is important to review the nutrition problems of people in the five social categories usually considered to be living in poverty (thesis page 11) (Najman, 1993).

Single parents and their children

Single parents comprised 48% of adults participating in a 'Better Beginnings, Better Futures' program in Ontario. Sixty-five percent of the parents expressed anxiety around being able to provide food within the household. While the distribution of protein, fat and carbohydrate met nutrition recommendations, the parents' median intakes of energy, calcium, iron, zinc, vitamin A and folate were below recommended levels (Badun et al., 1995). The prevalence of obesity was high; 34% of participants had a BMI >27. Young, female heads of households in the UK have been reported to spend large amounts on soft

drinks and confectionary (Santich, 1995).

Evers and Hooper, (1995), working with Ontario 7-9 year old children from largely (63%) lone-parent households, found adequate linear growth but excess body fat. Intakes of energy, calcium and vitamin A were below recommended levels. Low physical activity was identified as a potential problem. In contrast, Miller and Korenman (1994) reported higher prevalence of stunting and wasting in persistently poor families in the US. Daily energy and fat intakes in adolescent girls in the UK were significantly greater for girls from single versus two parent families (Moynihan et al., 1993). Similar high fat intakes were found for Montreal children from single-parent families (Johnson-Down et al., 1997). The children were also overweight. Intakes of iron, folate and vitamin A and C were related to household income.

Racial and ethnic minorities

Though nutrition research is conducted within specific ethnic communities in Canada, for example among Hassidic families in Montreal (Shatenstein et al., 1993) and among the Cree in northern Quebec (Bernard et al., 1995), reports on nutrition and poverty rarely describe ethnic income subsets. In the US data, ethnic subsets are more common. Ballew and Sugarman (1995) identified high-risk nutrient intakes among low income Mexican women in the US; more than half the subjects reported calcium, folate, zinc and iron intakes below recommended levels. Block et al. (1995) found the most important source of energy for low income Hispanic women and their children was whole milk; milk

accounted for 7% of energy for women and 18% for the children. Tortillas, for women, and bread, for the children, were second, followed by soft drinks. Milk, eggs, beans and tortillas were the main protein sources. The authors speculated from the data that women tended to provide more vegetables and fruit to their children than they ate themselves. Lower income, exposure to domestic violence and limited knowledge of health risk factors were correlated with lower 'healthy eating' scores among Black and Latino women in the US (Sanders-Phillips, 1994).

The disabled and/or homeless

Mental or physical impairment may result in functional limitations to self-care, language use, learning, mobility, capacity for independent living and economic self-sufficiency (Cloud, 1993). Physical disability is one social determinant of loneliness among older Americans (Mullins et al., 1996) and loneliness is in turn a factor in decreased dietary intake (Imbach, 1987). Kitchen resources, diet-drug interactions, oral hygiene, feeding skill level, emotional status, education and economic status are all important factors for recently deinstitutionalized people (Harvey Smith, 1993). The risk of dietary problems among the homeless disabled is great.

Twenty percent of the homeless men and women surveyed by Evans (1996) said they consumed vegetables less than once a week. Female participants had intakes of iron, zinc, calcium, vitamin A and vitamin C below recommended levels; vitamin A and C intakes were ≤50% of recommended levels. For men, only vitamins A and C were below

recommended levels. A second study of homeless men in the UK, using the 24-h recall technique, revealed intakes of energy, folate, zinc and magnesium below recommended levels. Food frequency data showed low weekly consumption of fruit, vegetables and whole grain products (Rushton and Wheeler, 1993).

Dietary interviews with homeless adults in the US revealed intakes of magnesium, zinc and iron at 2/3 of recommended levels and mean cholesterol intake at 400 mg per day; 39% of study participants were obese (Luder et al., 1990). Dietary assessment of a multiethnic homeless population in Florida showed energy, calcium and zinc below recommended levels for all ethnic groups; vitamin A and thiamin were also low among Hispanic participants (Wolgemuth et al., 1992). The psychosocial and economic problems of some homeless people may be compounded by irregular or inadequate nutrition.

The unemployed

Employment status is a sociodemographic variable generally reported in all studies of nutrition. Wage and salary earning households in Australia spent more on snacks and take-out food than unemployed people (Santich, 1995); this result is not surprising, given that employment would increase cash available for 'extras'. Moynihan et al. (1993), in the UK, found that adolescent girls from 'unemployed families' had significantly higher intakes of energy, fat and carbohydrate compared to girls from employed families. Boys from unemployed families had significantly lower intakes of iron and vitamin C than those from employed families.

The aged

Gray-Donald (1995), in describing the nutritional challenges facing the frail elderly, noted that many people who have eaten well all their lives encounter difficulty with food preparation, appetite or health conditions later in life. Wolfe et al. (1996) identified factors related to food security in the elderly: limited income, poor health, physical disability, medical costs and unexpected expenses. These contribute to food insecurity by limiting access to food, decreasing the ability to prepare food, or changing food patterns. Stitt et al. (1995) stated that the older poor know what healthy eating entails but they cannot afford to purchase a healthy diet. All age and sex groups in their low income sample consumed higher fat levels than the higher income group; energy intake was lower in the lower income group.

Myres (1990), in Canada, found low calcium and vitamin A intakes among the elderly. Free-living elderly subjects in Quebec reported intakes below 2/3 of recommended levels for folate, vitamin D, calcium, magnesium and zinc (Payette and Gray-Donald, 1991; Payette, 1993). Homebound elderly were found to have low energy intake (Gray-Donald et al., 1994). In a US survey of nutritional risk among 3602 senior citizens (mean age 73 y), 18% checked the answer "I do not have enough money to buy the food I need".

People living in poverty are nutritionally vulnerable; the extent of that vulnerability varies with a number of factors. Would food bank users, generally thought to be the 'poorest of the poor', be in a worse nutrition position than other groups living in poverty?

1.1.5 Responses to Food Insecurity

Charities and religious organizations have historically provided food relief to needy families. The gradual erosion of social programs and increasing hardships among low income groups has led to a resurgence of both self-help initiatives and emergency food assistance programs (Crawford and Kalina, 1997; Tarasuk and Davis, 1996). In the United States, federal food assistance programs are reported as "a step to food security for many" (Splett, 1994). Buying power of participants is enhanced by food stamps or vouchers or direct food support in the form of meal programs or commodities. Of the 13 federal programs in the US, the Food Stamp program has seen the greatest increase in participation in recent years (Matsumoto, 1991).

In Canada, a new kind of food support emerged in 1981: the food bank system (Oderkirk, 1992a). Food banks are non-profit organizations designed to pool food (that for various reasons would be discarded by the supplier) and transfer it to charitable food programs (food depots). The latter also seek donations from the public, or purchase foods, to help provide a greater nutritional balance for their users (Oderkirk, 1992a). Over time, the term "food bank" has come to be used by community workers and the public to refer to local, direct food assistance. The food reclamation and re-distribution centers tend to be called "central food banks". Food donation legislation protects donors from subsequent responsibility regarding food safety and sanitation outcomes (Davis, 1997).

The food bank system in Canada and the US food stamp program are outgrowths of community and legislative recognition of food insecurity and of the perceived dietary adequacy gap among low-income populations (Johnson et al., 1981; Campbell et al.,1988; Natl Antipoverty Org.,1989; Poppendieck, 1994; Reschovsky, 1991). Most food aid provided by food banks is in the form of groceries (82% of relief food action). Individuals or family representatives are given bags of foods including staples and perishables in quantities to last, most commonly, one to three days. A Toronto study showed that 23% of grocery recipients surveyed still ran out of food each month (Oderkirk, 1992a). The Self-Help and Resource Exchange (SHARE) program, serving the Food Bank of Delaware, did not provide any yogurt, milk and cheese (Paulhamus and Cotugna, 1998). Other reports have also shown variation in the foods available for distribution (Derrickson, 1994; Friedman, 1991).

While food banks and soup kitchens were meant to respond to emergency food needs, they are becoming a long term food source for many families (Allen and Newton, 1986; Clancy et al., 1991; Frongillo et al., 1992). In 1989, in Canada, 378,000 different people per month from 175,000 households went to food banks and 180 communities had a food bank or equivalent program (Hunger Watch, 1989). By 1990 this figure had increased to 590,000 and by 1991 two million food bank users had been counted (Oderkirk, 1992a). A 20% increase in the number of food banks was subsequently seen from 1992 to 1996 (Can Assoc Food Banks, 1997).

The first central food bank in Quebec, Moisson Montreal, opened in 1984, followed three years later by Moisson Quebec, in Quebec City. By 1994 a total of eight food banks were in operation in Quebec (Federation des Moissons du Quebec, 1994). From Moisson Quebec alone 1,510,430 kilograms of food per year were redistributed to agencies and individuals. This represents approximately 50% of all food aid distributed in that region. ie., community organizations also distribute food from other sources. In 1993, 8,785,317 kilograms of food were redistributed by Quebec food banks.

1.1.6 Food Assistance Research Review

While food security has grown as a concern in both Canada and the United States, most reports on food security in the North American context are limited to position papers or proposals for action (American Dietetic Association, 1990; Beaudry, 1993; Brownridge, 1990; Campbell and Desjardins, 1989; Canadian Dietetic Association, 1991; Davis et al, 1991; Jacobs Starkey et al., 1995; Tarasuk and Maclean, 1990b). In peer-reviewed research, little is found in terms of evaluation of the the dietary status of emergency food provision recipients: food bank users.

Descriptive studies are emerging which are specific to individual and household food assistance. However, possible selection bias is noted in the study by Emmons (1986) where food stamp program (FSP) families were recruited and "agreed to participate on a voluntary basis". The author provides no information on how many individuals or families

refused to participate, raising the question of what may be different, besides FSP participation, in this group. This could affect interpretation of the extent of benefit of food stamps to the target population. Taren et al. (1990), when calculating changes in weekly servings for 20 food groups, did not count additional servings of the same foods, thus underestimating the potential for total food intake stability.

Peterkin et al. (1982) presented data on the extent to which diets of 627 low income households with food costs approximating their Food Stamp allotment met recommended nutrient intake levels. Households that met 80% of the recommended intake for 11 nutrients spent more on dairy products, eggs and legumes, vegetables and fruit, and grains, and less on meat products, soft drinks and alcohol. Less than 50% of the households met calcium and magnesium intake recommendations. Data from Devaney and Moffitt (1991), on the other hand, do show that household availability of all nutrients studied was positively associated with the US food stamp program participation and money income. Nutrient availability was reported to increase up to 3.9% of recommended levels for each dollar increase in food stamp benefit.

Villalon (1998), in determining the theoretical contribution of food bank supplies to nutritional needs of families in New Brunswick, assumed that obtained foods were distributed proportionately among family members. Smith and Hoerr (1992) reported that food bank users purchased food more frequently in general and skipped meals more often than non-users; detailed dietary data were not collected.

Studies cited show that food security is not only an issue during a recession. The networks for community self-help expand with economic down-swings, and resources are in greater demand; yet food assistance programs can be expected to remain during less depressed times. To understand their role will continue to be an issue. To understand who uses these programs and to define the dietary status of the users is an immediate concern.

A further issue to consider in the dietary investigation of food assistance program users is the impact of seeking food aid on dignity and self-perception (Aiken, 1994; Anderson, 1990; Oderkirk, 1992a). Do food bank users report immediate or expected food shortage? Are emergency foods sought before or after intake is jeopardized? What do clients identify as the main reasons for seeking food aid? Sensitive interviewers may elicit answers to these and other questions which will in turn help to define the people served.

A case has been made for the strength of association of use of the US food stamp program with improved dietary status of low-income groups (Basiotis et al., 1983; Devaney and Moffat, 1991; Johnson et al., 1981; Lane, 1978; Salathe, 1980). These results cannot be extrapolated to Canada, where the food stamp program does not exist. Yet food supplementation via food banks in Canada has been a massive investment, locally and nationally. There is inadequate information about today's emergency food assistance programs. Who is using these programs? What is their food and nutrient intake status? What may be the association of dietary status of program participants and morbidity? The

first step is to answer these questions. This objective is supported by the Régie Régionale de la Santé, Montréal (1994b), a health planning group which has recognized research on the dietary status of Montreal residents as a priority, adding to their own goals the aim of improving the dietary and nutritional circumstances of people living in poverty.

1.2 Measurement Methods

Anderson (1990) stated that four dimensions of food need to be measured to identify food insecurity: quality, quantity, psychological acceptability, and social acceptability. At the individual level this means collecting data on adequacy of energy intake, of nutrient intake, feelings of restricted food choices, and the nature of meal patterns. No study to date addresses all these issues among food bank users.

The need for identification of descriptive characteristics of food assistance program participants has been justified, and constitutes an important first step in the search for dietary factors and methods of intervention that can be altered, eliminated or introduced to prevent or reduce food insecurity and the health sequelae associated with low-income status. The four dimensions of food insecurity cited by Anderson (1990) are all addressed in the present research, with the addition of dietary intake data. This approach meets the recommendation by Habicht and Pelletier (1990) that the indicator(s) selected in research also need to be good predictors of benefit, ie., when measured at a later date, would be

likely to show change.

Kirk and Miller (1986) state that qualitative research is invention, discovery, interpretation, and exploration, where reliability and validity can be addressed at each stage. The validity and reliability of qualitative inquiry depend largely on the methodological skill, rigor, sensitivity and integrity of the researcher (Patton, 1990). Inter-interviewer reliability (Bingham and Moore, 1959), informant accuracy (Bernard et al., 1984) and validity (Kirk and Miller, 1986) must be addressed.

1.2.1 Sociodemographic Questionnaire Development

No questionnaire tailored for use with food bank users was available at the outset of the research, but this was recognized as the first necessity to document who uses food banks. McGinnis et al. (1990) noted that ongoing descriptions of nutrition conditions in a socioeconomic subgroup are important to analyze the effects of policies and programs. Individual interviews may address behaviours, descriptions of events, attitudes, beliefs, evaluative questions concerning how an informant feels about events and actions, and responses to communications (Merton et al., 1956; Sims, 1981), as well as reports of what people have perceived. Sociodemographic variables such as age, education, head of household, gender and responsibilities, income, etc. may be explored (Platek et al., 1985) as well as food intakes and preferences (Gibson, 1990). As stated earlier, the effectiveness of a survey requires the information to be relevant to decision-makers' understanding of

the problem (Habicht and Myers, 1991).

Each interview is a reflection of the personalities of the participant and the interviewer, and the ways they interact (Seidman, 1991). The relationship also reflects the purpose, structure and method used. The focus is on the subjective experience of each person in order to determine their definition of the situation. It is necessary to determine habits from the perspective that thoughts are related to actions. Techniques are described in depth by Gorden (1975) and include types of questions (essential, extra, throw away and probes), overall components (appointments, privacy, relationships, timing) and interviewer training; these are described by many authors (Berg, 1989; Bingham and Moore, 1959; Seidman, 1991). Interview stages range from explanation of the purpose, defining roles, defining the relationship, and opening questions to the body of the interview and closure.

The measurement of food insecurity at the household or individual level involves the measurement of quantitative, qualitative, psychological and sociological constructs that are central to the experience of food insecurity (Campbell, 1991). Monsen and Cheney (1988) noted that qualitative methods such as structured interviews and questionnaires may be used with subjects who have special characteristics to be explored. Risk factors for food insecurity are congruent with factors that affect household resources and the proportion available for food (money, health, number of people, food choice) (Campbell, 1991).

Principles well documented in ethnographic research (Pelto and Pelto, 1978) should be employed prior to question or format formulation. Techniques of participant observation (Burgess, 1982; FAO, 1995) and nonstructured, key informant interviews (Berg, 1989; Seidman, 1991) improve researcher understanding of the behaviour of the proposed study group.

1.2.2 Dietary Assessment

Medlin and Skinner (1988) summarize the refinement of dietary intake methodology over a fifty year period, from use of the dietary history technique and lengthy food records in the 1930s, and shorter-term food records and 24-hour recalls in the 1950s, to the introduction of the food frequency technique in the 1960s. In 1988, Cameron and Van Staveren produced a comprehensive Manual on Methodology for Food Consumption Studies; methods to assess recent or distant intake are reviewed. In the years since these reports, much has been written on the subject of dietary intake assessment. Both The American Journal of Clinical Nutrition (January 1994) and the Journal of Nutrition (November 1994) were devoted to the subject of dietary assessment.

Thompson and Byers (1994) provide a critical evaluation of common dietary assessment methods, briefly summarized here. Dietary records have the potential to provide quantitatively accurate information on food consumed but require subjects to be both motivated and literate. Also, recording food as it is eaten affects both the type and

quantity of food selected. Food frequencies and semi-quantitative food frequency questionnaires allow estimation of usual intake of a food or groups of foods. The major limitation of the food frequency method lies in quantification of intake and the appropriateness of the food list to the population studied. The classic diet history captures usual food intake (frequency and amount) as well as details about the foods themselves (eg., cooking method). This approach requires trained dietitians and may be difficult for many respondents. The 24-hour dietary recall is time efficient, does not require subject literacy, and, because of its immediacy to the recall period, is easy for most subjects to complete. One recall cannot characterize an individual's usual intake but, rather, is used to describe the average dietary intake of a group.

Thompson and Byers (1994) further state that 24 hour recalls are most commonly used in dietary surveys, allowing quantitative accuracy in estimating average daily food and nutrient intake. Morgan et al. (1987) found the most effective and least costly method for assessing mean intakes for groups was personal contact followed by nonconsecutive 24-hour recalls.

Many studies over the years have attempted to compare the various methodologies (Karvetti and Knuts, 1985; Mertz et al., 1991; Morgan et al., 1987; Suitor et al., 1989). Recently, Surrao et al. (1998) found good agreement between the food frequency, 7-day record and 24-hour recall methods for total energy expenditure data when using food quotients for protein, fat, carbohydrate and alcohol derived from these methods.

Intra-subject variation is minimized by increasing the number of recalls and large sample size counteracts the effect of inter-subject variation on group mean nutrient intake (Willett, 1990).

To summarize, a single or small number of 24-hour recalls is an accepted method for assessing the mean intakes of foods and nutrients for large groups (Block, 1982; Willett, 1990). One recall is not accurate at the level of the individual (Karvetti and Knuts, 1985; Wotecki, 1985). Johnson et al. (1996), using the doubly labeled water method, found that three days of "multiple-pass 24-hour recalls were sufficient to make valid group estimates of energy intake". The multiple-pass technique emphasizes 3 steps: a quick listing of intake, then detailed descriptions, followed by an intake review. With multiple recalls, food patterns associated with inadequate nutrient intake can be identified as well as the proportion of the sample "at risk" for inadequate intake (Bingham et al., 1988; Cypel and Slesinski, 1994).

Gibson (1990) specifically addresses reliability and validity in dietary techniques; a concise summary of accuracy, validity and precision concerns in dietary interviews, including comparative methods, is also provided by Cameron and Van Staveren (1988). Wheeler and Buzzard (1994) stress that the usefulness of dietary data in epidemiologic studies depends on an understanding of the procedures used. The checklist they provide for reporting dietary intake methodology, augmented by that of The United Nations University (1994), provides the basis for the following descriptions, and important issues

raised by these authors are described in the context of the present research.

Cassidy (1994) called the 24-hour recall a culturally sensitive tool because it is respondent driven; the client has the power to decide how fully to participate. Yet validity of repeat 24-hour recalls could be in question since subjects would come to know that the recall reflects the previous day. There could be bias in reporting if subjects wanted to give a certain view. Karvetti and Knuts (1985) noted that 24-hour recalls with the 35 - 44 year old age group were the most valid. Validity has not been tested with food bank users, however, there was no reason to believe that false information would be given to skilled dietitian-interviewers.

Underreporting is another concern in dietary intake studies that rely on recollections or personal records of intake. A 1991 study found only 11% of participants accurate within 100 kilocalories when energy intake estimated by 7-day food records was compared with intake determined necessary to maintain body weight. Subjects who reported the highest food intake were closer to their maintenance energy needs (Mertz et al., 1991). Bingham (1991) notes that the repeatability of 24-hour recall results on a group basis is generally good and thus the technique is appropriate for measuring current diet in groups of subjects. Using two non-consecutive days of 24-hour recalls completed by subjects trained in portion size estimation, Howat et al. (1994) found no difference in mean energy or macronutrient intake by group.

Johnson et al. (1996), using repeated, non-consecutive 24-hour recalls with children accompanied by their parents, found that, on a group basis, the dietary method accurately estimated the energy expenditure of the children as determined by the doubly labeled water technique. Repeated 24-hour recalls may also be used to provide information on an individual basis. As early as 1971, Balogh et al. reported that repeated 24-hour recalls are valuable to classify individual dietary intakes, particularly for populations and nutrients where the range of variability is not extreme. Specific consideration must be given to the number of days od data required for different nutrients (Beaton, 1994; Beaton et al., 1983).

Johnson et al. (1998), in a study of low-income women, and again using 24-hour recalls, found that the risk of underreporting increases with body fatness but also that underreporting diminishes as reading and spelling scores improve. The authors hypothesize that subjects with higher scores "were simply more aware of what they were eating" and recommend that improbable intakes be identified using cutoff limits for energy intake (below which normal lifestyle is unlikely), for example, by methods such as proposed by Goldberg et al. (1991). Ideally, energy data would be validated by doubly labelled water technique, excreta collection or direct observation in a controlled research environment (Howat et al., 1994; Mertz, 1992).

It has been established that memory performance deteriorates as retention interval is increased (Smith et al., 1991). Memory is based on cognitive processes. Episodic

memory, which relies on particular memories about eating or drinking, is improved by cues and probes, demonstrating that well trained interviewers are crucial (Dwyer et al., 1987; Thompson et al., 1994).

As early as 1953, there was evidence that error in estimation of portion size was a large part of the error in dietary assessment studies (Young et al., 1953). Efforts to minimize error include interviewing by trained, professional dietitians and the use of food portion models. A Canadian study showed that three-dimensional models that are recognizable to subjects "are at least as accurate" as food replicas and abstract shapes (Kirkcaldy-Hargreaves et al., 1980). Posner et al. (1992) demonstrated that two- and three-dimensional food models produced similar intake results. Even so, Wein et al. (1990) noted that solid foods were easier to estimate than soups, beverages, or amorphous foods.

Validity, then, must be reviewed in the context of the inferences to be drawn from the research. Block (1982) wrote that self reports may sometimes be the only reasonale sources of information, and that while specific quantitative standards do need precisiion and accuracy, many diet relationship studies are successful in placing individuals into categories along the distribution of intake.

1.3 Direction and Overall Rationale

The challenges facing food insecure people have been explored (Aitken, 1994; Campbell, 1991; Clancy et al., 1991; Johnson et al., 1981) and efforts toward sensitization of allied health professionals and the public have been documented (Amer Diet Assoc, 1990; Brownridge, 1990; Can Diet Assoc, 1991; Davis et al., 1991; Jacobs Starkey et al., 1995). The US government has recently begun to include questions concerning food security in census surveys (Vozenilek, 1998). Canada too has committed to actions such that all people will at all times have access to sufficient food to meet their dietary needs for a healthy life (Agr and Agri-Food Canada, 1996). While the will to address the growing phenomenon of food insecurity appears to be present, data on who is affected, and how, are limited.

Participant-observer integration into the research milieu (Burgess, 1982) coupled with sensitivity and methodological rigor (Patton, 1990) are key elements in qualitative inquiry, an important first step to further understanding of food insecurity. Investigation of the concern for food and nutrient intake sufficiency requires cultural sensitivity (Cassidy, 1994) and quantitative accuracy (Bingham et al., 1988; Johnson et al., 1996; 1998; Willett, 1990).

Investigating the feasibility of sociodemographic and dietary inquiry among groups generally thought to be food insecure, such as soup kitchen and food bank clientele was a

logical first step to the research. This was followed with a study of food bank provision recipients using a structured questionnaire and multiple 24-hour recalls to assess nutrient and food group intakes. This portion of the research was implemented with trained interviewers and food intake memory aids.

CHAPTER 2.

PRELIMINARY STUDIES

Integration into the food assistance milieu was a personal commitment, and allowed background work for this research in two broad areas: familiarization with the potential study population and the community agencies which offer food assistance, and increased understanding and documentation of the nature of urban emergency food assistance.

Soup Kitchens in Urban Areas: Food Utilization and Nutrition Improvement (1991)

The increasing number of homeless people is one indication of people living substantially below the low-income cutoff level. This group was cautiously estimated to be between 20,000 and 40,000 people in Canada, including women, young people, families and deinstitutionalized psychiatric patients (McLaughlin, 1987). A US study described a similar profile of soup kitchen meal recipients: 40% were women; average age of all recipients was 43.6 years; 20% were employed; 11% of the unemployed were raising a family; and 93% had household income levels below the poverty level. Soup kitchen meals contributed 3.2-4.7 meals per week over extended periods of 17-23 months (Rauschenbach et al., 1990). For those who cannot afford to buy food for themselves or their families, dependence on soup kitchens is a reality.

From discussions with staff at the Montreal Harvest central food bank and the Good Shepherd Community Center, their concern about feeding people via soup kitchen meals

was clarified, opening the door to participant observation in the soup kitchen milieu. The food bank was concerned to know what use was made of the food they distributed; the community agency wanted to optimize the use of food received and decrease soup kitchen meal costs. My goal was to assess the likelihood of including soup kitchen meal clientele in the study definition of "food assistance program participants".

A proposal was developed to improve the use of, and decrease waste from, food supplied to the community agency by the food bank, as well as to increase the nutritional quality of the soup kitchen meals. Secondary objectives were: to train agency staff and volunteers in safe food handling and nutritious low-cost meal preparation; to increase the use of seasonal surpluses in soup recipes; and to develop a recipe booklet to be distributed to soup kitchens, pantries and shelters served by the central food bank.

The number of noon meal recipients served at the community center averaged 20/day; age range of clients was 21-77 y, with a mean age of 53.4 years. During this participant observation period, all but three clients were Canadian; there were equal numbers of English and French-speaking clients served. Fifteen 24-hour dietary recall interviews were conducted on one day (9 men and 6 women) to assess the practicality of using this recall technique in the soup kitchen environment and to assess the contribution of soup kitchen meals to clients' nutrient intake (chart follows). The information collected from this small sample was not unlike that reported by Lenhart and Read (1989) in a US study. They found 68% of the emergency food recipients with low intakes of calcium and thiamin.

Nutrients	% Nutrient recommendations met on previous day		% Nutrient recommendations provided by soup meal	
	Men	Women	Men	Women
Energy	76.1	88.6	26.5	28.4
Protein	134.3	131.2	45.2	54.9
Thiamin	97.1	148.6	38.6	51.0
Calcium	119.1	93.8	22.4	32.3
Zinc	115.1	118.3	35.6	31.3

Further, lunch time discussions with meal clients revealed that participants accessed more than one meal program throughout the day and often rotated among meal sites throughout the week. Agency staff remarked that some clients were 'regulars' but many meal recipients varied week-by-week. Many clients claimed to have no fixed address; a number were unable to participate in an interview due to attention deficit. It was concluded that soup kitchen clients' food and nutrient intake could be largely a function of the agency/agencies, versus a personal food coping strategy; second, it was determined that it would be difficult to meet with the clientele a second or third time, as follow-up.

Volunteer staff instruction at the community center was conducted on topics of safe food handling, use of hairnets, product dating, and principles of balanced meals. Food staples for the soup kitchen stores area were defined, partitioned into those items usually supplied by the food bank and those to be purchased. Soup recipes were recorded, costed and analyzed for nutrient content; foods to prepare meal complements and one-third of the daily recommended nutrient intake were determined. New soup recipes were introduced to prepare for fall vegetable surpluses. And finally, a recipe booklet (30 pages) was

produced: **Soups from Surplus/Soupes Saisonnieres** (Appendix I, exerpt). This resource was distributed by Montreal Harvest to their other member agencies (Jacobs Starkey and Duquette, 1992); the resource was reprinted in 1994 under the responsibility of Montreal Harvest.

The collaborative experience over the period of this work (January - December 1991) provided valuable linkages between the candidate, the community agencies and the people they serve.

An Evaluation of Emergency Food Provisions (1991-93)

In 1991, reliance on emergency food support in the Montreal area was apparent from line-ups at food assistance sites and from media attention, but no data were available on the food group and nutrient content of the emergency food bags provided. Friedman (1991) suggested that agencies need, and dietitians can provide, an evaluation of the food supplies offered along with guidelines on other foods needed for the recipient clientele. With repeated use of emergency food aid a reality in many Canadian cities (Oderkirk, 1992a; Tarasuk and Maclean, 1990b), the food and nutrients offered required evaluation.

The objective of this preliminary study was to document the food group and nutrient content of emergency food bags provided by a large community service organization. At

the same time prolonged participation by the researcher within the organization would allow better understanding of the milieu, the restraints to programs, and the stresses and coping strategies of staff, volunteers and clients. In-depth understanding of recipient registration procedures would allow preliminary design of a tool to measure sociodemographic characteristics of food bank users.

The community service elements were: to provide feedback on the food group and nutrient content of emergency food supplies offered to clients, with an end toward improving the use of limited resources to best meet client needs; to organize the food store room according to food groups and to develop a protocol for food bag packing according to the food groups of Canada's Food Guide to Healthy Eating (CFGHE) (Health and Welfare Canada, 1992); and to educate staff to recognize safe product dating limits.

Twenty-five emergency food bags were examined over a six-month period (Jacobs Starkey, 1994a; Jacobs Starkey, 1994b; Jacobs Starkey et al., 1995) (Appendix II). Briefly, randomly selected food bags were assessed for contribution to the food groups of Canada's Food Guide to Healthy Eating (CFGHE) (Health and Welfare Canada, 1992) and energy and nutrient provision. Daily CFGHE recommended servings were met for the Grain Products group, were highly variable for Vegetables & Fruit and Meat & Alternatives, and were below recommended levels for Milk Products. Nutrient provision data paralleled food group data with calcium, Vitamin D and Vitamin A most often below

recommended levels (Recommended Nutrient Intakes (RNI)) (Murray and Beare-Rogers, 1990). This work was the first published description of Canadian food bank provisions.

Food bank staff and volunteers received information for re-organizing the food bank and detailed standards for food bag contents (resources allowing) (Jacobs Starkey and Lindhorst, 1996) (Appendix III). During this phase, food and socioeconomic issues raised by clients and staff were explored, methods for food bag sampling and analysis were pretested, and the food security household questionnaire was developed and pretested.

An Inventory of Existing Food Aid Resources In the South-West Region (1993)

The primary goal in undertaking this project related to the thesis research need for a census of food assistance programs in Montreal; these had not previously been documented in a coordinated way. The communities in the south-west region of Montreal form part of the S-shaped band of poverty documented in 1989 (Mayer-Renaud and Renaud, 1989). The agencies, for their part, wanted a better understanding of the food related support available in their low-income communities. A mutually beneficial project to assess the nutrition-related activities of community organizations was requested of the candidate, through an existing McGill-Community coalition. A secondary goal was to continue to integrate into the administrative/management arena of the low-income milieu to better understand the multiple roles of the agencies in helping the poor, and to assess

the variability of food provision through the various agencies.

Over the five months of this project (December 1992-April 1993) it became clear that most agencies require some form of registration by food recipients, so it is unlikely that community members would participate in all available food programs; clients were familiar with the need to register to share the food resources available.

It was learned that local organizations prefer to "help their own" though clients from another community are not turned away. Food provision tends to be direct to the client and may be measured, whereas nutrition education/information is indirect and program specific. The variety of food aid approaches could be divided into categories: food bags/dépannage; food coupons; community meal programs; soup kitchens; meals on wheels; and snack programs. The largest number of people are served by the food bag programs: the number of 'families' served per week was 65, 230, 550 and1000 in Ville Emard, St-Henri, Little Burgundy and Pointe St-Charles, respectively. It also became apparent that it would be very difficult to make a complete inventory of all food bag programs on the island of Montreal, as word-of-mouth is how one most often learns of newly opened or closed food support sites.

As a service to the community, a resource book was compiled (Jacobs Starkey; Appendix IV). The 'Bottin' describes the communities and their food aid agencies and programs, and lists and compares specific food programs. The resource, **Bottin des resources**

communautaires en alimentation dans le Sud-Ouest de Montreal, was presented at the Forum sur alimentation dans le Sud-Ouest in Saint-Henri, April 15, 1993.

Preliminary Studies Summary

The three preliminary studies were crucial to build trust in the low-income milieu, at both the organizational and personal levels, for this work and the researcher. Rutishauser (1988) states that liaison between the community agency and research staff should begin well before the actual research. Based on these experiences, the study area was defined (the island of Montreal), the agencies of interest were identified (served by Montreal Harvest; primary agency goal as food bag provision), and the study population was profiled (adult recipients of food bag provisions, of known address (versus homeless), within two bus transfers of the local food bank used). The specific goals and objectives of the thesis research were then defined.

CHAPTER 3.

INTRODUCTION AND DESIGN

The International Conference on Nutrition generated two priority themes relevant to food assistance programs and nutrition: 1) assessing, analyzing and monitoring nutrition situations; and 2) improving household food security (FAO, 1995). Study of the food and nutrient intake patterns of low income groups is important. Assessment of the problem, intervention, or problem prevention may have significant effects on health, quality of life, family economy, and therefore the provincial and national economy.

3.1 Research Goal

The goal of this research was to examine who uses Montreal urban area food banks, to assess if they are nutritionally vulnerable, and to determine if their nutrient intake adequacy differs during several weeks of the month when cash availability varies.

Specific Objectives

1. To develop and implement a methodology to describe the socioeconomic, demographic, and cultural characteristics of individuals seeking food assistance, including timing of emergency food provision related to monthly income, relative to the Canadian population ie., who uses food banks and who uses food banks

earliest in the income month?

2. To assess the food group and nutrient intake of individuals on the day prior to seeking food assistance, and compare intake levels of this group to national dietary intake recommendations. Questions to be addressed include: How low does food and nutrient intake go prior to going to food banks? Do food bank users meet dietary recommendations on the day prior to seeking food assistance?

3. To define the percentage of recommended food and nutrient intake achieved week-by-week over a one month period, beginning from the week when food assistance is received, and to compare these intakes to recommendations. Is there any change in dietary status over the income month? When is intake highest? lowest? or is it constant?

4. To investigate the relationship between overall intake of nutrients and possible correlates of intake. Who has the lowest or highest nutrient intake?

The study protocol was approved by the Ethics Committee at McGill University.

3.2 Time Frame

While food intake of US families receiving social assistance was seen to decrease as the month progressed (Emmons, 1986; Taren et al., 1990), no Canadian data are available. Therefore food assistance program participants were surveyed four times over a one-month period, at weekly intervals, from the time food assistance was received. This approach provided a snapshot of dietary status week-by-week, over a period of changing financial status (ie., when social assistance or family allowance benefits were received, more funds were available than at the end of the month).

Table 3.2. Sample Scenario for Entering the Study: Possible Examples

	Weeks of the study						
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Person 1	Receives social assistance cheque	.....	Food assist-ance visit	.....	Receives social assistance cheque	.....	
			Interview 1	Interview 2	Interview 3	Interview 4	
Person 2	Receives social assistance cheque Food assist-ance visit						
	Interview 1	Interview 2	Interview 3	Interview 4			
Person 3	Receives social assistance cheque	.....	.....	Food assist-ance visit	Receives social assistance cheque		
				Interview 1	Interview 2	Interview 3	Interview 4

In other words, subjects could enter the study at any time during their income month. The study began with enrollment of the clients at the food assistance site. Clients were then

interviewed weekly, for a total of four contacts.

Winter was selected as the season of interest as it was considered a time of highest costs, given the need for additional clothing and heat, higher produce costs, and non-availability of community gardens. The winter months, therefore, offered greatest risk to food intake due to other demands on a household or individual budget.

3.3 Study Population and Sampling

There is one central food bank on the island of Montreal which, at the time of the pre-study census, provided food to 167 community agencies. A pilot project with this central food bank and the local food bank it supplied (Jacobs Starkey and Duquette, 1992) had developed trust and collaboration, such that the census forms were made available to the present research. Agency registration forms were screened to determine which sites listed food distribution to clients as a principal activity.

Thirty-nine (39) organizations did not provide food bags at all, but used the food bank supplies for meal preparation only. Sixty-five (65) agencies receiving food from the central food bank gave out food bags only as an adjunct to other programs. These centers, not retained for the study, included 18 congregate meal sites, 31 shelters, 13 training centers, one itinerant depot and two camps. Sixty-three (63) local food banks who listed distribution of food bags directly to clients among their primary purposes were identified.

It was these local agencies that were defined as "food assistance sites" or "food banks" for the purposes of this research. One was later deleted from the list because it was found to be off-island (ie., beyond the geographic boundaries of the study); five others were not retained as their clientele did not meet the inclusion criteria of the study (eg., served only itinerant clients or minors).

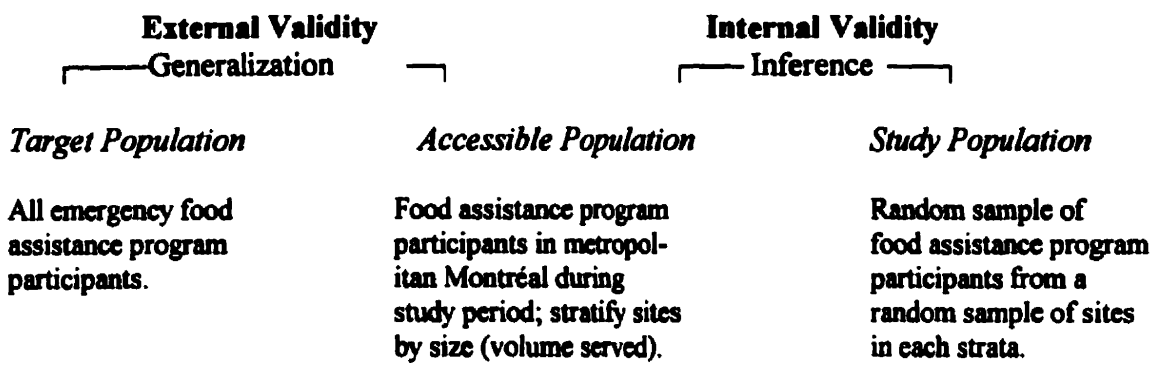

Figure 3.3 Sampling framework

Sampling Methods

3.3.1 *Sample Size*

Sample size calculations were based on testing the associations between food intake and weeks of the month. This was considered a two-tailed test (alpha = 0.05, Z = 1.96; beta = 0.2., power = 80%) with standardized effect size of 0.20 and calculated n = 393. The standardized effect size was computed as the expected effect size divided by the standard deviation of the outcome variable. This sample size was determined for energy, which has

high variability between individuals and a coefficient of variation of up to 47%. A factor of 10% was added for drop-out coverage, for a final n = 432. Preliminary inquiries had shown that it would be possible to enrol both individuals living alone and individuals in families.

From the census of eligible food assistance sites (n=57) , a stratified random sample of sites was selected. As pointed out by Dawson-Saunders and Trapp (1990), "a stratified random sample is one in which the population is first divided into relevant strata, and a random sample is then selected from each stratum." Babbie (1989) states that "to the extent that the subsets are homogeneous on the stratification variables, they may be homogeneous on other variables as well." The function of this stratification was to organize the food assistance sites into homogeneous subsets based on size, and to select an appropriate number of sites from each stratum. The sites themselves differed in their physical character and it was possible that different people would frequent larger, anonymous sites versus the small food banks close to their homes, where volunteer workers tend to know 'the regulars'.

The 57 food assistance sites were sorted into strata using the number of clients served as the indicator of size (Figure 3.1, Appendix V). Then the number of sites from each stratum was selected; each food assistance site was given a chance of selection proportionate to its representation of food depots of that size (Figure 3.2, Appendix VI). For example, the 21 small food banks represented 36.8% of the eligible sites, therefore 8

small sites were needed. The number of clients per site was based on the percent of people served by each stratum: 4.6% small, 20.6 % medium, and 74.8% between large and very large sites. Therefore, from the 8 small sites a total of 19.8 (20) participants was needed, 2.5 people per site (which was rounded to three for a total of 24 people from 8 small sites). In all, twenty of 57 eligible sites were required for a total of 432 clients from small, medium, large and very large food assistance sites. With rounding of decimals, the numbers in the actual sample were slightly higher (440 vs 432) (Table 3.3).

Table 3.3 Sampling Scheme for Selection of Food Assistance Sites

Site Strata	No. Clients/ Month	No. Sites	% of Food Depots	No. Sites Selected	% of Clients (n)
Small	≤100	21	36.8	8	5.5 (24)
Medium	>100-499	20	35.1	7	20.7 (91)
Large	≥500<999	7	12.3	2	18.6 (82)
Very Large	≥1000	9	15.8	3	55.2 (243)
Total		57	100	20	100 (440)

3.4 Site Enrollment

Food assistance sites within each stratum were numbered and a table of random numbers

(Armitage and Berry, 1987) was used to select each site to be contacted for participation in the study. Initial contact was by telephone, using a prepared script to assure uniformity of approach.

Response rate was high (87%). One site could not be reached after repeated efforts. Reasons for refusal by three food banks were elicited. The small sites stated : 1) would only agree if the study could be advertized with posters and clients would sign up (therefore random sample of clients not possible) ; and 2) "people are poor and don't want to be studied". A medium-sized site had a "bad" experience as a result of a newspaper visit and stated reluctance to "put our people through that again".

Table 3.4 Site enrollment

	No. Needed	Number Contacted			Total	% Enrolled
		Yes	No	Not Reached		
Small	8	8	2	1	11	72.7
Medium	7	7	1		8	87.5
Large	2	2			2	100
Very Large	3	3			3	100

Upon completion of the study, all sites were notified of the number of clients who completed all interviews, and agency staff were thanked for their hospitality toward the dietitian-interviewers and researcher.

Inclusion Criteria

To facilitate follow-up, it was decided to enrol adults (≥18 years) from a household of known address, within two bus transfers of the food assistance site. A subjective assessment of ability to participate in the interview process (to maintain 20 - 60 minutes of contact on a topic) was made at the time of enrollment because of the mental health problems of some of the clientele. Languages were limited to English or French unless an interpreter was available in the household. Proof of income status through cheque receipts for salary, social assistance, pension, etc. was found, during the pilot study, to be a customary document for food assistance recipients to bring to the food depot for proof of family size or address. This served to spot check replies to income or family data questions, for example.

Attrition

Data on expected response rate were not available at the outset of the study. Experience during development of the study instruments (questionnaire and dietary recall form) indicated that initial contacts were usually successful; clients were curious. Enrolled clients who left the study were replaced by random selection of a new participant at the same site.

Client Enrollment

The number of clients to enrol at each confirmed site was provided to the dietitian-interviewers during the training period. A random number generated by the interviewer each sampling day was used to designate the first client to be interviewed; after that interview was completed, at small and medium-sized food banks, the interviewer approached the person then at the head of the line. At large food banks, the person with the registration number closest to the next random number drawn was next invited to participate. Use of a form to record refusals was implemented, allowing calculation of the percentage of eligible food assistance clients initially approached who did or did not agree to participate in the study (Appendix VII: household number enrollment form). It has been reported that nonresponders are different from responders (Margetts and Nelson, 1991). At each participating site, clients who agreed to participate in the study were read, and then signed, a consent form (Appendix VIII). They were assured that all information was confidential and that their name would not appear in combination with any personal dietary or household data. Further, clients were advised that they would be paid $25 upon completion of the last interview. Newly enrolled subjects were registered on a "respondent" form (Appendix IX); this information was necessary to enable follow-up visits with the dietitian-interviewer and/or future appointment reminders.

Interview Protocol/Sequence

Once enrolled, food assistance program participants completed a structured questionnaire

and initial 24-hour dietary recall interview with the dietitian-interviewer. Most initial interviews were conducted on a week-day as food banks tended not to be open on the weekend. Clients were interviewed weekly thereafter at home, or other convenient location, to complete three more 24-hour recalls. Each person who completed the study was interviewed a total of four times.

This measurement sequence allowed assessment of socioeconomic and demographic characteristics at the first visit, the pattern of food and nutrient intake over the month, and food intake determination during the highest and lowest income weeks of the months. Use of a second or subsequent food assistance program was recorded.

3.5 Instrument Development

3.5.1 Food Security Household Questionnaire

The food security household questionnaire for this reaserch was conceived to provide a systematic method of gathering demographic information, indicators of restraints to dietary intake adequacy, and food security determinants. Briefly, over the summer months at a soup kitchen and throughout the winter season at one large food bank, issues related to food security that were discussed most frequently were noted. Semistructured interviews with staff at the food assistance sites provided informal triangulation to validate the importance of points deemed relevant to the study. Questions to determine attitudes and beliefs of food assistance participants relative to food seeking behaviour were

suggested.

A face-to-face interviewer-assisted format was planned, to compensate for possible reading level differences in the study population. The questionnaire layout and five previously tested questions related to country of origin, civil status and education were adopted from Mailhot et al. (1994). Further questions were devised to address household characteristics (sociodemographic status, food sources and food shopping practices) and beliefs about food availability, seeking food aid, food gifting, type of assistance most needed, and food coping strategies. These questions would complement inquiries regarding health status, expenses and income. At all times, respondent burden was considered; the household questionnaire was to be implemented at the same interview as the first 24-hour dietary recall, therefore brevity was an issue.

The use of nominal scale (closed) questions required careful development of response categories to make sure the choices were exhaustive and mutually exclusive. Ordinal scale questions were developed to provide, for example, frequency data on food assistance program use; intervals were used to quantify expenses.

Sensitivity of questions, language level, epidemiological flaws and content were reviewed by a research assistant trained in epidemiology, two community-based dietitians, two food depot directors, two food depot volunteers and a food bank communications coordinator. Results from a survey must be believable to the users of the information; the first level of

validity is face validity, and end "user" review is essential at the planning stage (Habicht and Myers, 1991). While repetition of some concepts was noted, seemingly similar questions were retained to serve as a cross-check of response consistency.

Pretesting of the draft questionnaire with 141 food assistance clients (during preliminary work) led to deletion of two questions with no variability in response, and selection of coding method for country of origin and health status data. The deleted items questioned participation in community gardens and collective kitchens; clients did not access these programs. Revisions were again reviewed, as recommended by Del Greco and Walop (1987). The final questionnaire contained 27 main questions and 10 sub-questions (Appendix X).

To ensure a consistent message with both the English and French questionnaires, back-translation was performed; the translated French version (Appendix Xa) was retranslated into English by a person unfamiliar with the original questionnaire. Comparison of the original and back-translated version showed minor differences which would not affect the interpretation of the questions (for example: sex vs gender; respondent vs interviewee).

The revised questionnaire was pretested with 12 food assistance clients (7 male, 5 female; 9 Canadian, 3 other; 4 English, 6 French, 2 other primary language). Respondents were asked "Were there any questions you found irritating? Were there questions where your

best answer was not provided as a choice? Were there any questions that used words that seemed strange to you?" Questions requiring further modification were identified, for example, "bien-être" was reworded to "l'aide sociale/bien-être". Mean interview time was 14.3 minutes for French respondents and 12.3 minutes when using the English questionnaire.

3.5.2 Dietary Assessment

An in-person 24-hour recall was conducted weekly with each client who accepted to participate in the study. As described by Gibson (1990) "exact food intake during the previous 24-hour period or preceding day" was recorded (Appendix XI). Information on smoking, intake of nutrient supplements, and use of food assistance each week was also obtained. The initial and the three subsequent recalls in this study would provide data for the group average for usual intake at each point in time relative to time of the income-month. And, since each subject participated in a total of four weekly 24-hour recalls, an income-week pattern associated with low nutrient intake could be identified.

All days of the week were to be represented in the dietary data. Therefore the dietitian-interviewers scheduled the second and subsequent interviews on a different day from the enrolment interview. Weekend intake was represented by 12% of the 24-hour recall interviews, Monday by 20.6%, Tuesday 23.4%, Wednesday 25.5%, and Thursday 17.8%. Friday was least well represented at less than 1% of interviews; clients did not accept

Saturday appointments. Beaton et al. (1979) found consistent day-of-the-week effects on nutrient intake of females, though the effect was not found when nutrient concentrations (% protein, fat and carbohydrate) were studied. As the preliminary work showed that most food bank clients were neither working nor attending school, similar day-of-the-week effects were not expected to be operating in the study population.

All dietary interviews were facilitated with the use of graduated portion models, including a dinner plate, glass, mug, bowls, spoons and 15 centimeter ruler (Appendix XII). It was reasoned that the use of portion models would be less suggestive of foods than replicas and would allow food assistance clients to exercise greater objectivity in recall, and that food preparation method (chunk, shredded) would be best captured with portion estimates (Lucas et al., 1995).

3.6 Interviewer Training

In order to implement the protocol with all sites and subjects within a given time frame, eight interviewers were required. Ten bilingual (English and French) dietitians participated in a seven hour training session held one week prior to the beginning of the research (Appendix XIII). From this group, eight dietitians were selected as the study interviewers and two were named as trained substitutes. A further two hour individual session was held with each of the eight dietitian-interviewers to assign food assistance sites (Appendix XIV) and to resolve specific issues arising from the training day.

Each interviewer was responsible for collecting data from 55 subjects. Forms were checked on a weekly basis by the candidate, and random on-site visits provided spot-checks of procedures. "Well supervised studies following standardized procedures have not found any systematic interviewer effect" (Bingham et al., 1988). A final responsibility of the dietitian-interviewers was to inventory one randomly selected food bag at some time during the visit(s) to each food bank.

3.7 Data Coding and Management

Food Security Questionnaire

Food assistance recipients' responses to the questionnaire were coded by the dietitian who conducted the interview. The researcher checked every questionnaire for completeness and coding accuracy and, in addition, coded all questionnaires for country of origin (IARC, 1970) and related sub-questions. Health problems were also coded by the researcher based on five categories developed in the pilot study (Appendix XV). Body mass index was calculated from self-reported height-weight data. Data were entered into a LOTUS 2.3 (1991) spreadsheet and analysed for descriptive parameters.

Twenty-four Hour Dietary Recalls

Each 24-hour recall was also coded by the dietitian who conducted the interview. First,

food codes for use with The Food Processor (Version 5.03, ESHA Research, Salem, Oregon (1990)) a software package which contains the Canadian nutrient file data base and the Canadian Recommended Nutrient Intakes (RNI) (Murray and Beare-Rogers, 1990) were assigned. A 1992 version of this computer program was found to be appropriate for most of the nutrients of interest in the present research (Barr et al., 1994). Results for folate, zinc and magnesium would be cross-checked with the ESHA American food values database only if intakes were found to be >6% below recommended levels (the point at which it was determined by Barr et al. (1994) that the earlier Canadian data base may underestimate intake of these nutrients). In a study comparing eight dietary analysis programs, Lee, Nieman and Rainwater (1995) gave The Food Processor (Version 6.0) an excellent rating based on both the operating and the US database features; the authors noted that the Canadian database was available and that results could be compared to Canadian standards.

Secondly, the contribution of recalled foods to the food groups of Canada's Food Guide to Healthy Eating (Health and Welfare Canada, 1992) was determined using serving sizes provided in the Guide. Volume and dimensions were converted to gram weights, as needed, using grocery labels and Agriculture Handbook #456 (Adams, 1975). One egg, 75 g of meat, fish or poultry and 250 g of canned beans or other legumes were used in place of the ranges provided; for comparison with Santé Québec (1995) data, servings in the Meat and Alternatives group were re-calculated using 60 g for meat, fish or poultry,

200 g for canned beans or legumes and 50 versus 30 ml for peanut butter.

Food Bag Content Assessment

The contents of randomly selected and inventoried food bags were coded by the dietitian-interviewers, using the same food codes as for the 24-h recalls. The procedure developed in the preliminary study (Jacobs Starkey, 1994b) was implemented to determine food group and nutrient content of the food bags.

3.8 Data Analysis

To describe characteristics of individuals

Descriptive statistics were generated with SAS version 6.04 software (SAS Institute Inc., Cary, N.C.). As recommended by Emrich, Dennison and Dennison (1989) data were plotted to identify outliers or skew. General linear models procedures combined with Tukey's HSD (honestly significant difference) test as well as the chi square test of independence were used to test associations between nutrient intake and variables from the food security questionnaire.

To assess food group and nutrient intake

The percent contribution of protein, fat and carbohydrate to total energy was determined (mean of 4 recalls) and compared to the Nutrition Recommendations for Canadians (1990). General linear model (GLM) procedure followed by Tukey's multiple comparison test was used to determine mean energy and nutrient intake. Analysis of variance was used to compare mean intakes by age, gender and income-week (Hatcher and Stepanski, 1994).

To investigate the relationship between overall intake of nutrients and possible correlates of intake, continuous variables were analysed using bivariate correlation and multiple regression. Change in energy and nutrient intake (from income-week 1 to income-week 4) was divided into quintiles; the association of these quintiles with sociodemographic variables was assessed using the chi square test of independence. To assess whether greater day-to-day variability in energy intake was associated with different levels of intake of any of the micronutrients, the mean intakes per energy variability quintile were compared using analysis of variance. Differences at the level of $p<0.05$ were considered statistically significant. Statistics were generated using SAS/STAT 6.11 (SAS Institute Inc., Cary, N.C., 1995).

Recalls were also assessed for adequacy of food group representation, by comparison of actual intake to the recommendations in Canada's Food Guide to Healthy Eating

(CFGHE) (Health and Welfare Canada, 1992). Univariate analysis was used to determine mean number of servings from each food group, by age, gender, food bank size and income-week. Descriptive statistics were generated using SAS/STAT 6.11 (SAS Institute Inc., Cary, N.C., 1995). CFGHE intakes of food bank users were compared to the general Quebec population (Santé Québec, 1995).

To Describe Food Assistance Provided

Nutrient and food group provision in sample food bags randomly selected at each participating food assistance site was determined according to the methods tested and reported during preliminary work (Jacobs Starkey, 1994b) (Appendix II).

OVERVIEW OF RESULTS AND TRANSITION

From the stratified random sample of 20 Montreal food banks that enrolled in the study, 490 food assistance recipients consented to participate. Each participant, met first at the food bank, completed a dietitian-administered food security household questionnaire and a 24-hour dietary recall interview. Sixty percent of all food bank users approached agreed to participate; those who refused were largely adults (91%), with few seniors or teens noted by observation. Further sociodemographic data were not obtained from clients who refused to participate. Most initial interviews were conducted on week days, as few food banks were open on the weekend. Subsequent 24-hour recall interviews (n=3) were conducted on all days of the week, at the participants' home or another convenient location. All four interviews were completed by 428/490 food assistance program participants. Dropouts differed from clients who completed the study by age, household size, food shopping frequency and expenditure on smoking, and these differences are described beginning on page 98.

Nutrition and sociodemographic characteristics of food bank users, nutrient intakes and correlates of intake, and intakes compared to the Recommended Nutrient Intake (RNI) (Murray and Beare-Rogers, 1990) and Canada's Food Guide to Healthy Eating (CFGHE) (Health and Welfare Canada, 1992) are presented. Additional analyses complement published and submitted manuscripts and provide a logical transition between the three papers.

CHAPTER 4.

FOOD BANK USERS: SOCIODEMOGRAPHIC AND NUTRITIONAL CHARACTERISTICS

4.1 Transition

The preliminary work to determine sociodemographic and nutritional characteristics of food bank users was conducted at a single food assistance site (Jacobs Starkey, 1994b). In the following manuscript, adult clients from 20 study sites of both genders and all ages were invited to participate.

Realization of the first research objective is described: to develop and implement a methodology to describe the socioeconomic, demographic, and cultural characteristics of individuals seeking food assistance. The question "who uses food banks?" is answered.

Food Bank Users: Sociodemographic and Nutritional Characteristics*

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Food Bank Users: Sociodemographic and Nutritional Characteristics

Running Head: food banks and nutrient intake

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4.2 ABSTRACT

Background: The continued expansion of food assistance programs makes it important to examine the sociodemographic characteristics and nutritional profiles of people relying on this service. The authors undertook such a study in a large urban centre.

Methods: A total of 490 food bank users were randomly selected from a stratified random sample of 57 urban food banks in Montreal. A questionnaire and dietary recall interview were administered by a dietitian-interviewer to determine the socioeconomic, demographic and cultural characteristics and macronutrient intake. These data were compared with national and provincial data.

Results: The mean age of the participants (256 men and 234 women) was 41 years; 199 (40.6%) were living alone and most (409 [83.5%]) were receiving social assistance benefits. These food bank users were well educated (190 [38.8%] had completed technical school or had a college or university education), and the sample included few elderly or disabled people. The median body mass index was greater than 24 which indicated that energy intake, although below recommended levels, was not a chronic problem. People using the food banks had a monthly shortfall in their food budget of between $43 and $46.

Interpretation: Food banks are used regularly, primarily by young, healthy adults. They are thought of as a necessary community resource.

RESUME

Contexte: À cause de l'expansion continue des programmes d'aide alimentaire, il importe d'examiner les caractéristiques sociodémographiques et les profils nutritionnels des personnes qui comptent sur ces services. Les auteurs ont réalisé une telle étude dans une grande agglomération urbaine.

Méthodes: Au total, 490 utilisateurs de banques d'aliments ont été choisis au hasard dans un échantillon aléatoire stratifié de 57 banques d'aliments urbaines à Montréal. Une diététiste a administré un questionnaire et l'entrevue de rappel sur l'alimentation afin de déterminer les caractéristiques socio-économique, démographiques et culturelles et l'apport de macronutriments. On a comparé ces données à des données nationales et provinciales.

Résultats: Les participants (256 hommes et 234 femmes) avaient en moyenne 41 ans; 204 (41,6%) vivaient seuls et la plupart (409 [83,5%]) touchaient des prestations d'aide sociale. Ces clients des banques d'aliments étaient bien instruits (190 [38,8%] avaient terminé des études techniques ou avaient fait des études collégiales ou universitaire) et l'échantillon comprenait quelques personnes âgées ou handicapées. L'indice de masse corporelle médian dépassait 24, ce qui indiquait que l'apport d'énergie, malgré inférieur aux niveau recommandés, n'était pas un problème chronique. Il manquait de 43 à 46 $ par mois au budget d'alimentation des personnes qui utilisaient les banques d'aliments.

Interprétation: Les banques d'aliments sont utilisées régulièrement, principalement par les jeunes adultes en bonne santé. On les considère comme une ressource communautaire nécessaire.

ACKNOWLEDGEMENT

The trust and cooperation of participating food banks and the many food bank users we met formed the cornerstone of this project. Special thanks is extended to the dietitian-interviewers for their thoughtful and thorough work. Financial support was provided by the National Health Research Development Program, Health Canada, grant 6605-4092.

The overall health of a population is better when the gap between rich and poor is narrow ⟨1⟩. Unfortunately, recent Canadian data show that the mean income of men in the highest-earning quintile rose by 9%, whereas that of men in the lowest earning quintile declined by 4% over a 7-year period (1981-1988) ⟨2⟩. Rates of illness are higher among lower-income Canadians, they have fewer disability-free years, and they are more likely to have behaviour-related risk factors for disease ⟨3-7⟩. Rates of cancer and cardiovascular disease are higher in low socioeconomic groups ⟨8⟩, and survival after infection with HIV is shorter ⟨9⟩. Self- reported health status is also lower among the poor ⟨10-17⟩. One community resource that has been developed to address the income gap is food banks.

The term "food bank" is used collectively to include food depots, food pantries and other community-based food distribution sites. In Canada, food banks are non-profit organizations that collect food that would otherwise be discarded and transfer it to charitable food programs ⟨18⟩, collect food from the public for redistribution or use monetary donations to purchase food so as to give their users a more nutritious diet ⟨19-21⟩. Most of the food is in the form of groceries, and bags of food usually contain enough staples and perishables to last 1 to 3 days ⟨18⟩. A Toronto study of people receiving food assistance showed that 23% of those surveyed ran out of food each month, even though they were using food banks ⟨18⟩. Recent data from Montreal showed that the recommendations of "Canada's Food Guide to Healthy Eating" could not be met if food banks were the sole food source ⟨19⟩.

Food banks were established to respond to emergency food needs but have become a long-term food source for many families ⟨20-22⟩. Emmons ⟨23⟩ observed that the number of emergency food sources used increased as the month progressed. Information about people who require emergency food assistance is incomplete, because no large-scale, systematic sample of this population has been studied.

The goal of this study was to describe the socioeconomic, demographic and cultural characteristics of food bank users from a random sample of urban food banks in the Montreal area, and to assess the macronutrient intake of these people the day before they sought food assistance.

4.3 METHODS

Study Population and Sampling

On the island of Montreal one central food collection and distribution center provides emergency food to 167 community agencies. By screening all agency registration forms we determined that 57 agencies had as their primary purpose the provision of food bags directly to clients; other agencies served meals or distributed food only as part of other programs. These 57 food banks were classified according to number of clients served; small sites served fewer than 100 people per month (n=21), medium-sized sites between

100 and 499 per month (n=20) and large sites more than 499 per month (n=16). A stratified random sample of 20 food banks was selected to reflect the proportion of small, medium and large sites among these 57 agencies. When 3 of the 20 sites originally chosen refused to participate, 3 more were chosen randomly to replace them.

From clients at the 20 food banks, 490 people were randomly selected for our survey. The number of people sampled from small, medium and large sites was based on the proportion of total food bank clients served at different sizes of sites (of all clients using the 57 food banks, 4.6% were served at small sites, 20.6% at medium-sized sites and 74.8% at large sites). Thus, 27 people were selected from small sites, 96 from medium-sized sites and 367 from large sites. The survey was conducted in winter, when the cost of living is highest: heat and warm clothing add to survival costs, and fresh produce is more expensive than at other times of year.

Enrollment of participants

People 18 years of age or older who had a known address and lived within 2 bus transfers of the food bank were eligible to participate. Interviews were conducted in English or French, or in another language if an interpreter was available.

People were given a number when they entered the food bank or made an appointment, and numbers were randomly chosen to select study participants. The number of people

who refused to participate was recorded. Signed consent was obtained from the participants, and ethical approval was given by the Ethics Committee at McGill University and, where required, by the boards of the participating agencies.

Questionnaire

A dietitian administered the food security* questionnaire orally so that the reading level of the participants would not affect the survey results. Five previously validated questions concerning country of origin, years in Canada, status as a refugee or landed immigrant, marital status and education level were adopted from a survey by Mailhot and colleagues (25). Other questions were devised to determine the characteristics of the household (number of people usually fed, age and sex of household members), sources of food and food shopping practices, beliefs about food availability, feelings about seeking food aid or receiving food gifts, and coping strategies related to food. Questions were also formulated about health status and household income and expenses.

The language level and content of the questions were reviewed by an epidemiology research assistant, 2 community-based dietitians, 2 food depot directors, 2 food depot volunteers and a food bank communications coordinator. The English questionnaire was translated into French and back-translated into English to ensure that the versions were comparable.

* Food security is a condition in which all people at all times have access to safe, nutritionally adequate and personally acceptable foods in a manner that maintains human dignity (24).

The questionnaire was pretested with 141 food bank clients, revised and re-reviewed. To check the validity of the self-reported data, clients involved in the pretesting phase were occasionally asked to supply proof of income (source and amount) and expenses by providing cheque stubs and household receipts. Twelve additional food bank users tested the revised questionnaire for language complexity and suitability of words (eg., social assistance v. welfare). Their reaction to the content of the questionnaire was also considered. The final questionnaire consisted of 27 questions and 10 sub-questions.

Dietary assessment

A dietary recall interview was conducted, during which the dietitian-interviewer used 3-dimensional food portion models to determine what food each survey participant had consumed in the previous 24 hours. Information on the number of cigarettes smoked within that period, the intake of nutrient supplements and the use of other food assistance programs (eg., soup kitchens) was also obtained. Detailed dietary analyses will be reported elsewhere.

Data Analysis

Reported food intake was coded for nutrient analysis by the dietitian-interviewers, who used data from the Canadian Nutrient File (Food Processor Version 5.03, ESHA Research, Salem, Ore.). Descriptive statistics were generated with SAS 6.04 software

(SAS Institute Inc., Cary, NC). General linear models procedures combined with Tukey's HSD honestly significant difference) test as well as chi square tests were used to test associations between nutrient intake and each variable on the questionnaire.

4.4 RESULTS

Sixty percent of all clients approached (490/816) agreed to participate in the study (62.9% of the men and 57.2% of the women). Participation was highest at medium-sized food banks, where 66.7% of those approached agreed to participate; at large food banks 59.9% agreed and at small food banks 45.8% agreed. Most interviews were conducted during the week because many food banks were not open on the weekends.

The number of men and women was about equal (256 and 234 respectively). The mean age was 41 years for both men (SD 12.3) and women (SD 13.0); the overall range was 18 to 85. In total, 210 participants (42.8%) had been born in Canada. When we compared data from our sample with Quebec census data ⟨26-28⟩, we found that fewer food bank clients were married or living with a partner and more had been born outside Canada (Table 1). Almost half of the men who participated had completed technical school or had a college or university education (Table 1). There was no association between food bank size and age, sex, refugee status, marital status or education level of the users.

Most clients (371 [75.7%]) reported being in good health. However, the mean body mass index (BMI), calculated from self-reported height and weight, was 27 (SD 11); for men 26 (SD 9), for women 28 (SD 13), which exceeds the upper limit of the recommended healthy range ⟨29⟩. The median BMI for participants between 18 and 49 years of age was 24, whereas clients 50 years of age or older were heavier; in that age group the median BMI was 26 for men and 27 for women. For all ages, 61 (23.8%) of men and 73 (31.2%) of the women had a BMI greater than 27, whereas 6 (2.3%) of the men and 22 (9.4%) of women had a BMI of less than 20. Of the 126 people who reported health problems or conditions of some type, 52 (41.3%) reported physical problems such as backache, headache, and eye or ear problems, 44 (34.9%) reported medical conditions such as high blood pressure, diabetes mellitus, tuberculosis or cancer, 19 (15.1%) reported psychological problems, 9 (7.1%) reported concerns about their diet and 2 (1.6%) reported other problems.

The study participants represented 490 households in which a total of 1170 people were fed on a regular basis. Of these 1170 people, 356 (30.4%) were younger than 18 years of age, and about one-third of these children lived in single-parent households. Single-parent households with children under 18 accounted for 12.6% of the 490 households represented in our sample; half of these (6.5% of the total) had 1 child, a quarter (3.1%) had 2 children, and another quarter (3.0%) had more than two children. Of the 490 participants 204 (41.6%) were usually responsible for feeding only themselves and thus were assumed to live alone.

The mean number of people fed in each household every day was 2.4 (SD 1.5), which is similar to national data ⟨26⟩ and to results from a recent survey of francophones in Montreal ⟨27⟩. Eighty-eight (18.0%) of the respondents said they fed more people on weekends.

The principal source of income was social assistance benefits (Table 1). Very few participants (13 [2.6%]) were employed, and those that were had low incomes. The mean monthly household income of less than $900 (Table 2) was well below the low-income cutoff for family units of similar size ($1,816 for 2.5 people) ⟨28,30⟩. An alternative definition of low income is the expenditure of at least a certain percentage (56.2% at the time of our study) of income on food, shelter and clothing ⟨30⟩. On average, food, housing, heating and telephone costs absorbed more than 90% of the monthly income of food bank users in our sample. Telephone service alone was a major expense for many clients: 161 (32.8%) paid phone bills of at least $66 per month. Ghadirian and colleagues ⟨27⟩ reported that 29.6% of francophones surveyed in Montreal smoked, but a much larger proportion (240 [49.0%]) of the participants in our study did so; the mean number of cigarettes smoked per day by those who did smoke (20.2, SD 17.8) was the same as in the earlier study (20.2). In our sample, 116 (23.7%) people reported spending an average of $2.17 per week (SD $5.90) on alcohol. Information on debts or costs for services such as cable television was not obtained. Although women reported a higher total household income than men ($p<0.001$), they generally lived in households with more people and therefore the monthly income per person was lower ($p<0.001$).

The questionnaire assessed the reasons people sought food assistance (Table 3). The main reason, given by 417 people (85.1%), was insufficient money after paying other bills. A large proportion of participants (357 [72.8%]) said that they had enough food on hand for one more day. Although 222 (45.3%) would have delayed seeking food until the next day had the food bank been closed, 77 (15.7%) would have gone to another food bank and 126 (25.7%) would have sought relief from family; less than 1% would have stolen or simply gone to sleep to avoid the problem. Only 35 (13.7%) of the men and 37 (15.8%) of the women were first-time users of a food bank.

On the day before seeking food assistance, mean dietary intake of the macronutrients protein, fat and carbohydrate, as a percentage of energy intake, approximated health recommendations ⟨36⟩: the energy intake for men younger than 50 was 15.8% protein, 30.4% fat and 53.4% carbohydrates; for women younger than 50 it was 16.5% protein, 31.0% fat and 53.1% carbohydrate. The energy intake of participants 50 years of age and older was similar. Fat intake was lower than that reported by Ghadirian and colleagues ⟨27⟩ and by the Quebec nutrition survey ⟨28⟩.

The relation between the determinants of total energy intake and sociodemographic characteristics was investigated for men and women separately. No differences were found between the sexes for energy intake in relation to total household income, country of origin, education level or whether or not a person smoked.

4.5 INTERPRETATION

This study represents the first sociodemographic and nutritional characterization of a random sample of urban food bank users in Canada. We found that men and women were equally likely to use food banks and that food bank users were relatively young. Their main source of income was social assistance, which was inadequate to cover monthly expenses. BMI did not indicate undernutrition. In fact, there were no consistent predictors of low dietary intake to identify those most in need of food assistance.

An earlier study in Montreal ⟨19⟩ showed that the mean age of women who sought food for themselves and their families was 36 (SD 3.8) years; that of men in the same situation was 37 (SD 3.6) years. The mean age of all people receiving social assistance benefits in Quebec is 39.3 years ⟨31⟩. The large number of food bank users who are of working age raises concern about the stress that shrinking emergency food resources may experience in future. This observation also raises the question of why we did not see the low-income subgroups often thought to be associated with food bank use (eg., single parents, elderly people). In our study 12.6% of households were single-parent households with children under 18, whereas 18.2% of Quebec social assistance recipients live in family units headed by one parent ⟨31⟩. From this discrepancy we speculate that some single-parent families may be seeking food assistance from programs other than food banks, such as community meals or collective kitchens. The proportion of single men in our study (44.2%) was similar to the proportion of single Canadians whose income is below the low-income cutoff (43.6%).

When asked, 72 (14.7%) of study participants reported that the current visit was the first time they had ever used a food bank; 328 (67.0%) of participants reported weekly, biweekly or monthly food bank use. These data support the views expressed by clients that the food bank is a community service and a necessity rather than an embarrassment. In view of this perspective on the part of users, it may be inappropriate to refer to food banks as emergency food resources.

The proportion of older food bank users who were overweight has health implications, since these people may be at increased risk for chronic diseases. Almost 50% of the study group smoked, and smoking is a risk factor for heart disease and cancer ⟨29⟩.

The food bank users in this study were better educated than their peers in the general Quebec population. Almost half of the men in our study had completed technical school or had a college or university education. Significant correlations between education and the quality of diet have been previously documented ⟨32⟩.

Kinsey ⟨33⟩ reported that as income increases a smaller percentage is spent on food. In our study, men reported spending 29.4% and women 24.9% of household income on food. These values are higher than the 21.8% reported in other recent work ⟨34⟩ but are in line with national data (26.7%) ⟨1,26⟩. In terms of absolute dollars, food bank users spent $2.99 to $3.10 per person each day on food. The minimum food cost for an adequate diet during the winter has been estimated at $4.53 per day ⟨35⟩, which means that these food

bank users had a monthly shortfall of between $43.04 and $46.35. It is unlikely that the food banks can compensate for this shortage. Many of our respondents were long-term food bank users, and studies have found that emergency food supplies do not provide adequate food variety or nutrition (19,21,36).

4.6 CONCLUSION

The majority of food bank users in this study were not those usually thought to be the most vulnerable in terms of nutritional status (the very young, those with chronic health conditions and the elderly); rather, they were healthy single individuals. Our findings indicate that food banks serve mainly the non-working poor, are used regularly and are seen by clients as a necessary community resource.

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Table 4.1. Sociodemographic characteristics of food bank users in Montreal compared with the general population in Quebec

Characteristic	In Montreal (this study), no. (and %)						In Quebec,*
	Men		Women		Total		
	n = 256		n = 234		n = 490		%
Age, yr							
18-49	207	(80.8)	177	(75.6)	384	(78.4)	72.1
≥ 50	49	(19.1)	57	(24.4)	106	(21.6)	27.9
Region of birth							
Canada	108	(42.2)	102	(43.6)	210	(42.8)	90.4
Eastern Europe	62	(24.2)	34	(14.5)	96	(19.6)	-
South America	27	(10.5)	27	(11.5)	54	(11.0)	-
Africa or Arab states	28	(10.9)	14	(5.9)	42	(8.6)	-
Caribbean	10	(3.9)	42	(17.9)	52	(10.6)	-
Asia, India, other	21	(8.2)	15	(6.4)	36	(7.3)	-
Refugee status	50	(19.5)	29	(12.4)	79	(16.1)	-
Marital Status							
Single	113	(44.2)	86	(36.8)	199	(40.6)	23.4
Married or living with a partner	96	(37.5)	75	(32.0)	171	(34.9)	66.5
Separated, divorced, widowed	47	(18.4)	73	(31.2)	120	(24.5)	10.1
Body mass index†							
< 20	6	(2.3)	22	(9.4)	28	(5.7)	11.9
20-25	140	(54.7)	95	(40.6)	235	(48.0)	47.5
26-27	46	(18.0)	38	(16.2)	84	(17.1)	14.0
> 27	61	(23.8)	73	(31.2)	134	(27.3)	26.7
No data	3	(1.2)	6	(2.6)	9	(1.8)	0.0
Education							
Did not complete high school	77	(30.1)	103	(44.0)	180	(36.7)	40.5
Completed high school	53	(20.7)	67	(28.6)	120	(24.5)	35.7
Completed technical school, college or university	126	(49.2)	64	(27.4)	190	(38.8)	23.8

Characteristic	In Montreal (this study), no. (and %)						In Quebec,* %
	Men n = 256		Women n = 234		Total n = 490		
No. of people in household							
1	139	(54.3)	65	(27.8)	204	(41.6)	27.2
2	37	(14.4)	52	(22.2)	89	(18.2)	31.5
3	35	(13.7)	46	(19.6)	81	(16.5)	17.9
4	26	(10.2)	35	(15.0)	61	(12.4)	–‡
5	13	(5.1)	24	(10.2)	37	(7.6)	–‡
≥6	6	(2.3)	12	(5.1)	18	(3.7)	2.1
Primary source of household income							
Social assistance benefits	222	(86.7)	187	(79.9)	409	(83.5)	–§
Employment insurance	15	(5.8)	8	(3.4)	23	(4.7)	11.5
Seniors' pension	4	(1.6)	10	(4.3)	14	(2.8)	–§
Full-time employment	2	(0.8)	3	(1.3)	5	(1.0)	–¶
Part-time employment	1	(0.4)	7	(3.0)	8	(1.6)	–¶
Seasonal employment	2	(0.8)	0	(0.0)	2	(0.4)	–§
Other	4	(1.6)	11	(4.7)	15	(3.1)	10.3
None	6	(2.3)	8	(3.4)	14	(2.8)	–§

*Source: Quebec Nutrition Survey and census data. [34,35]

†Body mass index = weight (kg) ÷ [height (m)].[29] Based on self-reported weight and height.

‡Quebec data: 21.3% had 4 or 5 people per household.

§Included in "other" for Quebec data.

¶Quebec data: 78.2% had full-time or part-time employment.

Table 4.2. Income and expense profile of food bank users

Income or expense item	Men n = 256 Mean (and SD)		% of monthly income	Women n = 234 Mean (and SD)		% of monthly income
Monthly income, $						
Per household *	762	(326)	NA	866	(323)	NA
Per person *†	450	(191)	NA	391	(155)	NA
Monthly expenses per household, $						
Rent	353	(130)	46.3	388	(155)	44.8
Electricity	52	(46)	6.8	69	(55)	8.0
Gas or oil heating	39	(28)	5.1	64	(64)	7.4
Telephone	37	(28)	4.8	43	(25)	5.0
Food	224	(284)	29.4	216	(140)	24.9
Cigarettes	28	(40)	3.7	22	(39)	2.5

Note: SD = standard deviation, NA = not applicable.

*Significant difference between men and women ($p < 0.001$).

†Midpoint of monthly income per household ÷ number of people fed.

Table 4.3. Factors related to food bank use among survey participants.

	No. (and (%) of survey participants					
	Men		Women		Total	
Factor	**n = 256**		**n = 234**		**n = 490**	
Main reason for food bank visit						
Not enough or no food at home	81	(31.6)	90	(38.5)	171	(34.9)
To stretch food budget	73	(28.5)	69	(29.5)	142	(29.0)
Ran out of money for food	64	(25.0)	50	(21.4)	114	(23.3)
Other (e.g., excessive expenses, disaster)	38	(14.8)	25	(10.7)	63	(12.8)
Food on hand for one more day						
Yes	190	(74.2)	167	(71.4)	357	(72.8)
No	66	(25.8)	67	(28.6)	133	(27.1)
Perception of the food bank						
A community service	120	(46.9)	99	(42.3)	219	(44.7)
A necessity	104	(40.6)	116	(49.6)	220	(44.9)
An embarrassment	14	(5.5)	8	(3.4)	22	(4.5)
Other (e.g., big help, stop-gap measure)	18	(7.0)	11	(4.7)	29	(5.9)
Greatest impediment to getting food						
Not enough money after paying other bills	211	(82.4)	206	(88.0)	417	(85.1)
Food too expensive	18	(7.0)	14	(6.0)	32	(6.5)
Physical disability or illness	5	(2.0)	2	(0.8)	7	(1.4)
Other (e.g., store too far away, lack of time)	22	(8.6)	12	(5.1)	34	(6.9)
Frequency of food bank use						
Every week	53	(20.7)	58	(24.8)	111	(22.6)
Every 2-3 weeks	41	(16.0)	29	(12.4)	70	(14.3)
Once a month	80	(31.2)	67	(28.6)	147	(30.0)
Every 4-6 weeks	18	(7.0)	15	(6.4)	33	(6.7)
Only once before current visit	29	(11.3)	28	(12.0)	57	(11.6)
First time	35	(13.7)	37	(15.8)	72	(14.7)

Additional Analysis

Nutrient intake on the day prior to receiving food provisions

Food banks report their heaviest demand for assistance toward the end of each month (Riches, 1986). This is especially true for those food banks that respond to social agency referrals; food bank coordinators report that demand peaks when cheques have run out (Riches, 1986). No data were available on dietary status of food bank users when they presented themselves for food. Before investigating nutrient intake of food bank users over a whole month, it was important to understand intake on the day prior to seeking food assistance. The goal of this segment of the research was to assess the nutrient intake of food bank users the day before they presented for emergency food, and to compare intake levels to recommended intake levels and reported intakes of the general population.

Methods

An in-person 24-hour recall, using three-dimensional food portion models, was conducted by the dietitian-interviewer who enrolled the client. Reported food intakes were coded for nutrient analysis by the dietitian-interviewers, using data from the Canadian Nutrient File (Food Processor Version 5.03, ESHA Research, Salem Oregon). Entered data were cross-checked; energy levels below 500 kilocalories (2.1 MJ) or above 2000 kilocalories (8.4 MJ) led to a item-by-item check of each food code and food portion. Descriptive statistics were generated using SAS 6.04 (SAS Institute Inc., Cary, NC). General linear

models (GLM) procedures were used to determine mean energy and nutrient intake. Therefore dietary data from the 24-hour recalls that were conducted upon enrollment provided a picture of the nutrient intake of food bank users on the day prior to seeking food assistance.

Results and Discussion

Energy and nutrient intakes varied widely among food bank users, as evidenced by coefficients of variation for different nutrients (energy 52.6%; folate 105%; protein 63.2%; iron 69.4% and thiamin 76.9%). Coefficients of variation for these same nutrients in the low-income group within the Quebec nutrition survey are similar: 53.5%, 90%, 67.9%, 63.4% and 70.5%, respectively (Santé Québec, 1995). Variability was lower in the medium and upper-income groups in the Quebec survey. The high variability is due to five food assistance clients who reported not eating on the day surveyed, and 172 clients (35%) who reported consuming less than 1000 kilocalories (4.2 MJ) (yet only 6 men and 22 women had a BMI <20). The BMI category of 26-27 allowed interpretation of weight status of clients aged 50+ years. Due to the high variability, both median and mean nutrient intakes are reported (Table 4.4).

Mean intakes of calcium, for all age and sex groups, energy for men 18-49 years, zinc for men 18-49 and 50+ years, and energy intake of women ≤ age 49 y, were below recommended intake levels (RNI). The mean intake of all other nutrients assessed met the RNI. Median intakes of energy, vitamin A, calcium and zinc were below recommended

levels for all age and sex groups; few subjects were underweight (Jacobs Starkey et al., 1998). The median intake of adult women (age 18-49 y) did not meet recommended folate or iron levels; women 50+ years reported higher median iron intake and adequate folate. The median dietary fiber intake was 10.9 g for men and 12.5 g for women; male food bank users consumed >5 g less fiber than their counterparts in the general Quebec population. Median intake of protein, thiamin, magnesium and vitamin C (for smokers and non-smokers) met recommended levels for all age and sex groups surveyed. Only energy intakes showed statistically significant differences in mean intakes by gender ($p<0.02$).

When comparing nutrient intake of Montreal area food assistance program participants to recent data for French Canadians in Montreal (N=1450), or Quebec participants in a provincial heart health survey (N=2118), small differences were apparent (Ghadirian et al., 1995; Santé Québec, 1995). Male food bank clients 18-49 y had intakes of energy, protein, vitamin A, thiamin, calcium and iron more than 5% lower than reported in both Quebec studies. Males aged 50+ y had lower intakes only for protein, vitamin A, calcium and zinc. An important difference between these groups is the largely non-working status of the food bank clients, as well as the high percentage of males living alone. With less spending for food, women food bank users age 18-49 years still fared better than the men; intake of iron, thiamin, folate and magnesium was higher than for women in the general Quebec population. Only mean vitamin A intake was marginally lower than both Quebec studies, and calcium below that reported by Ghadirian et al. (1995).

The limitations of a single 24-hour recall to assess vitamin A intake are well documented, however, considering the large sample size in the present research, concern for vitamin A intake is raised. Earlier Canadian data revealed low calcium and vitamin A intakes among low-income women and the elderly (Myres, 1990). Our median intake data show this problem in all age/sex groups studied. Mean vitamin A intake for men and women, and calcium, iron and zinc for men, were also below the nutrient intakes found in the general population (Santé Québec, 1995).

When income is limited there is less likelihood of buying more expensive, lower energy fruit and vegetables (Garn et al., 1974). Barriers to fruit and vegetable consumption in low-income families in Minnesota were found to be: total income, storage space, food shelf life/waste and taste preference (Reicks et al., 1994). Using data from the Nutrition Canada survey, Myres and Kroetch (1978) reported that vitamin C and folate intake increase in relation to income, for all age groups. Badun et al. (1995) report low median intakes of calcium, iron, folate and zinc in 44 low-income adults in Ontario; Ballew and Sugarman (1995) identified women with low intakes of these nutrients plus thiamin and riboflavin. Hargrove et al. (1994) reported that low-income clients were reluctant to try new foods or recipes because they could not risk that the food would not be eaten. Intervention strategies must consider these issues.

Conclusion

On the day prior to seeking food assistance men had intakes of calcium and zinc lower

than recommended intake levels. For women, only calcium intake was below recommended levels. The high variability in intakes is similar to that found for the low-income group in the Quebec Nutrition Survey.

Table 4.4. Food bank users' (n=490) nutrient intake on the day prior to seeking food assistance

		Male (n=256)				Female (n=234)			
Nutrient/Age Group		RNI[1]	Median	Mean	SD	RNI	Median	Mean	SD
Energy (MJ)	18-49	11.3-12.6	8.0	8.8	4.7	8.0-8.8	7.4	7.8	3.8
	50+	8.4-9.6	7.6	8.9	4.5	7.1-7.5	6.3	7.7	4.7
Protein (g)	18-49	61-64	75.5	83.4	54.9	50-51	68.2	77.0	46.0
	50+	59-63	66.0	80.7	48.7	54-55	59.5	68.1	42.5
Vitamin A (RE)	18-49	1000	622	1232	1555	800	578	1107	1454
	50+	1000	567	1370	1860	800	608	1294	1557
Folate (mcg)	18-49	220-230	223	269	233	215-230	211	288	384
	50+	180-185	194	242	148	195-200	205	270	189
Thiamine (mg)	18-49	1.1-1.2	1.3	1.5	1.0	0.8	1.1	1.5	1.2
	50+	0.8-0.9	1.2	1.7	1.4	0.8	1.2	1.5	1.3
Calcium (mg)	18-49	800	527	712	539	700	556	691	495
	50+	800	547	609	372	800	490	665	601
Iron (mg)	18-49	9	11.9	14.1	8.8	13	11.2	14.5	11.2
	50+	9	10.9	14.9	10.6	8	12.2	14.2	9.4
Magnesium (mg)	18-49	240-250	265	330	250	200	258	281	188
	50+	230-250	244	282	174	210	238	296	236
Zinc (mg)	18-49	12	8.7	10.4	6.8	9	8.9	10.5	7.7
	50+	12	8.4	10.4	6.2	9	7.3	9.6	7.5
Vitamin C (mg)	18-49	40-60	59.3	101	113	30-45	56.7	98	105
	50+	40-60	76.6	121	137	30-45	80.5	126	149

[1]RNI = Recommended Nutrient Intakes (Murray and Beare-Rogers, 1990)

CHAPTER 5.

NUTRIENT INTAKE OF FOOD BANK USERS IS RELATED TO FREQUENCY OF FOOD BANK USE, HOUSEHOLD SIZE, SMOKING, EDUCATION AND COUNTRY OF BIRTH

5.1 Transition

The food bank clientele have now been described; we also have achieved some understanding of clients' nutrient intake on the day prior to seeking emergency food provisions. The objective of the second phase of reporting was to document and interpret nutrient intake beginning from the first week of the income-month. Questions to be addressed included: What is the variation in intake and ability to meet dietary recommendations? Is there any change in dietary status over the income-month? When is it highest? Lowest? Or is it constant? Who has the highest or lowest intakes?

Therefore, in this second manuscript, the nutrient intake of food bank users who completed all four 24-hour dietary recall interviews is presented and interpreted (Jacobs Starkey et al., 1999; Appendix XVII). Data were expressed as mean and median nutrient intake over 4 days of intake as well as by income-week. Correlates of average intake were identified. Strengths of this report include the large sample size (n=428), the random selection of participants, the low dropout rate and the continued participation of the trained dietitian-interviewers.

This was the first description of the nutrient intake (overall and week-by-week) of a random sample of food bank users.

Nutrient Intake of Food Bank Users is Related to Frequency of Food Bank Use, Household Size, Smoking, Education and Country of Birth[1]

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Nutrient Intake of Food Bank Users is Related to Frequency of Food Bank Use, Household Size, Smoking, Education and Country of Birth[1]

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Food Bank Users' Nutrient Intake

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5.2 ABSTRACT

The number of individuals and families accessing food assistance programs has continued to grow throughout the 1990s. Despite the increased health risk among low-income people, few studies have addressed nutrient intake throughout the month or at the end of the month when food and financial resources are thought to be compromised, and no study has described dietary status of a random sample of food bank users. Nutrient intakes of adult female and male food bank users in metropolitan Montreal, Quebec, Canada were monitored week-by-week over a month by dietitian-administered 24-h recall interviews. A total of 428 participants from a stratified random sample of 57 urban area food banks completed all four interviews. Mean energy intake, as an indicator of diet quantity, was similar to other adult populations (10.2±4.8 and 7.9±3.6 MJ for men and women, respectively, age 18-49 y) and not related to sociodemographic variables except the expected biological variation of age and sex. Macronutrient intake was stable throughout the month. Overall median intakes of calcium, vitamin A and zinc were below recommended levels for all age and sex groups. Intakes of several micronutrients were related to frequency of food bank use, household size, smoking, education, and country of birth. High nutrient intake variability characterized these adult food bank users.

Key words: food security & nutrient intake ; urban food banks & nutrition
urban food security ; food bank users' nutrient intake

Increasing numbers of people continue to turn to food banks and soup kitchens for personal and family food assistance (Davis and Tarasuk 1994, Jacobs Starkey 1994). In Canada, a 20% increase in the number of food banks was seen from 1992 to 1996 (Canadian Association of Food Banks 1997). Recent reports from the United States show that the demand for these and other forms of emergency food assistance continues to grow (Kendall and Kennedy 1998).

The term "food bank" initially referred to a central collection and distribution center that provided bulk food to local food relief programs; the local food depot or food pantry then gave food assistance directly to those in need. Today the media, community workers and the clients themselves most often refer to the local food assistance sites as food banks; we use the term food bank in the local food relief context. The food bank obtains emergency food supplies from a central collection center, market discards, or food company donations; augments supplies through purchases from fund-raising drives or from food donations by residents of communities (Riches 1989; Vozenilek 1998); and gives the collected food to those in need of it. Emergency food bags were found to vary greatly in the amount of nutrients they provide (Jacobs Starkey and Kuhnlein 1996), and the food bank system was criticized as a limited nutritional support in a community (Riches 1989).

Despite the concern for food security and nutrient intake adequacy among urban food assistance recipients (Jacobs Starkey et al. 1995, Kendall et al. 1996, Radimer et al. 1990, Wolfe et al. 1996), most studies provide only a snap-shot of the food assistance program

participants from a single interview or from synthesis of focus group discussions (Badun et al. 1995, Hargrove et al. 1994, Smith and Hoerr 1992, Tarasuk and MacLean 1990). Few studies of food bank users address nutrient intake throughout the month, looking at week to week variation in food intake, or at the end of the month when the time since income was received is greatest and food and financial resources are considered to be most limited. Taren et al. (1990) reported the number of servings of different food items per week decreased during the last week of the month, however second or third servings of the same food were not counted. Other studies have been limited by the use of small convenience samples (Emmons 1986, Villalon 1998).

Increased health risk among low income people is well documented; nutritional status is one indicator of wellness, and an important health monitoring parameter (Margetts and Jackson 1993, Najman 1993). Definitive nutrient intake data are not available from difficult-to-sample populations such as emergency food recipients. The need for greater understanding of obesity, protein-energy malnutrition, iron, vitamin A and folate status among these people, as well as diet variety, was expressed (Anderson 1990). Further, two priorities from the International Conference on Nutrition are relevant to food assistance programs in industrialized countries: 1) to assess, analyze, and monitor nutrition situations; and 2) to improve household food security (Food and Agriculture Organization 1995).

We investigated the week-by-week over the income month food and nutrient intakes of

adult Quebec female and male food bank users, in order to describe the overall nutrient intake and to characterize the variation in ability to meet nutrient recommendations as the month progressed. An earlier publication described the sociodemographic characteristics of the study group (Jacobs Starkey et al. 1998). The objectives of this analysis were threefold: 1) to assess the average diet over a month (mean of 4 recalls) and determine correlates of poor overall intake; 2) to describe any decline in intake over the income month and determine for which clients this decline was most pronounced; and 3) to describe the characteristics of clients who had the most highly variable diet over the income month, as this may reflect food insecurity.

5.3 MATERIALS AND METHODS

Food Depot and Client Enrollment

Fifty-seven community organizations (sites) whose primary purpose was direct food aid to clients were identified from a census of 167 agencies receiving supplies from a central food bank in Metropolitan Montreal. Sites were stratified into three groups based on the number of people served per month: small sites (n=21) provided food to < 100 clients per month, medium (n=20) 100-499, and large sites (n=16) served > 500 people per month, for a total of more than 22,000 people served each month. A total of 20 individual sites were randomly selected in numbers proportionate to their representation of food banks of

that size, and clients were then systematically selected at each site, based on the percentage of people served in each stratum (5.5% small, 20.7% medium and 73.8% from large sites). A random number was generated each sampling day to designate the first client to be interviewed; after completion of that interview, the next person in line was approached for an interview, and so forth.

Participating clients signed a consent form. Eligibility criteria were: 18 years of age or older, from a household of known address within two bus transfers from the food assistance site, and spoken English or French in the home unless an interpreter was available. Clients entered the study at any time during the month, when they came to the food bank to obtain supplies; only one respondent per household was enrolled. Based on when study participants received their income, largely as one social assistance check per month, we determined whether they were in income-week 1, 2, 3 or 4 of the month. Income-week served as an indicator of financial risk (more money at hand in income-week 1 than income-week 4). Interviews were conducted in winter (February to April, 1995) when disposable income for food was expected to be most limited by other seasonal costs. All procedures were approved by the McGill University Ethics Committee.

Measurement Sequence

Once enrolled, while still at the food bank, clients completed a dietitian-administered structured questionnaire, including self-reported height and weight, and initial 24-h dietary

recall interview. They were interviewed weekly thereafter at home or other convenient location, to complete three additional 24-h recalls. Thus, each person who completed the study was interviewed a total of four times; these clients were paid an honorarium ($25) at the final visit. All days of the week were represented in the recall data.

Repeated in-person 24-h recalls were used because preliminary work revealed a number of food assistance recipients without a telephone, or with access only to a common-use telephone. Trained dietitian-interviewers used household food portion models to enhance correct estimation of portion size and decrease respondent bias. Clients were asked if they had visited a food bank in the interval since the previous interview; however, data on the source of foods consumed were not collected during the recall interviews.

Data Analysis

Each 24-hour recall was coded by the dietitian who conducted the interview, using food codes representing the Canadian Nutrient File (The Food Processor, Version 5.03, ESHA Research, Salem, Oregon). The software program selected was reported to be appropriate for the nutrients analyzed (Lee et al. 1995). The percentage contribution of protein, fat and carbohydrate to energy intake was determined for each income-week and compared to the Nutrition Recommendations for Canadians (Min Natl Health and Welfare, 1990).

The contribution of recalled food to the food groups of Canada's Food Guide to Healthy

Eating (Health and Welfare Canada 1992) was determined using serving sizes provided in the Guide. Volume and dimensions were converted to gram weights, as needed. For comparison with the Quebec Nutrition Survey (Santé Québec 1995), servings for the Meat and Alternatives group were calculated using 60 g of meat, fish or poultry, 200 ml of canned beans and 50 ml of peanut butter.

Mean energy and nutrient intake over the four recalls was calculated. Analysis of variance, stratified for age and gender, followed by Tukey's multiple comparison test, was used to compare mean intakes by income-week (Hatcher and Stepanski 1994). Mean intakes of the number of food servings for each of the food groups of Canada's Food Guide to Healthy Eating (Health and Welfare Canada 1992) were compared to minimum recommended intake levels for each food group.To investigate the relationship between overall intake of nutrients and correlates of intake, continuous variables were analyzed using multiple regression. Change in energy and nutrient intake (from income-week 1 to income-week 4) was divided into quintiles; the association of these quintiles with sociodemographic variables was assessed using the chi-square test of independence. To assess whether greater day-to-day variability in energy intake was associated with different levels of intake of any of the micronutrients, the mean intakes per energy variability quintile were compared using analysis of variance. Differences at the level of $p<0.05$ were considered significant. Statistics were generated using SAS/STAT 6.11 (SAS Institute Inc., Cary, N.C., 1995).

5.4 RESULTS

Client Profile

A total of 60% or 490/816 clients approached were enrolled, 57.2% of women and 62.9% of men. Sociodemographic data obtained upon enrollment are described elsewhere (Jacobs Starkey et al. 1998). Briefly, clients' mean age was 41 y with mean body mass index (BMI) of 27±11 (kg/m^2); 43% were born in Canada. The most common regions of origin for non-Canadian clients were: Eastern Europe, South America and the Caribbean. Refugees represented 16% of clients enrolled in the study. Weekly or biweekly food bank visits were reported by 36.9% of clients.

All four 24-h recall interviews were completed by 428 (87.3%) subjects (219 men and 209 women): 23 from small, 89 from medium and 316 from large food assistance sites. Among these food assistance recipients, men and women were equally represented (51.2 and 48.8%, respectively); 77.6% were in the 18-49 year old age group; 63.1% were single, separated or widowed; and 66.6% had completed high school or post-secondary studies. Twice as many men as women (49.2 vs 27.4%) had technical, college or university education. The total number of people fed in a household (mean 2.4±1.5) was higher when women versus men presented themselves at the food bank ($p<0.0001$), 2.8±1.6 versus 2.1±1.4, respectively. Eighty-three percent of food bank users who completed the study received income as social assistance benefits.

Of the 62 dropouts from the study, 59.7% were men. In comparison to the completing adults, dropouts were younger (mean age 38 vs 41 years, $p<0.05$), lived in smaller households (2.2±1.4 vs 2.4±1.6, $p<0.05$), and shopped more often for food ($p<0.05$) (4.5±2.8 vs 3.4±2.7 times per week) than clients who completed the study. Dropouts also reported spending more on smoking ($p<0.01$) ($9.33±10.38 vs $6.01±9.84).

Dietary Intake Status

Energy Intakes

Energy intakes (means of 4 days) (**Table 1**) of male and female food bank clients were similar to the general Quebec population (Santé Québec 1995). Further, whereas the vast majority of people received money once a month, as a social assistance check, there was no decline in mean energy intake over the income-month (**Table 2**). Mean energy intake varied with age and gender ($p<0.01$) in the expected directions, being higher for men and the younger food bank clients. Whereas energy intake variation was high, as evidenced by large standard deviations, it is unlikely that the food bank users chronically lacked enough to eat. Self-reported height-weight data indicated that less than 6% of subjects had a body mass index (BMI) below 20, 66% between 20-27 and 28% had a BMI ≥ 28 kg/m^2. There could be a concern that food bank users, entering the study in any income-week, would report lower intakes in later interviews as a result of interview fatigue thus obscuring trends over the month. There were no differences in energy intakes analyzed by 'visit'

(week-by-week from the time people entered the study, regardless of income-week).

To check for possible underreporting of intake (Black et al. 1993) in our population, mean energy intakes were also compared to energy needs calculated using the World Health Organization formula (WHO 1985). Goldberg et al. (1991) determined that a ratio of energy intake to calculated energy needs of 1.35 was adequate for normal living circumstances. Mean energy intake of food bank users met the 1.35 cut-off ratio, indicating that our energy intake data reflected neither important under-reporting nor undernutrition.

To further examine the week-to-week variability in energy intake, quintiles of the coefficient of variation (CV) of energy intake were formed (data not shown)*. There were no differences in the mean (4 day) energy intake by quintile of variation in energy intake. For men, mean energy intake at the lowest quintile of variability (13%) was 10.2 MJ, similar to the 10.4 MJ obtained by those with the highest variability in energy intake (65%). Multivariate analysis of the correlates of variability in energy intake indicated that the week-to-week variability in energy intake was higher among smokers ($p<0.002$) and among Canadian-born clients ($p<0.02$), and lower when more people usually ate together ($p<0.004$). Age and gender were not associated with variability of intake. The correlates of variability of intake from week-to-week appeared to reflect lifestyle whereas the

* see thesis Table 5.5

correlates of mean energy intake over the four week period were age and sex, indicators of biological variability between subjects.

Food Group Servings

The proportion of food bank users who met the minimum recommended number of servings from Canada's Food Guide to Healthy Eating (Health and Welfare Canada 1992) (Table 3) was similar to the general Quebec population (Santé Québec 1995). The proportion of clients who met minimum intake recommendations for Milk Products was lower than for Quebecers in general; only 32.5% of Quebecers and 21% of food bank clients met the recommended intakes. Mean intake of Milk Products (data not shown) was below the recommended minimum of two servings for all age and sex groups; mean intakes of the other three food groups exceeded the recommended minimum number of servings.

Micronutrient Intakes

With the exception of calcium, mean nutrient intakes (4 recalls) (**Table 1**) met the Recommended Nutrient Intakes (RNI), levels thought to meet the needs of most healthy people (Murray and Beare-Rogers 1990). Mean calcium intakes were below the RNI for women aged 18-49 y and both men and women aged 50+ years. Analysis of food group data support these observations (Table 3).

Mean nutrient intakes by income-week (**Table 2**) showed very little change over the month; nutrient intake was not influenced by how close clients were to their next check. It is possible that our participants obtained food bank provisions before running out of food, thus maintaining a stable intake over the weeks. Analysis of variance revealed an effect for income-week only for one nutrient, calcium ($F(3,1272)=3.08$; $p<0.03$)). Calcium intake was not consistent over time; during weeks 1 and 3 intakes were significantly lower than during weeks 2 and 4 ($p<0.04$) for all age and sex groups.

Mean nutrient intake was also not different by quintile of energy intake variability; those people with the most erratic daily eating pattern obtained micronutrients similar to their more energy-consistent peers.

Correlates of Nutrient Intake

Multivariate correlates of nutrient intake were identified (**Table 4**). Overall mean intakes (4 days) were regressed on the linear combination of age, sex, country of origin, education level, civil status, number of people fed, frequency of using the food bank, telephone costs, rent payment, and smoking. Civil status and rent payment showed no relationship to nutrient intake ($p>0.05$) and were deleted from the final models. As expected, men had a higher intake than women for energy (2.1 MJ) and all nutrients, with the exception of vitamins A and C. Food bank clients not born in Canada (58.8% of subjects) had higher intakes of folate ($p<0.0002$) and vitamin C ($p<0.001$). Similarly, education was positively

associated with intake of folate ($p<0.008$), vitamin C ($p<0.01$) and vitamin A ($p<0.001$).

The number of people in the household was negatively correlated with folate, vitamin C , iron and thiamin intake. Frequent food bank users had lower intakes of folate, protein, vitamin C, calcium, magnesium, and zinc. This may be explained by the finding that food bank users are exposed to limited distribution of meat, fresh vegetables and fruit in emergency food supplies (Jacobs Starkey 1994); in our study those with the most reliance on food bank supplies fared least well for these nutrients. Smokers' intakes of five nutrients (folate, protein, vitamin C, iron and thiamin) was significantly lower than for nonsmokers but total energy intake was not lower in smokers. Finally, those without a telephone had a lower calcium intake ($p<0.04$).

5.5 DISCUSSION

This is the first report of monthly (week-to-week) nutrient intake of a random sample of food bank users and the first paper to define correlates of usual nutrient intake. Study participants appeared to achieve a level of nutrition not unlike the general Quebec population, but under the restraint of a lower income. Variation in energy intake from week-to-week was substantial and was associated with lifestyle factors but was not associated with lower overall intake of energy or other nutrients.

The 60% enrollment success in this study compares favourably with other large scale

studies in Canada (69%) and the United States (61%) (Santé Québec 1995; USDHHS/USDA 1986). The <13% dropout rate over four contacts was not unreasonable.

Mean energy intakes below recommended levels (Murray and Beare-Rogers 1990), such as we found for food bank users, was also reported by Badun et al (1995) in a low-income group in Ontario and by Dowler and Calvert (1995) among lone-parents in Britain. Nonetheless our study participants did not have low mean body mass index. Although Kendall et al (1996) hypothesized that occasional bingeing behaviours may predispose food insecure individuals to obesity, we found the distribution of BMIs among food bank users to be similar to the general Quebec population (Santé Québec 1995) .

The mean of four 24-h dietary recalls is considered valid to represent the overall nutrient intake of a group (Bingham 1991). Mean energy intakes in this study were higher than reported in other low-income groups, for example, by Crotty et al (1992) using weighed food records and by Dowler and Calvert (1995) using two 24-hour recalls. Energy intakes reported in the NHANES III report (USDHHS 1994) and in the Quebec Nutrition Survey (Santé Québec 1995) were similar to those in the present study for women and older men. Men age 18-49 in both of these surveys had higher mean energy intakes than food bank users, however the low income subgroup in the Quebec survey had lower energy intakes than food bank users (USDHHS 1994, Santé Québec 1995).

Peterkin et al (1982) reported that food stamp program participants in the US meet the recommended daily allowance (RDA) for calcium, iron, magnesium, vitamin A, thiamin and vitamin C less often than their non-poor peers. Badun et al (1995) also found calcium, folate and zinc intake of a small sample of Canadian low-income people to be below recommended levels. Although Levine (1996) found that economic resources are a determinant of zinc status, in our study zinc intake by food bank users was higher in most age/sex groups than that reported in two Quebec surveys (Ghadirian et al. 1995, Santé Québec 1995). Lower zinc intakes (<7.5 mg/day) were found for lower income participants in NHANESII, which were attributed to food selection rather than a low energy intake (Mares-Perlman et al. 1995). These latter results are supported by analysis of Canadian family food expenditure data; Campbell and Horton (1991) found an increased proportion of households with lower protein, iron, folate and calcium levels among those with lower income. Interpretation of iron intake data must also consider food source. Gibson (1994), upon reporting a study where 44% of iron came from pasta, rice, cereal and bread, cautioned that meal composition may be an important variable for study in vulnerable groups. Given that over 70% of the food bank users had mean Meat & Alternatives food group intake above the minimum recommended number of servings, their mean zinc and iron intakes above RNI levels were not unexpected.

Mean intakes of folate, vitamin C, iron, thiamin, zinc and vitamin A were higher in the present study than recently reported for other low income groups (Crotty et al. 1992, Dowler and Calvert 1995, Santé Québec 1995). Fruit and vegetable intake (important for

sources of folate) is related to both income (Myres and Kroetsch 1978) and education (Rogers et al 1995). Low-income women in Maryland reported spending little time on cooking, and revealed barriers to fruit and vegetable consumption as: preference for other food, time and effort required, perishability and cost (Trieman et al., 1996). Given declining earnings of young men and increasing income gaps between higher and lower income Canadians (Morissette 1997), the challenge to have an adequate food budget is likely to affect even more people in the future. Stitt et al. (1995) found a 53% difference in the regularity of fresh fruit and vegetable consumption when comparing high and low income groups in Britain. Education level reported in our study group was reflected in mean folate intakes meeting recommended levels, except among older men.

Food bank users in this study who were not born in Canada had higher folate intakes; this may reflect a greater consumption of raw food or of meals that require cooking from raw ingredients. Dowler and Calvert (1995) found that non-white respondents' higher nutrient intake could be related to a greater dietary diversity, a more consistent habit of cooking from fresh, raw ingredients, and less likelihood of smoking. Diets with higher diversity scores are more likely to meet nutrient intake recommendations, and diet diversity is associated with higher income and education (Kant et al. 1991).

Heavy smoking has been reported to be negatively associated with attitudes about healthy eating (Smith et al. 1997). From 7-day weighed food records of British adults, Margetts and Jackson (1993) determined that, while there was little difference in total food energy

between smokers and nonsmokers, the smokers had lower fiber, iron, carotene and ascorbic acid intakes. Our results among low-income smokers show a similar pattern.

Mean calcium intake of participants in this study was below levels reported for French Canadian men and women (Ghadirian et al.1995), for low-income men (Myres and Kroetsch 1978) and for adult women entering a food bank study (Villalon 1998). Intakes of men and women aged 50+ were similar to those reported in the Quebec Nutrition Survey while younger food bank users had intakes below their provincial age-counterparts (Santé Québec 1995). Low income Quebecers mean intake of calcium (Santé Québec 1995) was similar to that of the food bank users in this study. In an early study of food stamp program participants in the US, Peterkin et al. (1982) reported that households meeting the RDA for calcium consumed more milk, vegetables and grain products, an area for further investigation among young food bank clients. The need to augment emergency food supplies with milk products was previously documented (Jacobs Starkey 1994).

Comparative data on variability in nutrient intake are limited. The coefficient of variation for energy intake of male food bank users age 18-49 was higher than reported by Beaton et al. (1979), (47.3 vs 35.8%, respectively) as was the variability for six other nutrients: protein, fat, calcium, iron, thiamin and vitamin C. Using the example of calcium variability in adults, that of food bank users (76.4%) was similar to low income Quebecers (72.4%) and higher than that reported in the US (49.7%) (Beaton et al. 1983, Santé Québec 1995). The response of within-person variance to both environmental and biological pressures

(Tarasuk and Beaton 1991) is at play. It may be that the high variation in food bank users' intake protects, in the short term, from overall low intakes.

Food bank users in this study most often reported use of the food bank as a 'community service' (Jacobs Starkey et al. 1998), had a fixed address, and were able to carry the provisions received. The homeless and other poor groups who are less mobile, such as single parents with large families and the frail elderly, are not well represented by these data.

5.6 CONCLUSION

The nutrient intake of adult food bank users is not worse than the general Quebec population. Energy intake was sufficient and was unrelated to clients' social circumstances. Five important correlates of nutrient intake in the study population were determined: frequency of food bank use, household size, smoking, education, and country of birth. These data may be important to health professionals to target nutrition information and intervention activities with food bank clients.

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TABLE 5.1. Mean and median[1] energy and nutrient intake of food bank users (n=428) averaged over 4 days of intake

Nutrient	Age Group	RNI[2] Males	Male[3] (n=219)		RNI[2] Females	Female[3] (n=209)	
Energy (MJ)	18-49	11.3-12.6	10.2±4.8	(9.5)	8.0-8.8	7.9±3.6	(7.4)
	50+	8.4-9.6	9.5±4.8	(8.2)	7.1-7.5	7.6±3.9	(6.6)
Fat (g)	18-49	-	84±55	(71)	-	64±43	(56)
	50+	-	78±55	(63)	-	59±50	(45)
Protein (g)	18-49	61-64	94±51	(85)	50-51	76±41	(69)
	50+	59-63	94±60	(79)	54-55	73±40	(64)
Folate (μg)	18-49	220-230	313±215	(258)	180-185	269±244	(210)
	50+	215-230	270±187	(217)	195-200	259±174	(209)
Thiamin (mg)	18-49	1.1-1.2	1.8±1.3	(1.5)	0.8	1.5±1.1	(1.1)
	50+	0.8-0.9	1.8±1.5	(1.4)	0.8	1.6±1.2	(1.2)
Vitamin C (mg)	18-49	40-60	133±157	(85)	30-45	127±136	(83)
	50+	40-60	119±139	(65)	30-45	121±123	(86)
Vitamin A (RE)	18-49	1000	1363±1644	(702)	800	1203±1533	(615)
	50+	1000	1457±1795	(653)	800	1283±1414	(643)
Calcium (mg)	18-49	800	805±615	(667)	700	698±474	(575)
	50+	800	771±610	(639)	800	703±500	(573)
Iron (mg)	18-49	9	16.2±9.3	(14.4)	13	13.2±8.9	(11.0)
	50+	9	16.2±11.1	(13.3)	8	13.9±9.0	(11.7)
Magnesium (mg)	18-49	240-250	342±238	(303)	200	278±169	(249)
	50+	230-250	327±200	(269)	210	288±183	(246)
Zinc (mg)	18-49	12	12.2±9.9	(10.2)	9	9.8±6.5	(8.4)
	50+	12	13.9±10.9	(10.8)	9	9.7±6.0	(8.5)

[1]Mean ± standard deviation; median values in brackets.

[2]RNI = recommended nutrient intakes (Murray and Beare-Rogers 1990).

[3]The number of men and women age 18-49 and 50+ years was 176 and 43 for men, and 157 and 52 for women, respectively.

TABLE 5.2.Mean[1] and median[2] energy and nutrient intake of food bank users by income-week[3] (n=428)

Nutrient	Sex[4]	Income-week 1		Income-week 2		Income-week 3		Income-week 4	
		x̄	Mdn	x̄	Mdn	x̄	Mdn	x̄	Mdn
Energy (MJ)	M	10.0±.4.7	9.5	10.9±5.8	9.8	9.8±4.3	9.4	10.0±4.3	9.4
		8.7±4.7	7.8	9.7±4.0	9.2	10.7±5.8	8.1	9.0±4.4	9.1
	F	8.0±3.5	7.5	8.0±3.4	7.3	8.1±3.6	7.5	7.6±3.8	7.1
		7.4±4.1	6.2	7.8±3.9	7.3	7.0±3.1	6.5	8.2±4.3	6.8
Fat (g)	M	85±57	74	88±64	70	81±48	70	83±51	71
		69±57	60	87±51	71	83±63	60	73±48	61
	F	67±43	58	64±39	57	64±43	52	63±46	55
		61±67	45	59±44	45	54±38	43	63±49	46
Protein (g)	M	91±55	87	99±52	87	89±47	79	95±49	85
		80±55	66	89±48	75	106±63	85	99±72	82
	F	79±44	69	76±42	70	76±39	73	72±40	64
		70±39	57	74±39	68	65±32	63	82±50	72
Folate (µg)	M	305±226	263	330±206	267	298±190	257	319±235	254
		267±179	231	276±163	206	236±130	194	299±255	215
	F	283±320	217	265±216	200	269±202	221	259±221	200
		256±179	190	253±171	244	256±192	201	272±158	230
Thiamin (mg)	M	1.8±1.4	1.4	1.9±1.4	1.5	1.7±1.1	1.5	1.9±1.5	1.5
		1.5±1.1	1.2	1.8±1.3	1.4	1.9±1.5	1.5	2.0±1.9	1.1
	F	1.4±1.0	1.2	1.4±1.0	1.1	1.5±1.1	1.2	1.5±1.3	1.0
		1.5±1.4	1.2	1.7±1.1	1.5	1.5±1.3	1.2	1.6±1.0	1.2
Vit. C (mg)	M	132±171	79	143±160	98	122±125	77	136±167	82
		130±141	70	134±132	74	113±157	78	100±126	49
	F	133±153	84	129±128	97	129±124	90	116±137	62
		124±138	69	126±127	103	111±107	75	123±121	90
Vit. A (RE)	M	1264±1579	615	1540±1838	828	1284±1608	632	1362±1536	878
		1743±2043	728	1248±1727	508	1480±1630	728	1357±1779	626
	F	1226±1518	694	1249±1679	641	1132±1212	629	1207±1699	503
		1082±1205	564	1329±1492	630	1359±1786	568	1360±1090	961

Continued

Nutrient	Sex[4]	Income-week 1		Income-week 2		Income-week 3		Income-week 4	
		x̄	Mdn	x̄	Mdn	x̄	Mdn	x̄	Mdn
Calcium (mg)	M	773±538	662	852±789	654	726±415	643	869±649	737
		717±449	667	805±582	634	756±658	503	805±731	654
	F	709±427	644	728±510	579	701±484	569	654±473	542
		634±504	539	763±517	587	626±366	541	787±579	648
Iron (mg)	M	15.5±8.3	14.1	17.8±10.6	15.3	15.4±8.0	13.8	16.3±10.0	14.4
		14.4±11.5	8.7	15.6±8.0	14.7	17.4±11.1	14.2	17.6±13.3	11.8
	F	13.3±9.9	11.5	12.9±8.7	10.8	14.1±8.5	12.7	12.8±8.5	10.7
		13.0±8.6	11.1	13.9±7.8	13.3	13.6±10.7	10.6	14.9±8.9	12.4
Magnesium	M	333±212	291	376±348	308	333±192	299	327±152	316
(mg)		299±173	247	322±159	291	356±215	313	332±246	270
	F	281±175	250	282±177	254	293±171	263	255±152	222
		261±133	227	289±186	261	279±185	241	322±217	259
Zinc (mg)	M	11.4±7.0	9.8	14.2±15.5	11.3	11.4±7.5	9.6	11.7±6.6	9.9
		11.5±9.5	8.1	14.1±11.3	10.8	16.3±11.7	12.3	13.4±10.6	10.7
	F	10.1±6.4	9.1	9.8±7.2	8.1	10.1±6.4	8.9	9.4±6.2	8.0
		8.9±4.8	8.3	9.6±5.7	8.3	9.0±6.0	7.7	11.5±7.0	10.3

[1] Mean (x̄) ± standard deviation.

[2] Median = Mdn in the table.

[3] Most study participants received income as one social assistance cheque per month, therefore we determined what income-week they were in for each interview.

[4] The two rows of data for each gender are for ages 18-49 and 50+y.

TABLE 5.3. Proportion of food bank users who met the minimum recommended number of servings of Canada's Food Guide to Healthy Eating[1] based on four 24-h recalls

	Food Groups and Minimum Recommended Servings[2]			
	Milk Products 2	Meat & Alternatives 2	Grain Products 5	Vegetables & Fruit 5
Québec Nutrition Survey[3]	32.5	62.2	57.5	43.4
Food Bank Users	21.0	71.7	62.9	49.5

[1]Health and Welfare Canada 1992.

[2]Recalled foods were classified according to food group and portion sizes were converted to food group servings using volumes, dimensions and weights.

[3]Santé Québec 1995.

TABLE 5.4. Regression models for average intake (4 recalls) of macro and micronutrients by food bank users (n=428)

	Explanatory variables: correlates of average intake									
Macro & Micro-nutrients	Intercept	Age (years)	Sex (male/ female)	Country-of-Origin (non-Can./Can.)	Education (level)	People Fed in Household (no.)	Food Bank Use (visits/mo)	Telephone (cost/mo)	Smoking (yes/no)	R^2 (%)
Energy (MJ)	12.9	-	2.1	-	-	-	-	-	-	6.9
Protein (g)	111.4	-	18.0	-	-	-	-4.6	-	-5.1	4.7
Folate (μg)	200.0	-	23.8	48.1	18.1	-20.6	-21.7	-	-29.3	5.9
Vit C (mg)	58.4	-	-	33.6	14.4	-9.9	-11.0	-	-22.2	5.0
Ca (mg)	954.7	-	91.0	-	-	-	-49.4	-41.8	-	1.9
Fe (mg)	20.1	-	2.5	-	-	-0.9	-	-	-1.5	3.7
Vit A (RE)	833.2	-	-	-	160.4	-	-	-	-	1.9
Mg (mg)	336.0	-	51.7	-	-	-	-20.6	-	-	2.9
Thi (mg)	2.1	-	0.3	-	-	-0.12	-	-	-0.19	3.2
Zn (mg)	10.4	1.1	2.4	-	-	-	-0.8	-	-	3.4

Table 5.5. Mean nutrient intake by quintiles of energy variability[‡] for male and female food bank users (n=428)

Quintile	Sex**	Energy CV*	Energy kcal	Folate μg	Protein g	Vit C mg	Ca mg	Fe mg	Mg mg	Vit A RE	Thi mg	Zn mg
1	Male	13.4±3.6	2442±787	321±122	94±33	145±98	844±334	17.1±7.1	355±155	1493±989	2.0±1.0	12.9±8.0
	Female	13.2±4.2	1941±576	294±197	81±27	141±109	824±417	13.3±5.4	305±135	1086±697	1.5±0.7	10.5±3.5
2	Male	22.5±2.2	2337±545	302±121	96±28	150±91	768±321	16.1±5.2	324±107	1426±835	1.9±0.8	12.0±3.6
	Female	22.6±2.2	1846±423	278±131	71±18	131±91	666±253	12.9±3.9	262±77	1287±967	1.5±0.5	9.1±2.7
3	Male	30.4±2.5	2236±655	326±162	88±25	129±97	717±346	15.1±5.7	318±109	1389±941	1.5±0.8	11.7±3.7
	Female	29.9±2.5	1812±683	265±159	71±30	120±80	701±342	14.1±7.2	278±142	1265±1003	1.5±0.8	9.6±4.7
4	Male	41.6±3.4	2486±886	295±135	93±36	121±86	850±509	16.3±6.3	350±168	1363±973	1.8±0.8	13.1±7.9
	Female	40.2±3.3	1990±651	250±122	81±27	107±72	662±282	13.7±7.2	293±104	1151±721	1.6±1.0	10.5±3.7
5	Male	65.3±16.7	2482±837	279±133	97±39	108±101	803±460	16.4±7.2	346±167	1233±976	1.7±0.9	12.8±5.3
	Female	60.8±13.8	1795±693	246±136	71±32	127±113	646±316	12.9±5.5	267±134	1311±933	1.4±0.8	9.4±4.6

[‡] No difference in energy or nutrient intake by quintile of energy variability

* CV = coefficient of variation

** Number/quintile 1-5 = 45,43,41,47,43 for men and 40,43,45,39,42 for women, respectively

Additional Analysis

Dietary intake compared to recommended levels

Having completed the analysis of nutrient intake of urban food bank users (Jacobs Starkey et al., in press), a remaining challenge was to present clients' intake in a manner that would be useful to dietitians and community health practitioners. Scoring systems (Dowler and Calvert, 1995, Griffiths et al., 1994, Kendall et al., 1996), between-group comparisons (Crotty et al., 1992, Kendall et al., 1996) or differences from an accepted standard (Villalon, 1998, Wundurlich et al., 1996) have been used to describe the dietary status of low-income people. Only Villalon (1998) has reported on food bank users' intake, however this study is limited by the small sample from a single food assistance site. No study has presented the energy and nutrient intake as a percentage of an accepted dietary standard for a large random sample of food bank users from a metropolitan area.

The Nutrition Recommendations for Canadians provide a dietary pattern that will meet essential nutrient needs of most people, while reducing the risk of chronic diseases (Min Natl Health and Welfare, 1990). The Recommended Nutrient Intakes (RNI) define the levels of those nutrients (Murray and Beare-Rogers, 1990). Since the RNI is above the requirements of nearly all persons in a population, the prevalence of inadequacy is overestimated when using 100% of the recommended level. Therefore it is customary to use a cutoff of 2/3 of the recommended intake to estimate the proportion of the population

with inadequate intakes (Sabry, 1988). Intakes of food bank users, expressed by age and sex group, were therefore compared to 100% and 67% of the RNI (Table 5.6).

One hundred percent or greater of the RNI was achieved for all nutrients with the exception of calcium for men and women aged 50+ years. Similar concern for calcium is seen in the US. Reporting on progress toward meeting National Nutrition Objectives, Crane et al. (1998) observe that only one-fifth of US adults consume the recommended number of servings of milk products. The authors state that consumption of calcium-rich foods will continue to be an issue. The new Dietary Reference Intake (DRI) values (National Academy of Science, 1998) list an Adequate Intake (AI) for calcium (1000-1200 mg) which is higher than the RNI (700-800 mg); when this new value is applied to food bank users' mean calcium intake, the percent achieved dropped to below 100% for all age and sex groups (men: 80.5% and 64.3%; women: 69.8% and 58.6% for ages 18-49 and 50+, respectively). The emergence of calcium fortified foods may be one approach to address this concern, however nutrition education efforts must continue as an important intervention for all age and sex groups.

While the mean percentage of the RNI met was generally greater than 100%, nutrients cited by Anderson (1990) as a concern in difficult-to-sample populations are prominent by prevalence of food bank users with low intakes, ie., mean intakes <67% of the RNI: vitamin A, calcium and zinc for all age and sex groups, iron for women under age 50 y and folate for all except men aged ≤49 years. Badun et al. (1995) also found calcium,

folate and zinc to be below recommended levels for a group of low-income people in Ontario. Results by Campbell and Horton (1991) were similar; lower income households experienced lower protein, iron, folate and calcium levels. Recently Villalon (1998), reporting on food bank users in New Brunswick, found energy, protein and calcium intakes below recommended levels.

The proportion of urban food bank users we found with some nutrient intakes below 67% of the RNI is troubling; these data may serve to alert readers to the need to re-visit the clientele, perhaps at intervals, to assess continued prevalence of low intakes among some food bank clients.

Table 5.6. Mean nutrient intake (4 recalls) of food bank users (n=428) as a percentage of the Recommended Nutrient Intake (RNI) and percentage of RNI met.

Nutrient	Gender[1]	Age (y)	RNI[2]	% RNI Achieved	% with intake <100% RNI	% with intake <67% RNI
Energy (kcal)	Male	≤49	2700- 3000	89.3	67.6	21.6
		50+	2000-2300	100.6	51.2	14.0
	Female	≤49	1900-2100	98.5	58.3	12.2
		50+	1700-1800	100.5	54.7	15.1
Protein (g)	Male	≤49	61-64	146.6	19.9	2.8
		50+	59-63	149.8	16.3	4.7
	Female	≤49	50-51	149.0	17.9	5.8
		50+	54-55	133.6	20.8	3.8
Folate (μg)	Male	≤49	220-230	136.5	28.4	7.4
		50+	230	118.1	41.8	11.6
	Female	≤49	180-185	146.3	32.7	12.8
		50+	195	132.0	37.7	11.3
Vitamin A (RE)	Male	≤49	1000	136.3	40.1	25.0
		50+	1000	145.7	46.5	32.6
	Female	≤49	800	149.8	35.9	21.8
		50+	800	162.1	37.7	24.5
Thiamin (mg)	Male	≤49	1.1-1.2	163.3	18.8	2.8
		50+	.9	204.6	16.3	--
	Female	≤49	.8	180.9	14.7	3.8
		50+	.8	193.1	17.0	1.9

Nutrient	Gender[1]	Age (y)	RNI[2]	% RNI Achieved	% with intake <100% RNI	% with intake <67% RNI
Calcium (mg)	Male	≤49	800	100.6	60.0	22.1
		50+	800	96.3	58.1	30.2
	Female	≤49	700	100.0	59.6	25.0
		50+	800	87.0	67.9	35.8
Iron (mg)	Male	≤49	9	180.4	6.8	1.7
		50+	9	180.5	7.0	2.3
	Female	≤49	13	102.2	55.1	21.2
		50+	8	171.8	13.2	3.8
Magnesium (mg)	Male	≤49	240-250	137.3	23.3	2.2
		50+	230-250	132.4	25.6	7.0
	Female	≤49	200	139.2	25.0	7.1
		50+	210	136.1	30.2	7.5
Zinc (mg)	Male	≤49	12	101.5	52.8	21.0
		50+	12	115.5	44.2	11.6
	Female	≤49	9	109.4	48.7	16.0
		50+	9	107.3	45.3	11.3

[1]Men aged 18-49 y : n=176 ; age 50+ : n=43

Women aged 18-49 y : n=156 ; age 50+ : n=53

[2]RNI=recommended nutrient intake (Murray and Beare-Rogers 1990)

CHAPTER 6

MEETING RECOMMENDED SERVINGS OF CANADA'S FOOD GUIDE TO HEALTHY EATING BY URBAN FOOD BANK USERS

6.1 Transition

An important element in the definitions of food security is the persistent emphasis on food itself. Campbell (1991) states that people would not experience "involuntary food shortage"; others have said that people would "acquire personally acceptable foods" (Can Diet Assoc, 1991) or "have sufficient food to meet dietary needs for a productive and healthy life" (Agr AgriFood Canada, 1996). Nutrient intake data have already shown that food bank users are similar to the general Quebec population. Is intake similar when compared at the food group level?

The next objective was to assess food bank users' intakes using a food-based framework. The goal was to determine the mean food group intake of food bank users over the income-month and to answer the question: Do food bank users meet the recommendations of Canada's Food Guide to Healthy Eating? An answer to this question would be useful to practising dietitians and could form the basis for nutrition education at the food bank sites.

Meeting Recommended Servings of Canada's Food Guide to Healthy Eating by Urban Food Bank Users

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Short Title

Canada's Food Guide and Food Bank Users

Key Phrases

food bank users' food group intake
food bank users' dietary status
mean food group intake

6.2 ABSTRACT

The widening gap between high and low income status is one contributor to the continued expansion of food assistance programs. Within a survey of the sociodemographic and nutritional characteristics of 428 adult food bank users, we determined dietary intake as the number of servings from the food groups of Canada's Food Guide to Healthy Eating (CFGHE). Our intent was to describe the dietary status of Montreal area food bank users by way of a tool familiar to diverse audiences. No age or sex group achieved the top end of the recommended servings range for any food group nor met the Milk Products minimum target intake level. Mean intake of Grain Products and Meat and Alternatives by all subjects met or exceeded minimum recommended levels. Women age 18-49 y consumed Vegetables and Fruit below the recommended minimum (4.9±3.2 servings). High variation around the mean number of food group servings reflected very low intakes by some food bank clients. The percent of food bank users who met the minimum recommended number of servings of CFGHE was higher than found in the Quebec Nutrition Survey for all but Milk Products, where intake was greater in the general Quebec population. The need for continued advocacy efforts toward food and nutrition security for all Canadians is demonstrated.

Canada's Food Guide to Healthy Eating (CFGHE)(1), a framework for the kinds and amounts of foods to choose for healthy everyday eating, is used in a variety of settings, by dietitians, teachers, and allied health workers, as a nutrition education resource. Like the US Food Guide Pyramid, the Guide links "nutrient needs, the dietary guidelines, and usual food patterns" (2). It has formed the basis for recent comparisons of dietary intakes to recommended food choice amounts among different age groups (3-5) and has been used to describe food supplies of food assistance program participants (6-7). The Guide was also well received by food bank volunteers and staff as a useful tool to categorize food supplies at the food depots prior to emergency food bag packing (8). We are aware of no report describing dietary status of food bank users which also uses this food-based comparison framework.

Demand for food assistance has grown throughout the 1990's (9). Having reported the sociodemographic and nutritional characteristics of food bank users (10-11), our next goal was to report the dietary status of food bank users. Our intent was to do so in a manner that would be meaningful to study participants and community workers, as well as to dietetics students, dietitians and others committed to what Fitz (12) describes as "the political, social, and economic struggle for food security".

6.4 METHODS

The study design, participants, and data collection methods are described in detail elsewhere (10-11). Stated briefly, a random sample of 428 adult men and women (mean age = 41 years) from a stratified random sample of 20 out of 57 eligible urban area food depots completed a dietitian-administered sociodemographic questionnaire and four 24-hour dietary recall interviews. The majority of study participants (83%) received income as social assistance benefits, 67% had education at or beyond high school, and 43% were born in Canada. Mean body mass index (BMI) was 27 kg/m^2 and underweight was not frequent among food bank clients. Procedures were approved by the Ethics Committee, McGill University.

For this report, 24-hour recall food intake data were calculated as CFGHE portions using the serving sizes provided in the Guide. One egg, 75 g of meat, fish or poultry, and 250 g of canned beans were used as serving sizes. Volume and dimensions were converted to gram weights as appropriate, using grocery labels and Agriculture Handbook 456 (13). To discuss food bank users' mean food group intake levels compared to data from the Quebec Nutrition Survey (14), intakes were re-calculated using smaller portion sizes for meat, fish, or poultry (60 vs 75 g) and legumes (200 vs 250 g), and larger portions for peanut butter (50 vs 30 ml) (Quebec Nutrition Survey (15) and CFGHE (1), respectively).

Univariate analysis was used to determine mean daily number of CFGHE servings by age,

gender, food bank size and income-week (week of the month following receipt of cheque). Descriptive statistics were generated using SAS/STAT 6.11 (SAS Institute Inc., Cary, N.C., 1995).

6.4 RESULTS

Data for men age 18-49 years (n=176) are presented to illustrate the consistency of food group intake found week-by-week over the income-month (Figure 1). **Figure 1 near here** There was no effect of income-week or food bank size (not shown) on the mean number of food group servings for men or women aged 18-49 or 50+ years. Overall mean number of servings from CFGHE (averaged over 4 recalls) are, therefore, reported for men (Figure 2) and for women (Figure 3).

Mean intake of Milk Products was below the recommended minimum of two servings for all age and sex groups; only 21% of food bank users obtained the recommended minimum number of servings (10), 11.5% less than the general Quebec population (15). Meat and Alternatives intake by food bank users met or exceeded minimum recommended levels and 10% more food bank users met the minimum recommended number of servings from CFGHE than reported in the Quebec Nutrition Survey (11, 15). Vegetables and Fruit intakes of food bank users were below the minimum recommended level for women age 18-49 y; both men and women had mean intakes of Grain Products above minimum

recommended levels. **Figures 2 and 3 near here**

The average intakes of men and women did not achieve the top end of the recommended servings range for any food group. Another important observation is the high variation in the number of food group servings, an indication that intakes of each food group were compromised by some food bank users with very low intake; median intakes were consistently below mean intake levels.

6.5 DISCUSSION

This is the first report of urban food bank users' dietary status compared to the recommended number of servings of CFGHE. Food bank clients' food group intake appears to have the same issues as that of the general Quebec public, but under the restraint of lower average income. Eighty-three percent of food bank users received income as social assistance while 61% of the Quebec Nutrition Survey participants were working and only 20% were classified as low-income (14).

Robbins and Robichon-Hunt (16-17) reported that 39% of Canadians' folacin comes from vegetables and fruit, a marginally adequate intake food group among food bank users, especially women age 18-49 years. Median folate intakes below recommended levels for this group, and for men age 50+ (11), support this observation; mean intakes did,

however, meet recommended levels. Adequate folate is a factor in prevention of coronary heart disease among women (18) and in modulation of cancer risk (19); correction of low blood folate is also reported to be important in medical management of depression (20). Barriers to fruit and vegetable intake identified by Reicks et al (21) may also be relevant to some participants in our study group: restrained budget, storage difficulties, food preferences and preparation time, and modelling behaviour of adults.

Dairy products and vegetables and fruit are sources of 21 and 48%, respectively, of vitamin A available in the average Canadian diet (16). All age and sex groups of food bank users studied had mean vitamin A intakes to meet recommended levels, though median intakes were below recommended levels (11). Motivational and educational intervention strategies that led to significant and sustained increases in carotene intake of a random sample of non-vegetarian adults (22) may be useful with some food bank clients. Food choices such as meats, eggs and fats also contribute to vitamin A availability but contributions of specific food to nutrient intake are not available from our data.

Sixty percent of Canadians' usual calcium source is dairy products; bakery products provide a further 10.6% of the calcium available to Canadians (16). The minimum recommended number of servings of Milk Products was rarely consumed by food bank users, supporting our reported observation that of all age and sex groups, only men age 18-49 y had mean calcium intakes above 800 mg/day (11). Median calcium intake was consistently below recommended intake levels for all age and sex groups (11). These

data, in addition to the report that food bank supplies in the Montreal area are low in Milk Products (6), confirm that food bank users in Montreal cannot currently look to emergency food provisions to supply this nutrient. In New Brunswick, however, at the only other Canadian site for which food bag data are available, skim milk powder is provided according to household size and composition (7).

Meat and other animal products provide approximately 60% of the zinc in the mixed Canadian diet (16). The high coefficient of variation for Meat & Alternatives intake that we observed offers a partial explanation for the inconsistent dietary zinc status observed over the income-weeks (11). Lower zinc intakes were found to be associated with low income in a major US survey (23).

RELEVANCE TO PRACTICE

Nutrition security assumes an environment where food choices consistent with good health can be made (24). It is shown here that food bank users did not consume food consistent with the healthy eating recommendations of CFGHE (1). Dietz (25) stated that "food insecurity seems to be a logical precursor of undernutrition". This is exemplified by undernutrition reported from single interview studies in the US and Canada (26-27). Our recent work (11) among food bank participants, however, brings this observation into question. While the recommendations of CFGHE were not met by food bank users, mean

nutrient intake (over 4 recalls) was not compromised. Calcium was a notable exception, where, of all age and sex groups of adults, only men age 18-49 y had mean intakes greater than 800 mg/day.

Mertz (28) stated that emphasis at any given time on only 'popular' nutrients (eg. polyunsaturated fatty acids in the 1960's and selenium in the 1980's) is a concern; we must remember that foods carry all nutrients and are potential carriers of nutritionally important substances yet to be identified. The contribution of "Other Foods" to macro- and micronutrient intake must also be acknowledged while expressing caution that these choices are often higher in energy, fat and/or salt (1). Broad spectrum diet assessment methods, including comparison to CFGHE, provide the food-based data essential for nutrition education.

6.6 CONCLUSION

Food bank users are not meeting the recommended number of servings of foods for a healthy diet. The generally recognized demand on food assistance programs makes it difficult to meet client food requests, and food bag supplies are highly variable in what is provided. Nutrition education using the framework of Canada's Food Guide to Healthy Eating may be one approach that food banks can use to assist clients to broaden the number and variety of foods consumed from donated or purchased supplies. Finally, dietitians and others must advocate for the right to nutrition security for all Canadians.

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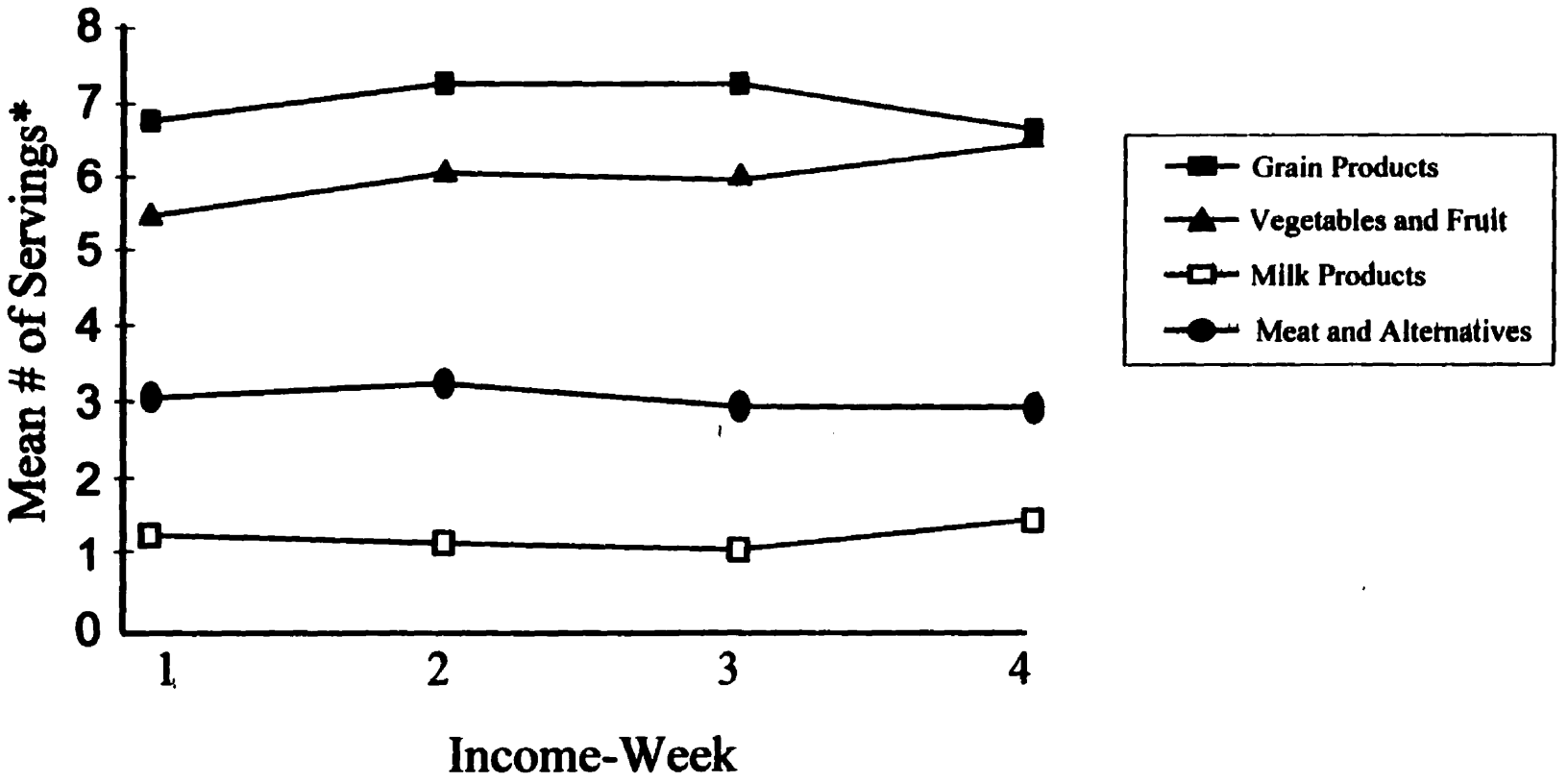
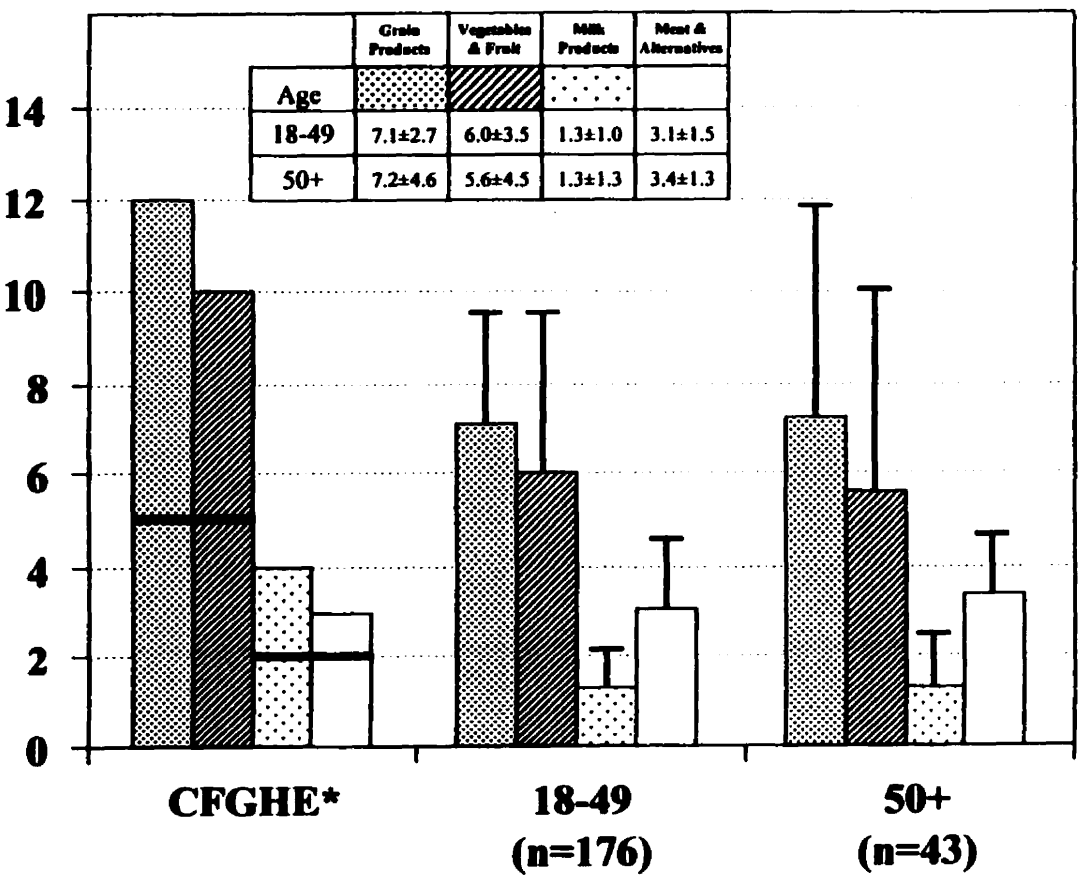
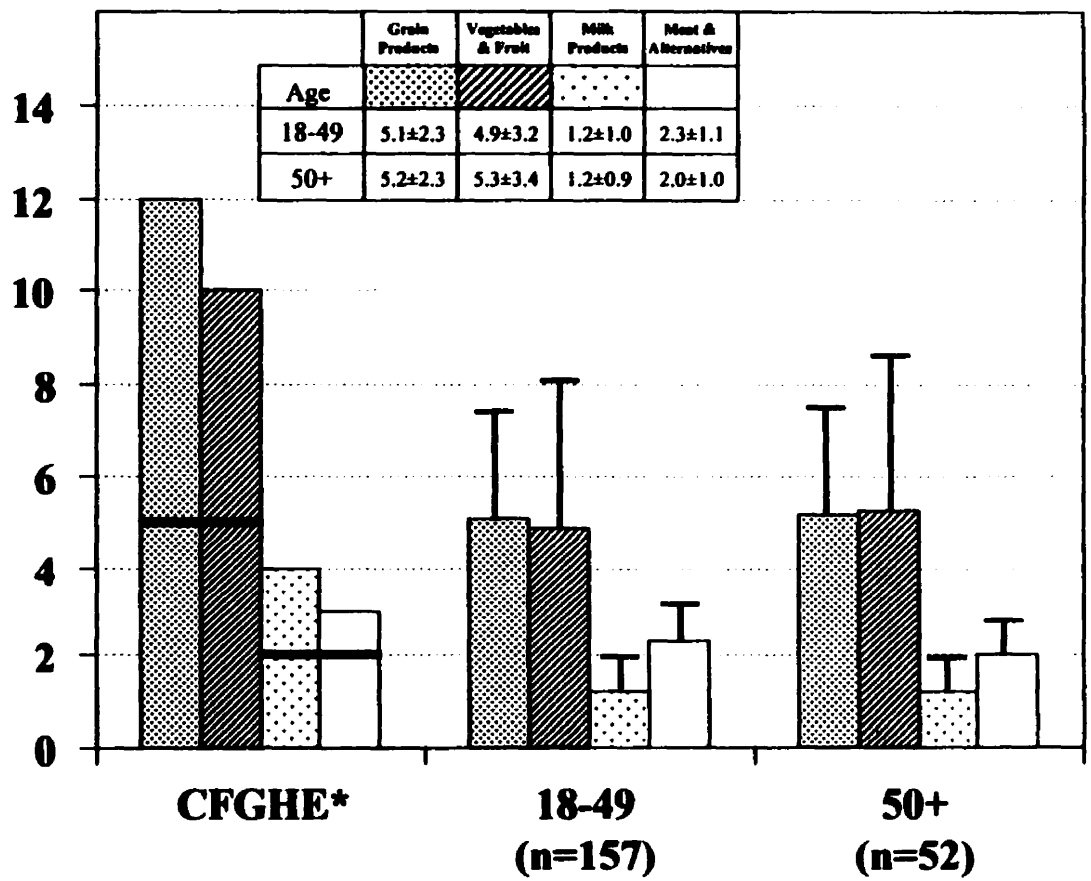
List of Figures



* no significant difference in mean number of servings from food groups by income-week



* bar denotes minimum recommended number of servings for adults



* bar denotes minimum recommended number of servings for adults

CHAPTER 7

CONTRIBUTION OF URBAN FOOD ASSISTANCE PROVISIONS TO RECOMMENDED FOOD AND NUTRIENT INTAKE

Comparison of food bank users' intake to Canada's Food Guide to Healthy Eating (CFGHE) (Health and Welfare Canada, 1992) revealed that achieving the minimum recommended food group intake levels was a particular problem for the Milk Products group, for all food bank clients; Vegetables & Fruit consumption for women age 18-49 years was also below recommended levels. To understand how food bank provisions contribute to food group availability was considered a logical follow-up in the analyses.

In Canada, the first published report of the content of a random sample of emergency food bags revealed provision of calcium, vitamin D and vitamin A below recommended levels; a method to inventory and analyse food bag contents was described (Jacobs Starkey 1994). Subsequently, Villalon (1998), also reporting for a single food assistance site, noted that food provisions supplied less than the recommended nutrient intake (RNI) for calcium. This component of the research documented the food and nutrient composition of emergency food provisions from the 20 sites described on page 50.

7.1 METHODS

At each participating site, a food bag packed for an individual (versus a family) was randomly selected by the dietitian-interviewer and an inventory of the provisions was

made. Nutrient content of the food bags was determined following the method previously reported (Jacobs Starkey, 1994). The Canadian Nutrient File (Food Processor Version 5.03, ESHA Research, Salem, Oregon) was used to calculate nutrient content of the bags, then the mean number of days of the recommended nutrient intake (RNI) that could be met (Murray and Beare-Rogers, 1990) through food bag supplies was calculated. Secondly, the mean number of servings provided toward the food groups of Canada's Food Guide to Healthy Eating (CFGHE) (Health Welfare Canada, 1992) was determined.

Descriptive statistics were generated using SAS/STAT 6.11 (SAS Institute Inc., Cary, N.Y., 1995). Analysis of variance was used to determine differences in food bag contents by size of food bank, with Tukey's Honestly Significant Difference (HSD) test applied to compensate for multiple comparisons (Hatcher and Stepanski, 1994).

7.2 RESULTS AND DISCUSSION

The mean number of different food items provided per food bag was 13.5±6; no difference was found, by food bank size, for the number of items provided. Contents of three example emergency food bags, representing bags with the least, most and mean number of items, are provided (Table 7.1). All examples came from medium-size food banks, serving 100-499 people per month. The mean contribution of macronutrients to energy provided in the food bags was 11.7, 26.6 and 61.7% for protein, fat and carbohydrate, respectively, similar to that found earlier for multiple random food bags from a single site (Jacobs

Starkey, 1994). Friedman (1991) reported higher protein (19±4%) and lower carbohydrate (55±10%) in a Texas study of urban and rural food agencies.

The mean number of days of the recommended nutrient intake (RNI) (Murray and Beare-Rogers, 1990) that could be met by an adult male by consumption of food bank provisions is presented (Table 7.2). Food bags provided less protein (188±345 vs 418±123 g) and vitamin D (11±41 vs 14±27 ug) than multiple samples from a single site (Jacobs Starkey 1994). If food bags were meant to supply approximately three days of supply, a common bench-mark when food bags are prepared, recommended nutrient intakes would be met if all food provided was consumed. However, given the variety in the food items supplied (Table 7.1), one cannot assume that RNI provision would lead to RNI consumption; it is unlikely that a jar of mayonnaise, five loaves of bread and three bags of bread rolls would be consumed in three days.

The mean number of servings provided toward the food groups of Canada's Food Guide to Healthy Eating (CFGHE) (Health Welfare Canada, 1992) was determined (Table 7.3). When the three days of food supply are considered on a per day basis, ie., divide the mean number of food group provisions by three, the minimum daily recommended food groups servings for an adult male was provided for all but the Milk Products food group. The mean number of servings from CFGHE available on a per day basis was higher than reported earlier for multiple bags from a single site (Jacobs Starkey, 1994) for Grain Products (23.2 vs 13.1) and Vegetables and Fruit (10.6 vs 8.3), and similar for Milk

Products (0.6 vs 0.5 servings). Meat and Alternatives were less well supplied in the present study (1.6 vs 4.3 servings/day). The number of items from the "other foods" group (eg. sour cream, candy, gravy) was similar to the previous report (1.1 vs 1.6 items); these foods contributed to nutrient provision but could not be assumed to have been consumed within one to three days, ie., to meet CFGHE or RNI recommendations.

7.3 CONCLUSION

As a monitoring activity, these data show that the food and nutrient provision via emergency food supplies remains, as expressed by Tarasuk and MacLean (1990b), "haphazard at best". Despite continued efforts by food bank staff and volunteers to improve the nutritional adequacy of emergency food bags (Jacobs Starkey and Lindhorst, 1996), these supplies, due to variation in content, can only be considered a budgetary adjunct versus a reliable nutritional support. Solutions other than food banks must be explored to advance food and nutrition security in Canada.

Table 7.1. Examples of Food Bags

Bag 1 Least number of items offered (n = 4)		Bag 2 Most number of items offered (n = 27)		Bag 3 Mean number of items offered (n = 13)	
32 slices	white (French) bread	141 g	fruit punch powder (Cherry)	4	sweet potatoes (12.7 x 5.1 cm)
500 g	dry spaghetti noodles	77 g	dry leek soup	20	carrots (20 x 2.5 cm)
250 g	whole wheat crackers	225 g	whole wheat crackers	4	broccoli spears
315 ml	sour cream, 14%	284 g	chocolate hazelnut pudding mix	1760 g	romaine lettuce (4 stalks)
		284 ml	condensed cream of chicken soup	1350 g	French bread (32 slices)
		384 ml	canned, diced beets	500 ml	sour cream, 14%
		398 ml	canned chicken gravy/sauce	225 g	soda crackers
		184 g	canned ham flakes	8 oz	bottled lemon juice, conc.
		425 g	canned spaghetti and meatballs	60 g	onion soup mix (dry)
		295 ml	cranberry grape drink with vitamin C	500 g	spaghetti (dry)
		106 g	canned sardines (in oil)	12 sl.	fresh watermelon (25 x 2.5 cm)
		220 g	clear hard candy	16 sl.	whole wheat bread
		289 ml	dry elbow macaroni	500 ml	mayonnaise
		2 oz.	dry cheese sauce mix		
		350 g	chocolate marshmallow cookies		
		678 g	Italian bread		
		675 g	whole wheat bread		
		1300 g	white bread		
		575 g	light rye bread		
		225 g	pita pockets		
		450 g	raisin bread		
		300 g	plain white rolls		
		200 g	hard crust white rolls		
		550 g	mayonnaise		
		340 g	dry onion soup mix		
		125 g	stick margarine		
		540 ml	canned whole carrots		

Table 7.2. Nutrient content of emergency food bags (n = 20 sites) expressed as number of adult 'person-days' days of RNI met

Nutrient	RNI	Days of Food Supply	Range
Energy (MJ)	11.3	4.8	1.3 - 8.0
Protein (g)	64	6.0	1.8 - 12.8
Vitamin A (RE)	1000	24.5	0.4 - 170.7
Thiamin (mg)	1.1	11.6	3.4 - 21.4
Riboflavin (mg)	1.4	7.6	1.7 - 14.5
Niacin (mg)	19	6.3	1.9 - 10.7
Vitamin B_{12} (mcg)	2.0	8.9	0.7 - 21.6
Folate (mcg)	240	9.5	2.5 - 19.5
Vitamin C (mg)	60	17.1	0.1 - 46.2
Vitamin D (mcg)	2.5	4.4	0 - 74.8
Calcium (mg)	800	4.2	0.9 - 9.1
Iron (mg)	8	11.6	4.0 - 21.6
Magnesium (mg)	250	6.1	2.2 - 11.3
Zinc (mg)	9	3.4	1.0 - 7.4

[1] RNI = recommended nutrient intake (Murray and Beare-Rogers, 1990)

Table 7.3. Mean number of servings from the food groups of Canada's Food Guide To Healthy Eating (CFGHE) provided by emergency food bags (n=20) on a 'per-day' basis for a single adult

	CFGHE*	Mean Servings in Food Bags (n = 20)
Grain Products	5 - 12	23.2
Vegetables and Fruits	5 - 10	10.6
Milk and Milk Products	2 - 4	0.6
Meat and Alternatives	2 - 3	1.6
Other foods (no. items)	--	1.1

* CFGHE recommended adult servings range (Health and Welfare Canada, 1992)

CHAPTER 8

DISCUSSION AND CONCLUSIONS

Food security, in the context of nutritional health of Canadians, emerged as a topical issue in the late 1980s (Campbell et al., 1988; Welsh, 1989). In 1996, food security was adopted as a clear priority in the national agenda (Joint Steering Committee, 1996). On World Food Day, 1998, Canada's ten priorities for action toward food security were released (Canada's Action Plan for Food Security, 1998). The goal of this research, to investigate the nutrition and sociodemographic characteristics of food bank users, was relevant.

The first objective was to investigate the socioeconomic, demographic and cultural characteristics of individuals seeking food assistance, to answer the question: who uses food banks? Food banks did not serve those generally considered to be the most vulnerable: the elderly, lone parents with large families and people with limited education. Food bank users were young men and women receiving social assistance benefits, who considered themselves to be healthy; median body mass index was 27. Less than 13% of the households represented single-parents with children under age 18 years; mean household size was 2.4±1.5 persons. Almost 40% of clients had technical, college or university education.

The food bank was seen as a necessary community service and was used at least once a month by 67% of the clientele. A new report by Tarasuk and Beaton (1999), who used in-depth qualitative inquiry processes with women seeking food assistance, revealed the women's view of the food bank as an embarassment. This difference may have arisen from their more exploratory technique compared to the structured interview format in this research.

It was important for the characterization of food bank users to include documentation of their nutrient intake status on the day prior to seeking food assistance, in order to answer these questions: 1) how low does food intake go before people go to food banks? 2) do food bank users meet dietary intake recommendations on the day prior to seeking food assistance? Mean energy intake of men and women 18-49 years was below recommended levels on the day prior to seeking food; calcium intake for all age and sex groups and zinc intake for men age 18-49 y was below recommended levels. Intakes were not different from the general population but large variation in intake of food bank users was observed. The characterization of food bank users was a new contribution to knowledge.

The next step was to define the percentage of recommended food and nutrient intake achieved week-by-week over an entire one month period, in order to assess the ability of food bank users to maintain dietary status over a period of declining cash availability. Would there be a change in dietary status over the month? When was intake highest? Lowest? Or was it constant? Four hundred and twenty-eight people completed all four

dietary interviews. Macronutrient intake did not differ by week. Mean energy intake was similar to other adult populations, varying as expected with age and sex, and also did not vary by income-week. With the exception of calcium, mean nutrient intakes met recommended levels and did not differ by income-week, ie., were not influenced by clients' time to the next cheque. Mean intake of Milk Products was below the recommended two servings for all age and sex groups and Vegetable and Fruit intake was below the recommended minimum five servings for women age 18-49 years. Both men and women had mean intakes of Grain Products and Meat and Alternatives above minimum recommended levels. Thus, energy and nutrient intake was stable throughout the month but variability around intake was high.

The next priority was to investigate the relationship between overall intake of nutrients and possible correlates of intake. The question to be answered was: who has the highest or lowest intakes? Food bank users not born in Canada had higher intakes of folate and vitamin C. Education was positively associated with intake of folate, vitamin C and vitamin A. Large household size was negatively correlated with folate, vitamin C, iron and thiamin intake, as was frequent food bank use for folate, protein, vitamin C, calcium, magnesium and zinc. Finally, smokers' intakes of folate, protein, vitamin C, iron and thiamin were lower than for nonsmokers, and were not related to a lower energy intake among smokers.

The last step was to investigate how many days of food support were provided by the

participating food banks. Were the food groups of Canada's Food Guide to Healthy Eating represented in the food bags? No difference was found, by food bank size, for the number of food items provided. The mean number of food group servings per day available in a bag for an individual adult exceeded the minimum recommended level for Grain Products and Vegetables and Fruit; Milk Products and Meat and Alternatives provisions were below two servings per day. Folate, vitamin C and vitamin A were well supplied in the food bags.

8.1 Limitations and Future Direction

One limitation was in the use of software that could not group food sources of nutrients; such a program was not available when these data were collected and coded. This information would expand the usefulness of the food group intake data to explain food sources of nutrients. For example, we determined that overall mean zinc intake met recommended levels for all age and sex groups, but intakes by income-week were sometimes lower. With grouping by food source we would have been able to determine the contribution of meat and other animal products to zinc intake, at each income-week, and to assess when other less expensive zinc sources also contribute largely to zinc intake.

It would be of interest to include questions in the area of food preparation and cooking facilities. The new finding that people whose country of birth was Canada obtained less of the nutrients associated with vegetables and fruit, could have been explored regarding

food preparation practices. It is possible that food storage facilities limit fresh vegetables and fruit purchase, or again, that food bank users have limited cooking skills or lack the habit to include vegetables and fruit in their meals. Food preparation traditions could be explored among food bank users whose country of birth is outside Canada in comparison to those born in Canada to explain these differences. Grouping of data dichotomously by country of birth (Canada or outside of Canada) may lead to diminished capacity to differentiate cultural food patterns. It would have been ideal to have sufficient numbers in country or cultural subgroups to better understand preferred food patterns.

A consideration for future research became apparent. The high completion rate (87%) suggested that it may have been possible to consider a further commitment from clients, ie., to visit clients at 3, 6 and 12 months to re-assess food assistance use (continuance or not), to answer the following questions: 1) did these educated, healthy young clients remain in the social assistance support system, including use of food bank provisions? 2) Did food group and nutrient intake change from the 'baseline' period we documented? If so, why?

Finally, a related study would be to investigate clients' use of the food provisions supplied by the food assistance sites. Are clients familiar with the food they receive? Are the food items received used immediately or added to family food stores? How do food banks differentially provision food bags for households of varying size? What are the barriers to use of food provided? Answers to these questions may help food banks develop food use

awareness programs to connect food distribution to food use and health.

A few closing comments are offered. Given that the proportion of food bank users' income allocated to food and shelter was more than 25% above the low-income cutoff, serious consideration must be given to non-food factors affecting nutritional well-being of the clientele. Low-income housing availability and cost requires attention. Further, clients stated that what would help them the most was "a job"; employment, then, is a second important non-food factor important to food bank users. To reach the goal of food security requires solutions other than refinement of the food bank system and the provisions offered.

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INTRODUCTION

Adequate nutritious food is a prerequisite to good health. For those who cannot afford to buy food for themselves and their families, dependency on soup kitchens is a reality. Soup kitchen meals can provide 3 to 7 meals a week, during personal emergency times or over extended periods. Optimizing the food and nutritional value of supplies available to prepare soup kitchen meals is a challenge.

The aim of this project was to promote use of the "excess" food resources available from a local food bank and to assist a community agency to integrate these seasonal, perishable foods into soup kitchen meals. The complementary goal was to decrease meal costs while maximizing the nutritional benefit of soups prepared from foods distributed by the food bank.

Soup recipes that utilized seasonally abundant perishables were developed or collected, adapted, tasted and costed. Nutritional analysis to determine recommended soup complements was conducted, so that approximately one-third of the adult recommended daily nutrient intake could be provided by the soup-based meals.

The enthusiasm and commitment of the agencies, meal recipients and volunteers made the project an enjoyable learning experience for all.

SOUPS FROM SURPLUS

Soup Kitchen Recipes Using Seasonal Surpluses

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December 1991

GETTING STARTED

Tips on nutritious food combinations and safe food handling complemented soup meal preparation activities during the project. Posters were developed in collaboration with volunteers, to serve as long term reminders and resources from this recipe project.

POSTER #1

FOOD SAFETY

To make certain food is kept safe from contamination it has to be:

- clean and free of dirt
- at least 6 inches (15 cm) off the floor during storage
- away from non-food products that may give it an odor or contamination

Canned goods need to be checked and rotated on a regular basis. Any unlabelled or damaged cans or cans with swollen ends should be thrown away.

Packaged goods must be completely sealed. Any punctured boxes or torn packages should be discarded.

School of Dietetics and Human Nutrition McGill University 1991

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As we neared completion of our project, Ontario's City of York Health Unit, Nutrition Division, publication "Eating Better ... A Basic Shelf Cookbook" by J. Miele and M. Edwards was reviewed. We acknowledge adapting their format for presentation of our soup recipes and recommend this resource for low-cost entrée recipes.

Your body needs the nutrients provided in many different foods. The boards posted in the food room provide a guideline to meet these needs.

In general, there are 4 categories in which foods are classified; all provide energy for the body but they are grouped by their common nutrients and role in the body.

MEAT AND SUBSTITUTES	FRUITS AND VEGETABLES
Mainly provide protein, iron and vitamin B_{12} needed for building and repairing tissue (muscle, hair, nails) eg. meat, chicken, fish, eggs, peanut butter, cooked and dried beans, peas and lentils	Mainly provide vitamins and minerals needed for body's functions, and energy. eg. all fresh, frozen, canned fruits and vegetables, fruit and vegetable juices
MILK AND MILK PRODUCTS	**BREADS AND CEREALS**
Mainly provide riboflavin, calcium and Vitamin D needed for teeth and bones, Vitamin B_{12}, protein and other vitamins. eg. milk, yogurt, cheese	Mainly provide carbohydrates, protein and fibre, vitamins and minerals needed for metabolism eg. spaghetti, macaroni, breads, rice, cereal

Items in each group provide similar nutrients the body needs and therefore can replace one another. If one food choice is not available choose a replacement from the same group.

School of Dietetics and Human Nutrition McGill University 1991

The soup recipes in this booklet were developed to use mainly vegetable ingredients available to the community centre from the food bank. The foods listed as SURPLUSES FOR SOUPS were free of charge and were not costed in the recipes. Soup costs reflect only ingredients which will likely need to be purchased to make the soup. Our aim was to use the available surpluses more effectively than had been possible in the past.

SURPLUSES FOR SOUP KITCHEN SOUPS

Beets
Broccoli
Cabbage
Carrots
Cauliflower
Celery
Corn
Cucumber
Green Pepper
Green beans
Leeks
Lettuce
Lima beans
Onions
Parsley
Potatoes
Shallots
Spinach
Tomatoes
Turnip
Yellow beans
Yogurt
Zucchini

SURPLUS FOR SOUP potatoes, onions, parsley
COST / PORTION $0.04
PORTION SIZE 350 ml

POTATO HERB SOUP					
INGREDIENTS	YIELD / PORTIONS				METHOD
	1	15	30	60	
Potatoes, peeled, diced Chicken stock (prepared)	670 g 500 ml	1.6 Kg 1.2 L	3.3 Kg 2.5 L	6.7 Kg 5.0 L	1. In a 25 L soup pot, combine chicken stock and potatoes. Bring to a boil and simmer 30 minutes, covered. Set aside.
Onion, coursely chopped Margarine	115 g 25 g	290 g 60 g	575 g 125 g	1.1 Kg 250 g	2. Cook onion with margarine in a 5 L saucepan. Simmer for 10 minutes until onions are tender.
Garlic powder	10 ml	25 ml	50 ml	50 ml	3. To the 25 L soup pot, add the garlic powder.
Flour, all purpose	15 g	40 g	75 g	150 g	4. Stir flour into onion and margarine and cook on medium heat, stirring for 2 minutes. 5. Mash potatoes coursely with a potato masher. 6. Add onion mixture to the potatoes; stir well.
Skim milk (prepared), heated	1.0 L	2.5 L	5.0 L	10.0 L	7. Place soup pot over medium-high heat; gradually add hot milk. Bring to a boil, stirring constantly.
Salt Black pepper Parsley	2 ml 10 ml 20 ml	5 ml 25 ml 50 ml	10 ml 50 ml 100 ml	15 ml 50 ml 200 ml	8. Season with salt, pepper, and parsley. 9. Simmer until serving time.

RECOMMENDED MEAL COMPLEMENTS ARE NEEDED TO MEET ONE-THIRD OF RECOMMENDED DAILY NUTRIENT INTAKE to strengthen the intake of energy, protein, vitamins A and C, calcium magnesium, iron, zinc and B vitamins. This soup uses up the potatoes in stock bu requires additional foods to meet recommended nutrient intake.

MEAT, FISH, POULTRY AND ALTERNATES Lima beans (added to soup) or egg for sandwich
MILK AND MILK PRODUCTS -
FRUITS AND VEGETABLES Tomato juice
BREADS AND CEREALS Whole grain bread with margarine

SURPLUS FOR SOUP spinach, onions, yogurt
COST / PORTION $0.02 [with rice = $0.05/400 ml]
PORTION SIZE 375 ml

CREAM OF SPINACH SOUP					
INGREDIENTS	YIELD / PORTIONS				METHOD
	1	15	30	60	
Spinach	600 g	1.5 Kg	3.0 Kg	6.0 Kg	1. In a 25 L soup pot, cook spinach covered tightly over low heat for 5 minutes. Turn spinach leaves and cook for 3 to 5 minutes longer. Set aside.
Margarine Onions, chopped	40 g 40 g	100 g 100 g	200 g 200 g	400 g 400 g	2. Cook onions and margarine on low heat, stirring constantly, until onion is tender.
Flour, all purpose	30 g	75 g	150 g	300 g	3. Sprinkle in flour and blend.
Skim milk (prepared) [Optional: rice, dry]	500 ml 250 g	1.2 L 700 g	2.5 L 1.4 Kg	5.0 L 2.8 Kg	4. Stir in milk until mixture is smooth and slightly thickened. [Add rice and stir. Cook for 30 minutes]
Salt Black pepper Nutmeg Plain yogurt	1 ml 2 ml 2 ml 210 g	2 ml 5 ml 5 ml 525 g	5 ml 10 ml 10 ml 1.0 Kg	10 ml 10 ml 20 ml 2.1 Kg	5. Puree spinach in a blender and return to soup pot. Add onion and milk mixture. 6. Add seasonings and plain yogurt. 7. Cook on low heat until soup is well blended and hot. Serve.

RECOMMENDED MEAL COMPLEMENTS ARE NEEDED TO MEET ONE-THIRD OF RECOMMENDED DAILY NUTRIENT INTAKE to strengthen the intake of energy, protein, zinc, riboflavin and niacin.

MEAT, FISH, POULTRY AND ALTERNATES -
MILK AND MILK PRODUCTS -
FRUITS AND VEGETABLES Carrot sticks (from surpluses); canned fruit or surplus
BREADS AND CEREALS Whole grain muffins (+ margarine)

SURPLUS FOR SOUP onions, potatoes, green beans, parsley
COST / PORTION $0.07
PORTION SIZE 375 ml

GREEN BEAN SOUP					
INGREDIENTS	PORTIONS				METHOD
	5	10	25	50	
Margarine Onion, chopped Garlic powder	30 g 200 g 5 ml	35 g 525 g 15 ml	100 g 1.0 Kg 25 ml	175 g 2.1 Kg 30 ml	1. Sauté onion, garlic powder and margarine on medium heat until onion is soft or for 5 minutes.
Potatoes, diced Green beans, cut Chicken stock (prepared)	350 g 280 g 1.0 L	875 g 700 g 2.5 L	1.7 Kg 1.4 Kg 5.0 L	3.5 Kg 2.8 Kg 10.0 L	2. Add potatoes, green beans and chicken stock. Cover and simmer 1 hour.
Lentils, soaked & drained Skim milk (prepared) Salt Black pepper Parsley, dry or fresh	40 g 1.0 L 5 ml 5 ml 15 ml	100 g 2.5 L 15 ml 15 ml 40 ml	200 g 5.0 L 25 ml 25 ml 75 ml	400 g 10.0 L 30 ml 30 ml 150 ml	3. Add lentils, soaked and drained, and skim milk, salt, black pepper and parsley. Simmer covered for 45 minutes. 4. Turn on lowest heat until serving time.

RECOMMENDED MEAL COMPLEMENTS ARE NEEDED TO MEET ONE-THIRD OF RECOMMENDED DAILY NUTRIENT INTAKE to strengthen the intake of energy, protein, vitamin A, calcium, zinc and niacin.

MEAT, FISH, POULTRY AND ALTERNATES -
MILK AND MILK PRODUCTS Low fat fruit yogurt
FRUITS AND VEGETABLES -
BREADS AND CEREALS Plain muffins with margarine

SURPLUS FOR SOUP onions, tomatoes, zucchini, parsley
COST / PORTION $0.08
PORTION SIZE 375 ml

SUMMER VEGETABLE SOUP					
INGREDIENTS	PORTIONS				METHOD
	5	10	25	50	
Lima beans, dry	190 g	475 g	950 g	1.9 Kg	1. Soak lima beans in water overnight. Drain.
Margarine Onions, chopped	30 g 210 g	70 g 525 g	140 g 1.0 Kg	280 g 2.0 Kg	2. In a 25 L soup pot, add margarine and onions, cooking until limp, approximately 5 minutes.
Garlic powder	5 ml	10 ml	20 ml	40 ml	3. Add garlic powder.
Chicken broth (prepared) Zucchini, chopped Tomatoes, diced Bay leaves, each	1.0 L 320 g 600 g 2	2.5 L 800 g 1.5 Kg 5	5.0 L 1.6 Kg 3.0 Kg 10	10.0 L 3.2 Kg 6.0 Kg 20	4. To the soup pot, add zucchini, tomatoes, lima beans and bay leaves. Cook for 30 minutes. 5. Puree with a blender or a potato masher.
Skim milk (prepared) Parsley, dry or fresh	500 ml 10 ml	1.25 L 40 ml	2.5 L 60 ml	5.0 L 125 ml	6. Add skim milk and parsley to the pot. Cook for 30 minutes. 7. Turn on lowest heat until time to serve.

RECOMMENDED MEAL COMPLEMENTS ARE NEEDED TO MEET ONE-THIRD OF RECOMMENDED DAILY NUTRIENT INTAKE to strengthen the intake of energy, protein, vitamin A, calcium, zinc and niacin.

MEAT, FISH, POULTRY AND ALTERNATES -
MILK AND MILK PRODUCTS Low fat fruit yogurt (from surplus)
FRUITS AND VEGETABLES Canned fruit or juice
BREADS AND CEREALS Wheat and bran muffins with margarine

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RESEARCH/RECHERCHE

An Evaluation of Emergency Food Bags[1]

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Abstract/Résumé

Increasing reliance on private food assistance has been well publicized. The objective of this study was to document food group and nutrient content of emergency food bags provided by a large community service organization. Randomly selected food bags were assessed for food group portions offered, and nutrient composition. Food bags for individuals contained 17±3 different items. The per cent contribution of macronutrients to energy was 12.4, 30.8 and 56.8 for protein, fat and carbohydrate, respectively. On a per person per day basis, provision of foods to meet the guidelines for *Canada's Food Guide to Healthy Eating* was successful for grain products (5-10 servings), highly variable for vegetables & fruit and meat & alternatives (4-12 and 1-8 servings, respectively) and inadequate for milk products (<1 serving). Calcium, vitamin D and vitamin A were the nutrients most often below recommended intake levels. (J Can Diet Assoc 1994;55:175-178)

On a beaucoup parlé de la dépendance croissante envers l'aide alimentaire privée. L'objectif de cette étude était de documenter la teneur en groupes d'aliments et en nutriments des sacs de provisions d'urgence fournis par un grand organisme de services communautaires. Les sacs, choisis au hasard, ont été évalués quant au nombre de portions offertes par groupe d'aliments et quant à la composition en nutriments. Les sacs individuels renfermaient 17±3 produits différents. La contribution énergétique des macronutriments se chiffrait à 12,4, 30,8 et 56,8 % respectivement pour les protéines, les matières grasses et les glucides. Sur une base individuelle et journalière, les provisions satisfaisaient aux directives du Guide alimentaire canadien pour manger sainement pour les produits céréaliers (5-10 portions); elles étaient très variables pour le groupe «légumes et fruits» et «viandes et substituts» (4-12 et 1-8 portions, respectivement) et insuffisantes pour les produits laitiers (<1 portion). Le calcium, la vitamine D et la vitamine A étaient les nutriments qui étaient le plus souvent inférieurs aux apports recommandés. (Rev Assoc can diététique 1994;55:175-178)

Introduction

Food security was described as a priority issue for The Canadian Dietetic Association in a 1991 report by the Ad Hoc Committee on Hunger and Nutrition (1). Policy, liaison, advocacy, monitoring and research recommendations were outlined to support the goal that all Canadians have access to sufficient quality foods through personally acceptable means (2). Friedman (3) suggests that dietitians can assist food agencies by providing guidelines on quantities of foods needed and by evaluating nutrients provided by food donations. Alleviation of acute food shortage by way of well-stocked emergency food bags is not suggested as a solution for the daily personal and household food concerns of low-income Canadians. Yet with repeated use of emergency food assistance a reality in many Canadian cities (4,5), the food and nutrients offered require evaluation.

The objective of this descriptive study was to document the food group and nutrient content of emergency food bags provided by a large community service organization in metropolitan Montreal. Results provide the basis for staff and volunteer education to assure best use of limited resources and to guide food solicitation from corporate and individual donors.

Methods

For a period of six months, January to June, food bag contents and client sociodemographic parameters were recorded.

Demographic Data: According to the usual procedures of the food assistance agency, all clients seeking emergency food assistance provided identification. Data were recorded so that individuals could not be recognized in a personal context. Only daily tallies of age, gender, family size and income source were saved. Twenty-one weeks of client data were collected; on four holiday dates food bags were distributed but no client data were recorded.

Food Bag Contents: Once a week, a randomly selected food bag was pulled from the shelves or cart and examined. A total of 25 bags packed for individuals were assessed. Food bag contents were recorded, coded for computer nutrient analysis using data from the Canadian Nutrient File (Food Processor Version 5.0, ESHA Research, Salem, Oregon), and priced at both a local grocery store and convenience store (dépanneur). Conversion to food guide portions (Canada's Food Guide to Healthy Eating, 1992, Health and Welfare Canada, Ottawa) (6) was completed, converting where necessary from "as purchased" to "edible portion" (7,8). It was intended that the food guide-based analysis could provide a framework understood by dietitians and the public to describe the number of servings of food offered (9). Detailed nutrient analysis would guide recommendations for specific food or food groups that may be needed to better meet dietary guidelines.

Data Handling: Descriptive statistics were generated using SYSTAT for Windows (SYSTAT, Inc. 1992, Version 5 Edition, Evanston, Ill.). These data were useful to describe the variability of food bags provided and could serve as a base-

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line for comparison, for example, after staff and volunteer nutrition education.

Results and Discussion

Increasing reliance on private food assistance has been documented in the United States (10,11) and Canada (5,12). Use has increased the most in Quebec, where the number served per month increased 69% over an 18 month period (5). It is reasonable, therefore, to look at the family size and income source of clients participating in one Canadian emergency food assistance program (Table 1) and compare them to other groups. Of the 6773 clients seeking food for themselves or their family during the study period, 2484 (36%) were female and 4289 (64%) were male. The average age was 36±3.8 and 37±3.6 years, respectively. Emergency food program users in New York were of a similar age (10). Smith and Hoerr (11) found Michigan food assistance program users to be younger (25.8±5.3 years of age) with 3.9±1.5 persons per household. In this study, the mean family size was two, but those living alone were the largest subgroup at over half (52.6%) of the population served. Almost 15,000 people in total are represented by the households served. Income data are similar to those of Oderkirk (5), who summarized national data available from the Canadian Association of Food Banks. Lenhart and Read (13) found 28% of their clientele reported an income from part-time or casual work.

TABLE 1

Family size and source of income of emergency food program users (N=6773)

Family Size (%)*		Reported Source of Income (%)*	
1	52.6	Social assistance	76.3
2	18.1	Unemployment insurance	10.6
3	11.7	Pension	<0.1
4	9.6	Work	1.2
5	5.1	Other income	7.5
6	2.0	No income	<0.1
7	0.6	No data	3.9
8	0.3		
≥9	0.1		

differences from 100% represent rounding

Twenty-five emergency food bags were examined over a six-month period (Tables 2 and 3). Not unexpectedly, the market value of food was 26% higher when priced at a convenience store (dépanneur) compared to the cost at a large supermarket (paired t-test, $P<0.01$). This information could be valuable in discussion with clients on the impact of food store choice on the household food bill.

The per cent contribution of macronutrients to energy provided by food in the emergency food bags was 12.4, 30.8 and 56.8 for protein, fat and carbohydrate, respectively. This compares favorably with information provided in a recent report on Canadian food purchase data (14). The FOODEX Survey found energy distributed as 14.9% protein, 36.9% fat, and 48.2% carbohydrate. A report from Texas cited higher protein (19%) and lower carbohydrate (55%) and fat (26%) in food bags (3).

Each emergency food bag in this study was meant to provide approximately three days food supply for an individual. The number of bags a family was given was based on the number of people in the household. Comparing servings of food groups provided in *Canada's Food Guide to Healthy Eating* (CFGHE), the bags were not always "complete". On 16 days there were no milk products; yogurt was the milk product most frequently provided. Data for milk products are skewed upward because dry milk powder was available on one day. Meat and

TABLE 2

Contents of three sample emergency food bags*

Bag 1	
Cream of mushroom soup, canned, condensed	2 x 284 ml
Macaroni and cheese dinner, dry, package	225 g
Pasta salad, package	225 g
Spaghetti, noodles, dry	500 g
Mayonnaise	750 ml
Breakfast cereal, cold	450 g
Peanut butter, canned	796 ml
Corn nibblets, canned	341 ml
Pudding mix, dry, package	186 g
Canned corned beef	340 g
Tuna canned in oil	184 g
Pineapple tidbits, canned, in juice	796 g
Instant coffee	500 g
Beef stew, canned	680 g
Beef meatball in tomato sauce, canned	425 g
Bag 2	
Macaroni and cheese dinner, dry, package	225 g
Chick peas, canned	540 ml
Peach halves, heavy syrup, canned	796 ml
Green beans, canned	398 ml
Whole tomatoes, canned	796 ml
Spaghetti in tomato sauce, canned	398 ml
Tuna canned in water	184 g
Ready-to-serve vegetable soup, canned	796 ml
Beef soup, condensed, canned	284 ml
Macaroni noodles, dry	500 g
Italian salad dressing	250 ml
Crunchy peanut butter	375 g
White bread, loaf	398 g
Fruit salad, light syrup, canned	142 ml
Bag 3	
Pineapple grapefruit drink	341 ml
Tuna canned in water	147 g
Green beans, canned	398 ml
Yellow beans, canned	398 ml
Beets in soup, canned	398 ml
Pineapple tidbits, in juice, canned	549 ml
Salad dressing, specialties	500 g
Barbeque sauce	425 ml
Tomato sauce, canned	398 ml
Macaroni and cheese dinner, dry, package	225 g
Spinach spaghetti noodles, dry	375 g
Cinnamon cookies	300 g
Soda crackers, salted	225 g
Oat bran cereal, cold	575 g
Strawberry jam	500 ml
Fresh cabbage	1 kg
Oatmeal cookies	454 g

all commercial names have been omitted but were available for coding and nutrient analysis

alternatives were provided most frequently as canned tuna and peanut butter, followed by canned stew or meatballs. On four days, a single tin of fish provided the meat and alternatives selection in the three-day emergency food bags. Canned legumes were provided in nine bags. Vegetables and fruits were represented by canned tomatoes, tomato sauce, green beans, corn, juices, pears, pineapple and fruit cocktail. Fresh produce was available in six bags; one citrus was provided during the 25 weeks of the study. Pasta and cold cereals were the most common grain products with occasional bags containing canned pasta meals or frozen bread. Other food included salad dressing, cookies, pudding mix, dry soup packages, jam, barbeque sauce and fruit drinks. A US study reported more meat protein, meat alternates, milk and fresh fruit, explaining the higher protein and carbohydrate content of their food boxes (3).

A closer look at nutrients provided in the emergency food bags is found in Table 4. A limitation of using nutrient values in place of food group choices lies in the assumption of intake. It is reasonable to assume that the entire loaf of bread, can of vegetables or package of pasta may be consumed within three days. This may not hold true for the powdered milk or the bottles of sauce, jams and peanut butter. Therefore, nutrient availability may seem inflated when considered independent of the food itself. An example is the case of vitamin D. At 4.7 ug/day the availability seems adequate, yet the mean of 25 days of vitamin D data is skewed by 500 g of dry milk powder on one day. Calcium availability is also inflated by this one day. Food group data (Table 3) show that these nutrients are most likely to be inadequate in emergency food bags. Lenhart and Read found calcium to be inadequate 76% of the time for male food bank users (13). These and other authors (10) concluded that even with these limitations, if private food assistance were to decrease, the risk of food insecurity could only increase.

The per day range of nutrients (Table 4) shows that vitamins A, B12, C and D, calcium, iron and zinc were inadequately supplied on some days.

TABLE 3

Average contents of emergency food bag for one person (N = 25)

Number of items/bag	17.4 ± 2.8[1]	Energy distribution (%)	
Value of foods provided ($)		Protein	12.4 ± 2.2
Supermarket	27.61 ± 5.9	Fat	30.8 ± 11.7
Convenience store	34.90 ± 7.5[2]	Carbohydrate	56.8 ± 11.5

Food group servings provided	3 days[3]	per day[4]	CFGHE[5]
Grain products	39.3 ± 15.6	(5-18)	5-12
Vegetables & fruit	25.0 ± 11.7	(4-12)	5-10
Milk products	1.5 ± 3.5	(0-1)	2-4
Meat & alternatives	12.8 ± 10.1	(1-8)	2-3
Other foods	4.9 ± 2.1	(1-2)	

[1] *mean ± standard deviation, throughout*
[2] *significantly different from the supermarket value ($P < 0.01$)*
[3] *mean of 3 day supply*
[4] *range, mean of 3 day supply ÷ 3*
[5] *Canada's Food Guide to Healthy Eating (9)*

TABLE 4

Nutrient content of emergency food bags (N=25)

Nutrient	Mean (3 days)[1]	Per day (range)[2]	RNI (♂)[3] (15)	RNI (♀)[3] (15)
Energy (MJ)[4]	55.7 ± 14.9	18.6 (13.6-23.5)	11.3	8
Protein (g)	418 ± 123	139 (98-180)	64	51
Vitamin A (RE)	2949 ± 1886	983 (354-1612)	1000	800
Thiamin (mg)	10.4 ± 4.4	3.5 (2.0-4.6)	1.1	0.8
Riboflavin (mg)	8.3 ± 4.9	2.8 (1.1-4.4)	1.4	1.0
Niacin (NE)	151 ± 48	50 (34-66)	19	14
Vitamin B12 (ug)	10.8 ± 8.7	3.6 (0.7-6.5)	1.0	1.0
Folate (ug)	1367 ± 542	456 (272-636)	230	185
Vitamin C (mg)	391 ± 355	130 (13-260)	40	30
Vitamin D (ug)	14 ± 27	4.7 (0-14)	2.5	2.5
Calcium (mg)	3311 ± 2507	1104 (241-1968)	800	700
Iron (mg)	106 ± 35	35 (0-23)	9	13
Magnesium (mg)	1804 ± 592	601 (404-799)	250	200
Zinc (mg)	45 ± 16	15 (10-20)	12	9

[1] *mean ± standard deviation*
[2] *mean 3 day supply ÷ 3; range of nutrients for one day*
[3] *age 25-49 years*
[4] *kilocalories per day = 4436 (3247-5624)*

Conclusion

Emphasis on the best use of limited resources is a priority for food assistance programs. Where prepacked food bags or boxes are provided, dietitians have an important role to play in advising emergency food organizers on what and how much food to offer in order to reasonably support clients' immediate food needs. This study supports the importance of including food group analysis along with nutrient assessment of emergency food bags. Results form the foundation for nutrition education for emergency food program staff and volunteers. Local initiatives such as this can contribute to better

understanding of food assistance problems and interim solutions. A description of the potential dietary contribution of foods which are usually provided may help sensitize dietitians and community leaders to the quality of local food assistance.

Further research is needed to document seasonal variability in emergency food assistance supplies, frequency of repeated use of food assistance programs, and dietary status of clients who seek food assistance.

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Appendix III
Emergency Food Bags Offer More Than Food

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Figure 1. Assigning foods to the appropriate food group.

Food security has emerged as a priority for many dietitians and home economists in North America, arising from the proliferation of emergency food packages in thousands of urban and rural communities. This proliferation prompts many questions: Do the foods provided meet an individual's or family's needs? Where can food assistance program staff and volunteers obtain information to help them improve the quality of the food provided? How can nutrition educators train a diverse audience to assemble a nutritionally balanced emergency food package? When developing such a training, consideration must be given not only to the nutrition message, but also to participants' educational level and problem-solving skills.[1,2] For example, print materials may not be effective for an audience with varied cultural and literacy backgrounds.

To answer some of these questions, an interactive nutrition education workshop was implemented at a large, urban food assistance agency. The workshop targeted food procurement coordinators and volunteer food bag packers who came from the local community and were often food assistance recipients themselves. The objective of the workshop was to teach coordinators and volunteers the principles of *Canada's Food Guide to Healthy Eating*[3] (similar to the U.S. Food Guide Pyramid), and how to use it as a guideline for packing and monitoring the nutritional adequacy of emergency food bags.[4]

To introduce the Food Guide concept, one workshop participant's food intake from the previous day was recorded on a blackboard. The workshop leader then reviewed the concepts depicted in a large pictogram poster of the Food Guide, and compared the recalled intake to the Food Guide assigning foods to food groups and counting the number of servings from each food group. The poster of the Food Guide was then reviewed once more, with emphasis on the variety of foods within each group, serving sizes, and the recommended number of servings for an adult. The use of the poster allowed nonreaders and those with limited fluency in English or French to participate effectively. Non-Food Guide foods, such as jams, sauces, and desserts, were termed "extra energy foods" for the purpose of the workshop; there was no minimum level recommended, but a ceiling of three choices was applied.

Each participant then compared the contents of a prepacked food bag from the agency's food room to the Food Guide by unpacking "their" bag, assigning foods to the appropriate food group (Fig. 1), and counting the number of food group servings provided by each can, package, or bottle. Workshop leaders intervened when a participant was unsure of the correct food group assignment. A round-table discussion and display provided each participant with the opportunity to describe the adequacy of his/her food bag. Other participants recommended additions or deletions in each food group. Participants also discussed possible substitutions when meal-in-a-can items were available for the food bags or when specific types of food were in short supply (e.g., dairy and citrus foods).

The hands-on approach captured participants' attention; everyone wanted to see how their food bag fared in the evaluation. Staff and volunteers were brought together in a mutual learning experience. Both groups said the Food Guide principles became more tangible when they assessed the food group adequacy of "their own" food bag.

An additional result of this activity was that food bag packers were able to notify agency staff when foods from a specific food group were in limited supply. Cash donations or food solicitation could then be targeted to foods from that food group.

Careful management of limited food resources is important to emergency food assistance programs. A nutrition education activity to improve the balance of foods offered is one realizable step in this management

process. In the future, the agency would like to focus on consumption of emergency food provisions, for example, by providing simple, low-cost recipes when unfamiliar foods are distributed. Emphasis will continue to be placed on collaborative action to help resolve nutrition problems of low-income people.

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Appendix IV

McGILL / South-West Joint Committee

McGill University

Solidarité Saint-Henri

Little Burgundy Coalition

Action gardien / Table de concertation
des organismes communautaires de Pointe-St-Charles

Table de concertation de Ville-Émard et Côte-St-Paul

ANNUAL REPORT
1992 - 1993

BACKGROUND SURVEY

TOWARD A

COMMUNITY FOOD RESOURCE INVENTORY

AND

FORUM SUR L'ALIMENTATION DANS LE SUD-OUEST

Linda Jacobs Starkey, P.Dt., M.Sc.
School of Dietetics and Human Nutrition
McGill University

Caroline Breton, P.Dt.
Project Assistant

March 1, 1993

FORUM SUR L'ALIMENTATION DANS LE SUD-OUEST

INTRODUCTION

In October 1992 the goal and objectives toward a *Forum sur l'alimentation dans le sud-ouest* were defined (Appendix I). The goal is repeated here:

> *Le FORUM vise à faire un retour sur l'intervention des organismes communautaires en alimentation, afin de favoriser une plus grande convergence des actions visant la prise en charge et la conscientisation de la population à faible revenu du sud-ouest.*

Following this meeting, an action plan was developed and the cooperation of participants and resource groups was sought.

The School of Dietetics and Human Nutrition, McGill University, was contacted through Anne-Marie Bourdouxhe, University Relations Office; a meeting with France Legault (RESO), Jocelyne Gauvin (Le Club des consommateurs de Pointe Saint-Charles), Ms. Bourdouxhe, and Linda Jacobs Starkey, School of Dietetics and Human Nutrition, led a commitment by McGill to facilitate the *Enquete Ressources* section of the action plan through a leadership role in the following action steps:

1.1 *Demande comité conjoint McGill*
1.2 *Problèmatique, métho., quest. #1*
1.4 *Quest. #2, pré-test*
1.6 *Entrevue*
1.9 *Rapport final répertoire & analyse*

The final questionnaire to elicit requested information (Appendix II) was negotiated and community agencies were notified of the study by a letter (Appendix III) prior to any visit or appointment.

QUESTIONNAIRE INQUIRY

A list of community agencies in the four districts of the sud-ouest was updated when appointments were made for the questionnaire/interview (Appendix IV). A total of 64 agencies with some food component were identified; of these, 59 participated in an interview with the project assistant, Caroline Breton, P.Dt. Interviews were completed during the end of January and first two weeks of February. Each interview required approximately 30 minutes.

Representatives from the community agencies provided additional resource material when available. Overall findings are summarized as well as details provided by district.

OVERALL FINDINGS

While each district and each agency has it's own history, the main objectives in relation to community service are similar. These statements of *Objectives* have been extracted from survey questionnaires:

- helping the poor and people in need
- providing moral and spirtual support
- promoting health, well-being and improvement of social conditions
- offering first line health and social services
- offering a supportive and creative environment for children
- preventing isolation; developing autonomy
- informing people of rights and services
- facilitating resident participation in the community

Agencies may target their programmes and services to a specific sub-group in the community (children, young adults, pregnant women, single parents, adults, etc.) but overall, each district addresses all population groups through one or more agencies. The common thread is the low-income characteristic; sources of support are most often social assistance, workers compensation and unemployment insurance. Income status is frequently used as one criterion for admission to a community program.

Food support is offered by all agencies in the revised index (Appendix IV). Some centres are open daily, others weekly; some offer food bags once a week, some twice a week, and others daily during the end of the month only. Individual questionnaires can be consulted for specific details. There is, nonetheless, availability within a district of some form of food assistance every day. Since most programs require some form of registration, it is unlikely that a resident would participate in all services, though overlap is possible. In addition, parishes prefer to "help their own" while quickly affirming that those from another area would not be turned away.

Table 1 provides a summary comparison of the four sud-ouest districts' agencies. Food provision tends to be direct and measurable whereas nutrition education is often an indirect product of client involvement in a program.

TABLE 1. Number of Agencies Visited, Food Services and Agency Staffing

	Saint Henri	Petite-Bourgogne	Ville Emard/ Côte St-Paul	Pointe St-Charles
Community agencies: Total	(10)	(13)	(22)	(19)
Visited:				
Parishes (including Saint-Vincent-de-Paul)	4	3	5	1
Daycare	2	2	4	2
CLSC	1	1	1	-
Other	2	7	10	14
Food Services Offered:				
Nutrition education	4	5	3	11
Lunch for children	2	3	5	3
Dépannage	7	9	7	6
Food coupons	2	2	1	1
Christmas baskets	5	4	5	2
Community meals	1	4	3	6
Collective kitchens	1	1	3	3
Meals-on-wheels	-	2	1	1
Soup kitchen	-	2	1	-
Program facilitation	-	1	1	-
Snacks program	3	2	4	4
Agency Staffing:				
Full-time paid	26	38	56	35
Part-time paid	13	19	5	38
Volunteers	65	165	169	84
PDE: Prog. dev. d'emploi	-	10	8	2
Extra measure program	1	35	25	44

QUARTIER: VILLE EMARD CÔTE SAINT-PAUL

Of the 22 agencies identified with an implication in the food needs of this community, only 2 were unalbe to meet with the interviewer. The types of agency visited were:

Saint-Vincent de Paul	5
Garderie	4
CLSC	1
Other community agencies	10

TABLE 4.

Sommaire Des Services		Food	Nutrition Education	Clientele
St-Vincent-de-Paul	(1930, 1960, 1914, 1920)	Christmas baskets Food coupons Emergency food bags Depannage Cuisine collective	Via collective kitchens	Families Men and women Single parents
Garderies	(1992, 1984, 1970, 1986)	Hot lunch Breakfast; snack	Food discovery activities	Children
CLSC		Homecare help for food preparation	Prenatal nutrition	Adults
Other:				
Circle educatif	(1978)	Pre-cuisine collective	Healthy eating Meal planning	Parents & children
Maison coeur à tout	(1984)	Food supplements Community meals (10/yr)	Eating disorders	Adolescents
Centre de formation	(1979)	Depannage	Family budgeting	Single mothers
Centre comm. âines	(1991)	Community meal		Persons agées
Meals-on-wheels	(1988, 1972)	Meal service		Homebound elderly
Maison d'entraide et cuisine collective	(1991)	Food preparation	Via collective kitchen	Families
Centr'ami	(1988)	Community meals	Balanced meals	Adults
La Louche	(1991)	Locale for other agencies Children's lunch		
Toit Bethleem	(1972)	Soup supper Depannage		All ages

Beginning 150 years ago, residents of Petite-Bourgogne received aid from Saint-Vincent-de-Paul; the Mission Bon Accueil joined in community service 100 years ago, followed by local churches. Other community organizations have come into service throughout the sixties (2), seventies (1), eighties (2) and nineties (1).

There is a wide variety of food-related services available in the community. Depannage is the most common assistance offered with nine agencies reaching out to residents and homeless people. Foods are secured from Montréal Harvest directly, from Garde Mangé, parishoners and companies. Some cash donations are used to purchase foods in the parishes. Frequency of depannage varies with each agency from daily give-away to once-a-week at the end-of-the month. Collectively, there are always at least two agencies providing food bags to people every day; more sites are available after the 20th of the month. Over 550 families may be served per week by food bags.

Over 200 community meals per week provide socialization opportunities at modest cost ($1-2.50 plus annual membership ($5-15/year). Approximately 3 times a week a community meal program can be found somewhere in Petite-Bourgogne. In addition, soup kitchen lunches at no cost are found 3 days/week. For the homebound, meals-on-wheels reaches close to 30 people twice each week; $2.50 is charged for each meal.

Hot meals and a snack program at the garderies reach over 100 children 5 days/week. In addition, the Pagé lunch program extends to another group; meal cost is $.50.

Other programs include a collective kitchen (involving 16 families), Christmas baskets, food coupons, and nutrition, budgeting and cooking workshops. All age groups are served, though there is no specific "youth" or young adult program.

Garde Manger plays a major role both within the district, as a site for Pagé lunch preparation, and as the food distributor to 10,000 people via 36 member agencies throughout the neighbouring districts. Mission Bon Accueil serves over 36,000 hot meals and 15,000 breakfasts during the year. Snacks are available daily.

QUARTIER: POINTE SAINT-CHARLES

Seventeen of 19 agencies were visited for the questionnaire/interview. The types of community groups met included:

Church	1
Garderie	2
CLSC	-
Other community agencies	18

TABLE 5.

Sommaire Des Services		Food	Nutrition Education	Clientele
Garderies	(1972)	Lunch and snacks	Food variety	Children
Other:				
Church	(1950)	Food bags Christmas basket Meals-on-wheels		All ages
CPAS	(1976)	Café; dépannage		Adults
Mme Prend Congé	(1983)	Collective kitchen Christmas basket	Via collective kitchen	Adult women
Mais. Partage d'Y	(1984)	Depannage	Food handling	Men & women
Club Pop. Consomm.	(1970)	Cuisines collectives	Good nutr. at low cost	Men & women
Carrefour d'Educ. Pop.	(1967)		Healthy food at low cost Cooking classes Healthy wt. courses	Adults
Serv. Bénévoles	(1982)	Community meals		All ages
Café sans murs	(1985)	Community meals Afternoon Café Hot meal		Young adults
Ecole J.-Leber	(1990)	School lunch		Children
Action Santé	(1974)	Community meals	Cooking classes Nutrition conferences	Men & women
Group Jeune-Mère	(1986)	Depannage	Nutrition information Recipes	Young mothers
Centre du Jour: L-R	(1986)	Community meals	Cooking courses Nutrition information	Adults & seniors
YMCA	(1980)	Community meals		All ages
Clinique Comm.	(1968)	Milk coupon & vitamins	Healthy eating Counselling	All ages; Pregnant women
St. Columba	(1926)	Community meal Cuisine Collective Family lunch Emergency food bag	New foods exposure Cooking	All ages
Point Educ. Centre	(1969)		Cooking classes	Adults

With the exceptions of Saint-Vincent-de-Paul, one daycare centre, Toit Bethleem and a meals-on-wheels most food-related services in this district have arisen since the late seventies (2), eighties (5) and more recently (4). The services too, differ from other communities in that there are fewer depannages (32% of agencies) and more collective kitchens. One strength of the latter is the inherent food and nutrition education that accompanies this self-help activity.

Ville Emard/Côte Saint-Paul has the greatest total number of community agencies participating in food related activities. Dépannage, however, is less frequent (65 families/week, average), and is more often available on a monthly basis versus daily or weekly. Community meals draw approximately 130 people twice a month, on average. Collective kitchens involve 30 families. These latter two activities require some financial input by participants, from $1.50 to 4.50 per meal, depending on the site. Meals-on-wheels, as in other communities, serves 42 homebound twice a week for a cost of $2.50-$3.00/meal.

Staffing appears higher in this district (N=56 full time), however there is over-representation in this category by daycare centre employees. The Pagé school lunch program operates in this district through two sites.

The Garde Manger was referred to only once as a major resource in this district. Foods are purchased by the daycare, school lunch, community meal programs and collective kitchens. The parishes have their own donations of food to re-distribute. Centre Yvon Brunet was cited as a food source for one agency. There was evidence of alot of sharing of sites and resources between agencies, for example inter-dependency in use of La Louche.

PROBLEMS IN ORGANIZATION OF SERVICES

Within the framework of frequently cited problems of limited space, money, and staff, most agencies expressed no problems in organization and implementation of programs and activities to meet stated objectives. The most common problems are:

- unstable food supply
- limited variety of foods available
- lack of meat and milk
- concern over food perishability and safety
- limited storage capacity and food preparation equipment
- inability to respect cultural food choices
- need for more volunteers
- high personnel turnover due to changes in support programs

On an informal basis, interviewees also alluded to concerns regarding limited literacy, familiarity with cooking methods, and dependency on programs.

EVALUATION OF SERVICES

All agencies reported that their objectives related to offering food support are met, and that clientele are for the most part satisfied with the program(s). However it is also clear that, with the exception of 2 questionnaire surveys from time to time, there has been no structured evaluation of the food programs vis-à-vis clientele satisfaction or impact (long or short term). Evaluation has been informal through thanks received or absence of complaints.

Most organizations expressed an interest in the Forum planned for the spring.

ST-VINCENT DE PAUL / ST-ZOTIQUE (1908)

Adresse: 4565, rue Notre-Dame ouest
Montréal (Québec)
H4C 1S3

Téléphone: (514) 937-2553
Fax: (514)

Responsable: Brigitte Roy

CATÉGORIE: Service paroissial

Description des services et activités reliés à l'alimentation

ACTIVITÉS OU SERVICES	Dépannage.	Paniers de Noël et service d'urgence.	
CLIENTÈLE	Résidents de la paroisse à faible revenu.	Résidents de la paroisse à faible revenu.	
HORAIRE	Les mardi et vendredi entre 14h00 et 15h00.	Selon la saison et les besoins.	
COÛT	Aucun	Aucun	
AUTRE	Etre de la paroisse.	Les personnes doivent faire une demande préalable.	

CLUB POPULAIRE DES CONSOMMATEURS (1970)

Adresse: 2370, Rozel
Montréal (Québec)
H3K 1J7
Après le 1er juin: 2383 Grand-Trunk

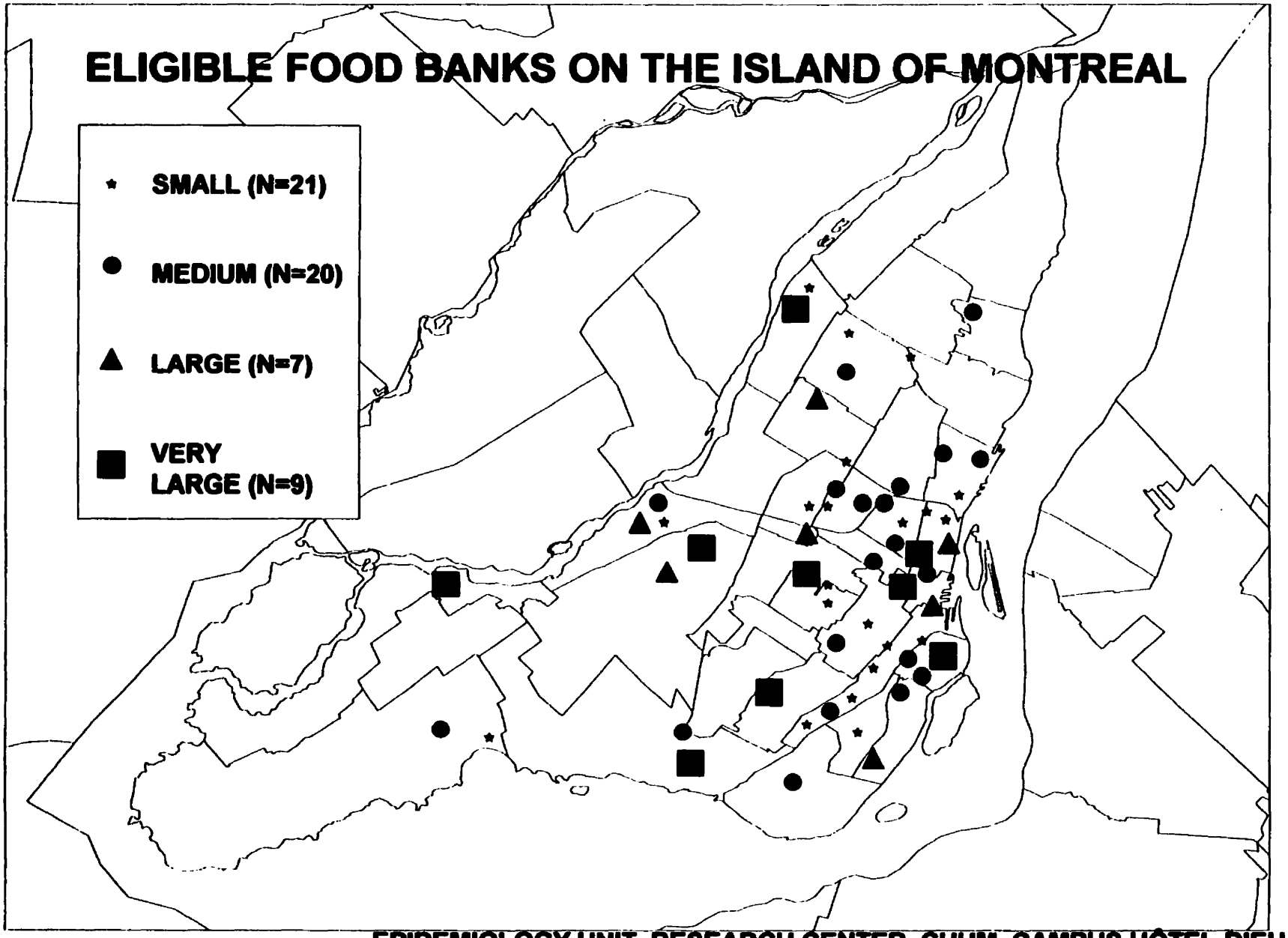
Téléphone: (514) 932-5088
Fax: (514)

Responsable: Jocelyne Gauvin

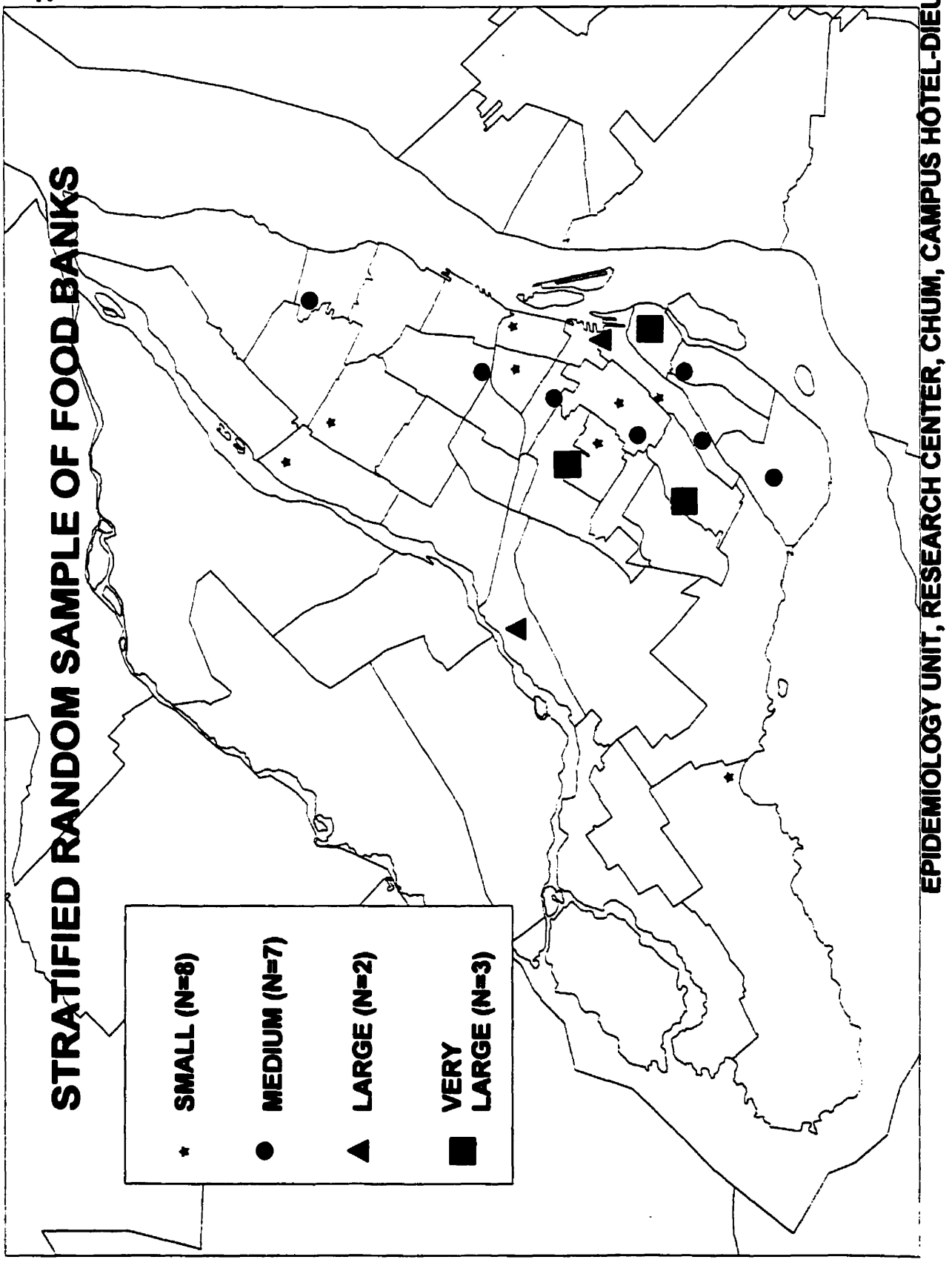
CATÉGORIE: Education populaire

Description des services et activités reliés à l'alimentation

ACTIVITÉS OU SERVICES	Comité d'information sur les "achats spéciaux" en alimentation.	Cuisines collectives.	Soutien technique pour la mise sur pied de cuisines collectives.
CLIENTÈLE	Population à faible revenu résidentes du quartier.	Personnes à faible revenu. Majorité de femmes.	Groupe faisant la demande.
HORAIRE	Rencontre du Comité le mardi de chaque semaine, de septembre à mai.	Le jeudi une fois par mois pour la préparation des aliments. Le lundi ou mardi pour la planification.	
COÛT	Aucun	1.00 $ par portion.	
AUTRE	Les meilleurs spéciaux de la semaine sont affichés à la vue du public. Une feuille de spéciaux est distribuée dans 6 organismes.	Approvisionnement du service de distribution du Garde-Manger pour Tous.	


ELIGIBLE FOOD BANKS ON THE ISLAND OF MONTREAL
SMALL (N=21)
MEDIUM (N=20)
LARGE (N=7)
VERY LARGE (N=9)
EPIDEMIOLOGY UNIT, RESEARCH CENTER, CHUM, CAMPUS HÔTEL-DIEU

Appendix VI


STRATIFIED RANDOM SAMPLE OF FOOD BANKS
SMALL (N=8)
MEDIUM (N=7)
LARGE (N=2)
VERY LARGE (N=3)
EPIDEMIOLOGY UNIT, RESEARCH CENTER, CHUM, CAMPUS HÔTEL-DIEU

Appendix VII

Food Bank:								**Code:**	
Household Number									
001	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
002	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
003	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
004	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
005	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
006	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
007	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
008	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
009	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
010	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
011	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
012	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
013	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
014	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
015	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
016	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
017	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
018	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
019	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
020	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
021	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
022	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
023	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes
024	M	F	Eng	Fr	Teen	Adult	Senior	No	Yes

Appendix VIII

CONSENT FORM

Title of Project: **Food Assistance Programs and Nutrition**

Purpose: Determining the contribution of the present food assistance to an individual's food intake may lead to recommendations to the food banks about which foods to solicit (or buy) and provide in food bags.

Investigators: **Local Contact: Linda Jacobs Starkey (398-7850)**
Harriet V. Kuhnlein, Professor; Katherine Gray-Donald, Asst. Professor

School of Dietetics and Human Nutrition, McGill University

Procedures: If I agree to participate, the following things will happen:
I will answer questions about my food intake, once a week, for four weeks.
This will take about 15 minutes for three of the interviews and 30-40 minutes for the first interview. The interviews may take place at my home (if I agree), at this food bank, or at another agreed upon locale.
Benefits and Risks: There will be no risk to me or my family from participating in the study. No agency will know whether I am participating, nor will my participation in the food assistance program be affected in any way. As reimbursement, I will be paid $25 at the end of the fourth interview.
Confidentiality: All information about me and my family obtained in this study will be used only for research. My identity will be kept confidential.
Right to Withdraw: My participation is voluntary and I can withdraw at any time.
Consent: I agree to participate and my signature means that I understand this information.

_____
Signature

_____
Date

FORMULAIRE DE CONSENTEMENT

Titre du projet: **Programme d'aide alimentaire et nutrition**

Objet: En déterminant la contribution de l'aide alimentaire aux apports alimentaires individuels, il pourra être possible de formuler des recommandations aux banques alimentaires sur les aliments à solliciter (ou à acheter) et à intégrer aux sacs de provision.

Chercheurs: **Contact: Linda Jacobs Starkey (398-7850)**
Harriet V. Kuhnlein, professeur; Katherine Gray-Donald, professeur agrégé, École de diététique et de nutrition humaine

Procédures: Si j'accepte de participer: Je devrai répondre à des questions sur ma consommation alimentaire, une fois par semaine pendant quatre semaines. La première entrevue durera entre 30 et 40 minutes et les trois dernières, 15 minutes. Les entrevues auront lieu chez moi (si j'y consens), à la banque alimentaire ou à tout autre endroit.
Avantages et risques: Ma participation à cette étude n'expose ni ma famille ni moi à aucun risque. Aucun organisme ne saura que j'y ai participé et ma participation au programme d'aide alimentaire ne sera nullement compromise. Je percevrai 25 $ à titre de dédommagement, à la fin de la quatrième entrevue.
Anonymat : Les renseignements se rapportant à moi et à ma famille, obtenus dans le cadre de cette étude, ne seront utilisés que pour la recherche. Mon anonymat sera rigoureusement protégé.
Droit de se retirer : Ma participation à cette recherche est entièrement volontaire et je peux m'en désister à tout moment.
Consentement : J'accepte de participer et ma signature indique que j'ai parfaitement compris les renseignements ci-dessus.

_____
Signature

_____
Date

Appendix IX

Respondents/Food Assistance Site **Food Bank Code:** _____

Respondent Code	**Name, Address and Telephone #**
01	
02	
03	
04	
05	
06	
07	
08	
09	
10	
11	

Appendix X

EVALUATION OF FOOD ASSISTANCE PROGRAMS

School of Dietetics and Human Nutrition
McGill University

HOUSEHOLD QUESTIONNAIRE

Food Bank Code: _____ UU

Household Number: _____ UUU

Respondent Number: _____ UU

Gender of Respondent: Male 1 Female 2 U

Date of Interview: _____ UU UU
d m

Time Interview Started: _____ UU UU
h m

HELLO. My name is _____, and I am from McGill University. I am an interviewer for a research project on food assistance programs in the Montreal area. I would like to ask you to answer some questions which will help us understand Montreal area food banks. No one will know you are helping with this study.

Before beginning the interview, I would like to read with you the consent form which will give more information. Please sign this form if you accept to participate in this survey.

UU UUU UU

To begin, I would like to ask you some general questions about yo

1. In what country were you born? _____

   * *consult Country of Origin code sheet for code*

   * *if not Canada, ask the following questions:*

   1.1 How many years have you lived in Canada?_____

   1.2 How many years have you lived in Québec?_____

   1.3 Do you have refugee status in Québec?

   Yes 1 No 2

2. What language do you usually speak at home?

   1 French 2 English 3 Other:_____
   4 Two languages: _____ _____

3. Please tell me your civil status:

   1 Single 2 Married or common law 3 Widowed
   4 Separated 5 Divorced

4. And your birth date?_____

5. What is the last grade of schooling you have completed?

   _____

   1 Elementary incomplete 2 Elementary complete
   3 Secondary incomplete 4 Secondary complete
   5 Technical/trade school
   6 College/CEGEP
   7 University
   8 Post-graduate degree

UU UUU UU

6. Please tell me the source(s) of income for you and your household:

1 Social welfare
2 Unemployment insurance
3 Senior pension
4 Employment: full time
5 part time
6 seasonal
7 CSST/workman's compensation
8 Alimony/child support
9 Government program such as PAY, EXTRA, etc.
10 None
11 Other:_____

* *secondary answer, if necessary*

How many cheques do you receive each month? _____
What is the date you receive your cheque(s)? _____

7. What, then, is your total monthly household income from all sources?_____

1 0
2 1 - 199
3 200 - 399
4 400 - 599
5 600 - 799
6 800 - 999
7 1000 - 1199
8 1200 +

8. Do you believe you are in good health? 1 Yes 2 No

* *if no:* Tell me your major health problems:_____
_____

Your height? _____ Weight? _____

Now I would like to ask you some questions about the food bank here at

9. From where or whom did you first learn about this food bank?
1 spouse
2 friend
3 relative
4 community worker
5 church
6 media/advertising
7 other: _____

UU UUU UU

10. Do you know anyone who has been here before?

1 Yes 2 No

11. Do you know where there are <u>other</u> food banks?

1 Yes 2 No

12. How many people do you feed on a usual day?_____
Be sure to include yourself.

Person	1 Male	2 Female	Yrs Age
1	____	____	____
2	____	____	____
3	____	____	____
4	____	____	____
5	____	____	____
6	____	____	____
7	____	____	____
8	____	____	____
9	____	____	____
10	____	____	____

On the weekend, are there: more 1 , fewer 2 or the same 3 number of people?

13. What is the <u>main</u> reason you came to the food bank today?

1 No food at home
2 Not enough food at home
3 To stretch my food dollar/budget
4 Ran out of money for food
5 Lots of expenses this month
6 Fire, theft, disaster increased expenses
7 Hunger (self, family)
8 Nutrition information
9 Other:_____

UU UUU UU

14. If the food bank was not open today, what would you have done?

1 Gone to another one
2 Waited until the next day
3 Don't know
4 Other:_____

15. Would your food supplies be enough for tomorrow if you did not come here today?

1 Yes 2 No

16. What is the <u>one thing</u> that makes it hardest for you to get food?

1 Not enough money after paying bills
2 Physical disability
3 Stores are too far away
4 Stores too expensive
5 Not enough time
6 Children at home
7 Illness
8 Other:_____

17. When you think of the food bank, do you consider it:

1 A community service
2 A necessity
3 An embarrassment
4 Other:_____
* *secondary answer, if necessary*

18. Is today your first time at this food bank?

1 Yes 2 No

* *if no*, How often did you come here in the past 3 months?

3 Every week
4 Every 2 to 3 weeks
5 Once a month
6 Every 4 to 6 weeks
7 Once only

UU UUU UU

19. Did you ever <u>think</u> about coming to the food bank before this time?

1 Yes 2 No

20. What is the one thing that would help you the most to have enough food?

1 Employment
2 Household help
3 Money
4 Health improvement
5 Sharing food costs and cooking with another family
6 Counselling

The final questions are about your expenses

21. How much do you pay per month for rent or mortgage?

1 Less than $200
2 200 - 299
3 300 - 399
4 400 - 499
5 500 - 599
6 600 - 699
7 700 - 799
8 800 - 899
9 900 +

22. Did you pay it yet this month?

1 Yes 2 No

23. Is hydro included in your monthly rent?

1 Yes 2 No

* *if no:* Is your hydro bill in equal monthly payments or every 2 months?

Equal payments _____ Every 2 months _____

What was your last hydro bill?_____

* *calculate monthly bill:* _____

1 < 50
2 50 - 99
3 100 - 149
4 150 - 199
5 ≥200

24. Do you have gas or oil costs?

1 Yes 2 No

* *if yes:* what was your last bill?_____
how long does it cover?_____ hours/weeks

* *calculate monthly bill:* _____

1 < 50
2 50 - 99
3 100 - 149
4 150 - 199
5 ≥200

25. Approximately how much was your telephone bill last month?

_____

1 no telephone
2 ≤ 25
3 26 - 35
4 36 - 45
5 46 - 55
6 56 - 65
7 ≥ 66

UU UUU UU

26. Where do you shop for most of your food?

_____

1 grocery chain store
2 depaneur/corner store
3 market
4 other_____

On average, how often do you go there?_____

* *calculate to number of times per week* _____

Where else do you shop for food?_____

1 other large store
2 depaneur/corner store
3 market
4 other_____

On average, how often do you go there?_____

* *calculate to number of times per week* _____

On average, how much do you spend per week for groceries? $_____

For tobacco/cigarettes $_____

For beer/wine/alcohol $_____

27. When you, yourself, leave the home, do you usually travel by:

1 Walking
2 Bus or metro: daily fare
3 Bus or metro: monthly pass
4 Car
5 Cab/taxi
6 With a friend or relative

TIME INTERVIEW FINISHED:_____

INITIALS OF INTERVIEWER:_____

YOUR TIME AND TRUST IN COMPLETING THIS INTERVIEW IS TRULY APPRECIATED. PLEASE BE ASSURED OF THE CONFIDENTIALITY OF YOUR REPLIES.

UU UUU UU

Was the interview assisted by someone?

1 Yes 2 No

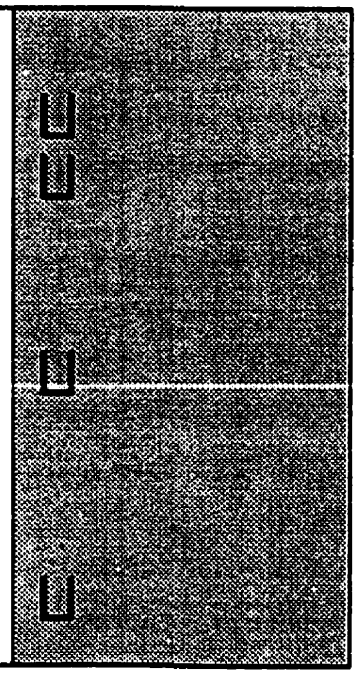
* *if yes:* 1 Some responses 2 Totally

Describe the collaboration of the respondent:

1 Very good
2 Good
3 Fair
4 Poor

State your opinion of the credibility of the replies:

1 Very good
2 Good
3 Fair
4 Poor



Appendix Xa

ÉVALUATION DES PROGRAMMES D'ASSISTANCE ALIMEI

École de diététique et nutrition humaine
Université McGill

QUESTIONNAIRE DOMESTIQUE

Code de la banque d'alimentation: ______________________________

No. du domestique: ______________________________

No. du répondant: ______________________________

Sexe du répondant: Masculin 1 Féminin 2

Date de l'entrevue: ______________________________

Heure de début: ______________________________

Bonjour. Je m'appelle ______________________ et suis d
l'Université McGill. Je suis chargé(e) d'interroger des personnes dans
cadre du projet de recherche sur les programmes d'aide alimentaire dan
la région de Montréal. Comme vous le savez, votre nom a été choisi a
hasard parmi les prestataires de l'aide alimentaire de votre quarti
Personne ne sait que vous participez à cette étude.

Avant de commencer l'entrevue, j'aimerais lire avec vous le formulaire d
consentement qui vous fournira de plus amples renseignements. Veuil
le signer si vous acceptez de participer à ce sondage.

UU UUU UU

Pour commencer, j'aimerais vous poser quelques questions générales au sujet de vous-même.

1. Dans quel pays êtes-vous né(e)?_____

   * *consulter la feuille des codes des pays d'origine*

   * *si autre que le Canada, poser les questions suivantes:*

   1.1 Depuis combien d'années vivez-vous au Canada?_____

   1.2 Depuis combien d'années vivez-vous au Québec?_____

   1.3 Avez-vous le statut de réfugié au Québec?

   1 Oui 2 Non

2. Quelle langue parlez-vous à la maison?

   1 Français 2 Anglais 3 Autre:_____
   4 Deux langues: _____ _____

3. Quel est votre état civil:

   1 Célibataire 2 Marié(e) ou conjoint de fait 3 Veuf(ve)
   4 Séparé(e) 5 Divorcé(e)

4. Quelle est votre date de naissance?_____

5. Quelle est votre dernière année de scolarité complétée?_____

   1 Primaire incomplet 2 Primaire complété
   3 Secondaire incomplet 4 Secondaire complété
   5 École de métier 6 Collégial/CEGEP
   7 Universitaire 8 3e cycle

UU UUU UU

6. Veuillez m'indiquer votre (vos) source(s) de revenu(s) et celle(s) de votre foyer.

1 L'aide sociale/bien-être
2 Assurance-chômage
3 Retraite
4 Salaire: temps plein
5 temps partiel
6 saisonnier
7 CSST/accidenté de travail
8 Pension alimentaire
9 Programme gouvernemental comme PAIE, EXTRA, etc.
10 Aucune
11 Autre:_____

* *réponse secondaire, si nécessaire*

Combien de chèques recevez-vous chaque mois?_____
À quelle(s) date(s) recevez-vous votre/vos chèque(s)?_____

7. Quel est le revenu mensuel total de votre foyer?_____

1 0
2 1 - 199
3 200 - 399
4 400 - 599
5 600 - 799
6 800 - 999
7 1000 - 1199
8 1200 +

8. Croyez-vous être en bonne santé? 1 Oui 2 Non

* *si non:* quels sont vos problèmes de santé:_____
_____

Votre taille? _____ Poids? _____

Maintenant, j'aimerais vous demander des questions au sujet de la banque d'assistance alimentaire ici à _____

9. Où, ou par qui, avez-vous entendu parler de cette banque d'alimentation?

1 conjoint
2 ami
3 parents
4 travailleur communautaire
5 église
6 journaux/publicités
7 autres:_____

UU UUU UU

10. Connaissez-vous quelqu'un qui soit déjà venu ici auparavant?

1 Oui 2 Non

11. Savez-vous où il existe **d'autres** banques d'alimentation?

1 Oui 2 Non

12. Combien de personnes devez-vous nourrir quotidiennement?___
N'oubliez pas de vous compter.

Personne	1 Masculin	2 Féminin	Années Âge
1	____	____	____
2	____	____	____
3	____	____	____
4	____	____	____
5	____	____	____
6	____	____	____
7	____	____	____
8	____	____	____
9	____	____	____
10	____	____	____

La fin de semaine, y a-t-il: plus (1), moins (2) ou le même (3) nombre de personnes?

13. Quelle est la raison principale pour laquelle vous avez recours à la banque d'alimentation aujourd'hui?_____

1 Pas de nourriture à la maison
2 Pas assez de nourriture à la maison
3 Pour faire prolonger mon budget alimentaire
4 Plus d'argent pour acheter à manger
5 Trop de dépenses ce mois-ci
6 Feu, vol, catastrophe, augmentation des dépenses
7 Faim (soi-même, famille)
8 Renseignements sur la nutrition
9 Autre:_____

UU UUU UU

14. Si la banque d'alimentation n'avait pas été ouverte aujourd'hui, qu'auriez-vous fait?

1 Je serais allé(e) dans une autre
2 Aurais attendu au lendemain
3 Je ne sais pas
4 Autre:_____

15. Auriez-vous eu suffisamment à manger pour demain si vous n'étiez pas venu ici aujourd'hui?

1 Oui 2 Non

16. Quelle est la cause <u>principale</u> qui vous empêche d'acheter à manger?

1 Pas assez d'argent après avoir payé les factures
2 Invalidité physique
3 Magasins trop éloignés
4 Magasins trop chers
5 Pas suffisamment de temps
6 Enfants à la maison
7 Maladie
8 Autre:_____

17. Que pensez-vous de la banque d'alimentation:

1 Un service communautaire
2 Une nécessité
3 Un embarras
4 Autre:_____
* *réponse secondaire, si nécessaire*

18. Est-ce qu'aujourd'hui c'est votre première visite à cette banque d'alimentation?

1 Oui 2 Non

* *si non*, à quelle fréquence êtes vous venus ici dans les trois derniers mois?

3 Chaque semaine
4 Toutes les 2 à 3 semaines
5 Une fois par mois
6 Toutes les 4 à 6 semaines
7 Une fois seulement

UU UUU UU

19. Avez-vous déjà <u>songé</u> à vous rendre dans une banque d'alimentation avant cette fois-ci?

1 Oui 2 Non

20. Quelle est la chose principale qui vous aiderait le plus d'avoir assez à manger?

1 Du travail
2 De l'aide à la maison
3 De l'argent
4 Une meilleure santé
5 Le partage des frais d'alimentation et de cuisine avec une autre famille
6 Des conseils

Les dernières questions portent sur vos dépenses

21. À combien s'élève le montant de votre loyer ou hypothèque mensuel?

1 Moins de $200
2 200 - 299
3 300 - 399
4 400 - 499
5 500 - 599
6 600 - 699
7 700 - 799
8 800 - 899
9 900 +

22. L'avez-vous déjà payé ce mois-ci?

1 Oui 2 Non

UU UUU UU

23. La facture d'électricité est-elle comprise dans votre loyer mensuel?

1 Oui 2 Non

* *si non:* payez-vous votre facture d'électricité à tous les mois pa paiements égaux ou tous les deux mois?

Paiements égaux _____ Tous les deux mois _____

À combien s'élevait votre dernière facture d'électricité? _____

* *calculer la facture mensuelle:* _____

1 < 50
2 50 - 99
3 100 - 149
4 150 - 199
5 ≥200

24. Avez-vous des frais de gaz ou d'huile?

1 Oui 2 Non

* *si oui:* à combien s'élevait votre dernière facture? _____
Quelle est la durée couverte?_____ heures/semaine

* *calculez la facture mensuelle:*_____

1 < 50
2 50 - 99
3 100 - 149
4 150 - 199
5 ≥200

25. À combien s'élève votre facture de téléphone ce dernier mois?

1 pas de téléphone
2 ≤ 25
3 26 - 35
4 36 - 45
5 46 - 55
6 56 - 65
7 ≥ 66

UU UUU UU

26. Lorsque vous faites votre épicerie, dans quel magasin vous rendez-vous habituellement?_____

1 chaîne de magasins d'alimentation
2 dépanneur
3 marché
4 autre_____

En moyenne, à quelle fréquence y allez-vous? _____

* *calculez le nombre de fois par semaine*_____

Faites-vous l'épicerie à d'autres endroits?_____

1 autre chaîne de magasins d'alimentation
2 dépanneur
3 marché
4 autre_____

En moyenne, quelle est la fréquence que vous y allez?_____

* *calculez le nombre de fois par semaine*_____

En moyenne, quelle somme dépensez-vous chaque semaine?

pour votre épicerie? $_____

pour le tabac/cigarettes $_____

pour la bière/le vin/l'alcool $_____

27. Lorsque vous sortez de chez vous, habituellement vous:

1 Marchez
2 Prenez le bus ou le métro: billets individuels
3 Prenez le bus ou le métro: passe mensuelle
4 Prenez la voiture
5 Prenez un taxi
6 Vous faites conduire par un ami ou un parent

HEURE DE FIN DE L'ENTREVUE:_____

INITIALES DE L'INTERVIEWER:_____

NOUS VOUS REMERCIONS D'AVOIR PRIS LA PEINE DE VOUS LIVRER À CETTE ENTREVUE. VOUS POUVEZ ÊTRE SÛR(E) QUE VOS RÉPONSES RESTERONT ANONYMES.

UU UUU UU

Avez-vous bénéficié d'aide de quelqu'un pour l'entrevue? U

1 Oui 2 Non

* *dans l'affirmative:* 1 Pour quelques réponses 2 Pour la totalité U

Décrire la collaboration du répondant:

1 Très bonne
2 Bonne
3 Moyenne
4 Médiocre U

Dites ce que vous pensez de la crédibilité des réponses:

1 Très bonne
2 Bonne
3 Moyenne
4 Médiocre U

Appendix XI

24 Hour Food Recall

☐ ☐☐☐ ☐☐

Day of the Week: 1 M 2 T 3 W 4 R 5 F 6 S 7 S ☐

Date: _____ ☐☐ ☐☐ ☐☐
D M Y

Time	Where (home, takeout, work, restaurant)	Description of Food Eaten/Preparation	Amt	Code	Milk	GrP	VF	Meat
		Water						
				TOTAL				

→

Did you smoke this week? 1 Yes 2 No ☐

If yes, how many cigarettes did you smoke per day 1 _____ per week 2 _____ ☐☐ ☐

Please tell me how much of the following alcoholic beverages you consumed today:

Y/N

beer:	1 Yes 2 No	Amount _____	☐
wine:	1 Yes 2 No	Amount _____	☐
liquor:	1 Yes 2 No	Amount _____	☐
wine cooler:	1 Yes 2 No	Amount _____	☐

Did you take any vitamin, mineral or other nutrient supplement yesterday? 1 Yes 2 No ☐

How often did you take it or any other supplement this week:

what brand name *(see bottle)*	_____	_____	daily ☐
	_____	_____	1-2/week ☐
	_____	_____	3-4/week ☐
	_____	_____	4-6/week ☐

Did you obtain food from a food bank this week? 1 Yes 2 No ☐

If yes, please tell me what foods you obtained:

_____

_____

_____

_____

_____

THAT COMPLETES TODAY'S INTERVIEW

THANK YOU

(Next appointment?)

Rappel alimentaire - 24 heures

234

☐ ☐☐☐ ☐☐

Jour de la semaine : 1 L 2 M 3 M 4 J 5 V 6 S 7 D ☐

Date: _____ ☐☐ ☐☐ ☐☐
J M A

Heure	Où (maison, commande à emporter, travail, restaurant)	Description de l'aliment mangé/préparation	Quantité	Code	Lait	Céréales	Légumes et Fruits	Viande et Substituts
		Eau						
				TOTAL				

→

Avez-vous fumé cette semaine? 1 oui 2 non ☐

Si oui, combien de cigarettes avez-vous fumé?

par jour 1 _____ par semaine 2 _____ ☐☐ ☐

Combien de boissons alcoolisées avez-vous bu aujourd'hui?

O/N

bière :	1 oui 2 non	quantité _____	☐
vin :	1 oui 2 non	quantité _____	☐
liqueur :	1 oui 2 non	quantité _____	☐
«wine cooler» :	1 oui 2 non	quantité _____	☐

Avez-vous pris des vitamines, minéraux ou autres suppléments nutritifs hier? 1 oui 2 non ☐

Combien de fois cet semaine prenez-vous ce ou ces suppléments:

Nom de marque du supplément *(voir flacon)*_____ _____ par jour ☐

_____ 1-2 par semaine ☐

_____ 3-4 par semaine ☐

_____ 4-6 par semaine ☐

Avez-vous retiré des aliments d'une banque alimentaire cette semaine? 1 oui 2 non ☐

Si oui, SVP, énumérez les aliments que vous avez obtenus :

_____

_____

_____

_____

_____

C'EST TOUT POUR L'ENTREVUE D'AUJOURD'HUI

MERCI

(Prochain rendez-vous?)

Appendix XII Food Portion Measurements and Portion Models

Household Measures

Small spoon	3 ml level 5 ml mounded
Large spoon	5 ml level 10 ml mounded 15 ml maximum mounded capacity
Plate	250 ml dry material just covers the bottom of the plate 500 ml dry material side-to-side
Small bowl	250 ml level
Large bowl	500 ml level
Mug	300 ml level
Glass	375 ml level

Appendix XIII

Dietitian-Interviewer Training Topics

1. The objectives of the study and the procedures used to enroll food assistance sites were explained. Inclusion criteria and methods for random selection of food assistance program participants were then reviewed. The form to record respondent and non-respondent data was explained, so that differences of nonrespondents from the study participants could be described (Dawson-Saunders and Trapp, 1990).

The consent form to be read to prospective study participants was reviewed and the use of duplicate consent forms was explained: one copy for the client's file, one for the client to retain. Interviewers then reviewed the format for assigning codes to respondents and for recording the participants' names and addresses, for future contact and/or home visits.

2. The household questionnaire was reviewed, line by line, for clarity of meaning. Interviewers were instructed to strictly follow the format provided, using repetition without paraphrasing as prompts, where necessary. Inter-interviewer differences are minimized when a structured interview is employed (Babbie, 1989).

3. A sample 24-hour recall was reviewed to demonstrate the detail of information desired (for example, brand names, preparation methods, and time and location of eating), and to provide each interviewer with an opportunity to practice food coding. Bingham et al. (1988) stress that interviewers require a thorough knowledge of the food data base in

order to obtain sufficient detail for appropriate coding. Where differences in food code selection were identified during training, discussions were held to clarify the procedures for future coding decisions during the study. Interviewers then partnered to practice using the 24-hour recall form and food portion models. Reliability of the data is improved as measurement error is reduced (Margetts and Nelson, 1991).

4. Each dietitian-interviewer was given a log book to record daily observations such as number of clients enrolled or interviewed each day, difficulties encountered at the interview site(s), and questions for discussion at team meetings. Interviewers were instructed not to solve problems among themselves, but rather, to call in for advice. The use of field notes as qualitative data was discussed (Babbie, 1989).

5. Concerns about under-reporting of food intake (Scholler, 1990), cultural sensitivity (Cassidy, 1994), sources of bias in dietary interviews, loss to follow-up and other measurement errors (such as respondent bias, interviewer bias, respondent memory lapses, supplement use omission, incorrect estimation of portion size and coding errors) (Wright, Ervin and Briefel, 1993) were discussed.

6. Interviewers were alerted to issues of personal safety and confidentiality. Concerns were addressed and suggestions for various situations were discussed in a case-scenario framework.

7. The need for maintenance of a detailed agenda was highlighted, so that in the event of absence, a trained substitute interviewer could assume the interviewer's client responsibilities. Representation of all days of the week for interviews was also stressed at this time.

INTERVIEWER SITE ASSIGNMENT

Category	# Clients	Food Bank Name	Code	Interviewer Code
Small	3	Service d'Aide Communautaire	01	002
		Omega Center	02	007
		Centre Communautaire Multi-Ethnique	03	007
		S-V-P St-Leonard	04	007
		Carrefour Saint-Eusebe	05	006
		Mile End Community Mission	06	007
		S-V-P St-Henri	07	001
		Native Friendship Centre of Montreal	08	006
Medium	13	L'Hirondelle	09	002
		La Maisonnée Inc.	10	008
		Aliment Action LaSalle	11	005
		Union United Church	12	001
		Good Shepherd Community Centre	13	006
		Service d'aide Communautaire Anjou	14	004
		Organisation d'aide aux assistés sociaux	15	003
Large	41	La Corbeille Bordeaux-Cartierville	16	005
		Mission Bon Accueil	17	006/010
Very Large	81	La Maison du Partage d'Youville Inc.	18	001/007
		NDG Food Depot	19	003/004
		La Cafétéria Communautaire Multi-Caf	20	002/008

Health Problems

Description		Code
Physical	amputation, back problems, eyesight, hearing, respiration, headaches, dental	1
Psychological	depression, fatigue, nervousness, mental handicap	2
Medical/biological	tuberculosis, hypertension, diabetes, cholesterol/heart, cancer	3
Dietary	insufficient food, malnutrition, stomach problems	4
Other		5

Food bank users: sociodemographic and nutritional characteristics

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Abstract

Background: The continued expansion of food assistance programs makes it important to examine the sociodemographic characteristics and nutritional profiles of people relying on this service. The authors undertook such a study in a large urban centre.

Methods: A total of 490 food bank users were randomly selected from a stratified random sample of 57 urban food banks in Montreal. A questionnaire and a dietary recall interview were given by a dietitian-interviewer to determine socioeconomic, demographic and cultural characteristics and macronutrient intake. These data were compared with national and provincial data.

Results: The mean age of the participants (256 men and 234 women) was 41 years; 204 (41.6%) were living alone and most (409 [83.5%]) were receiving social assistance benefits. These food bank users were well educated (190 [38.8%] had completed technical school or had a college or university education), and the sample included few elderly or disabled people. The median body mass index was greater than 24, which indicated that energy intake, although below recommended levels, was not a chronic problem. The people using the food banks had a monthly shortfall in their food budget of between $43 and $46.

Interpretation: Food banks are used regularly, primarily by young healthy adults. They are thought of as a necessary community resource.

Résumé

Contexte : À cause de l'expansion continue des programmes d'aide alimentaire, il importe d'examiner les caractéristiques sociodémographiques et les profils nutritionnels des personnes qui comptent sur ces services. Les auteurs ont réalisé une telle étude dans une grande agglomération urbaine.

Méthodes : Au total, 490 utilisateurs de banques d'aliments ont été choisis au hasard dans un échantillon aléatoire stratifié de 57 banques d'aliments urbaines à Montréal. Une diététiste a administré un questionnaire et l'entrevue de rappel sur l'alimentation afin de déterminer les caractéristiques socio-économiques, démographiques et culturelles et l'apport de macronutriments. On a comparé ces données à des données nationales et provinciales.

Résultats : Les participants (256 hommes et 234 femmes) avaient en moyenne 41 ans; 204 (41,6 %) vivaient seuls et la plupart (409 [83,5 %]) touchaient des prestations d'aide sociale. Ces clients des banques d'aliments étaient bien instruits (190 [38,8 %] avaient terminé des études techniques ou avaient fait des études collégiales ou universitaires) et l'échantillon comprenait quelques personnes âgées ou handicapées. L'indice de masse corporelle médian dépassait 24, ce qui indiquait que l'apport d'énergie, malgré inférieur aux niveaux recommandés, n'était pas un problème chronique. Il manquait de 43 à 46 $ par mois au budget d'alimentation des personnes qui utilisaient les banques d'aliments.

Interprétation : Les banques d'aliments sont utilisées régulièrement, principalement par de jeunes adultes en bonne santé. On les considère comme une ressource communautaire nécessaire.

Evidence

Études

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The overall health of a population is better when the gap between rich and poor is narrow.[1] Unfortunately, recent Canadian data show that the mean income of men in the highest-earning quintile rose by 9%, whereas that of men in the lowest-earning quintile declined by 4% over a 7-year period (1981 to 1988).[2] Rates of illness are higher among lower-income Canadians, they have fewer disability-free years, and they are more likely to have behaviour-related risk factors for disease.[3-7] Rates of cancer and cardiovascular disease are higher in low socioeconomic groups,[8] and survival after infection with HIV is shorter.[9] Self-reported health status is also lower among the poor.[10-17] One community resource that has been developed to address the income gap is food banks.

The term "food bank" is used collectively to include food depots, food pantries and other community-based food distribution sites. In Canada, food banks are nonprofit organizations that collect food that would otherwise be discarded and transfer it to charitable food programs,[18] collect food from the public for redistribution or use monetary donations to purchase food so as to give their users a more nutritious diet.[19-21] Most of the food distributed is in the form of groceries, and bags of food usually contain enough staples and perishables to last 1 to 3 days.[18] A Toronto study of people receiving food assistance showed that 23% of those surveyed ran out of food each month, even though they were using food banks.[18] Recent data from Montreal showed that the recommendations of "Canada's Food Guide to Healthy Eating" could not be met if food banks were the sole food source.[19]

Food banks were established to respond to emergency food needs but have become a long-term food source for many families.[20-22] Emmons[23] observed that the number of emergency food sources used increased as the month progressed. Information about people who require emergency food assistance is incomplete, because no large-scale, systematic sample of this population has been studied.

The goal of this study was to describe the socioeconomic, demographic and cultural characteristics of food bank users from a random sample of urban food banks in the Montreal area, and to assess the macronutrient intake of these people the day before they sought assistance.

Methods

Study population and sampling

On the island of Montreal one central food collection and distribution centre provides emergency food to 167 community agencies. By screening all agency registration forms we determined that 57 agencies had as their primary purpose the provision of food bags directly to clients; other agencies served meals or distributed food only as part of other programs. These 57 food banks were classified according to number of clients served: small sites served fewer than 100 people per month (n = 21), medium-sized sites between 100 and 499 per month (n = 20) and large sites more than 499 per month (n = 16). A stratified random sample of 20 food banks was selected to reflect the proportion of small, medium and large sites among these 57 agencies. When 3 of the 20 sites originally chosen refused to participate, 3 more were chosen randomly to replace them.

From clients at the 20 food banks, 490 people were randomly selected for our survey. The number of people sampled from small, medium and large sites was based on the proportion of total food bank clients served at different sizes of sites (of all clients using the 57 food banks, 4.6% were served at small sites, 20.6% at medium-sized sites and 74.8% at large sites). Thus, 27 people were selected from small sites, 96 from medium-sized sites and 367 from large sites. The survey was conducted in winter, when the cost of living is highest: heat and warm clothing add to survival costs, and fresh produce is more expensive than at other times of the year.

Enrolment of participants

People 18 years of age or older who had a known address and lived within 2 bus transfers of the food bank were eligible to participate. Interviews were conducted in English or French, or in another language if an interpreter was available.

People were given a number when they entered the food bank or made an appointment, and numbers were randomly chosen to select study participants. The number of people who refused to participate was recorded. Signed consent was obtained from the participants, and ethical approval was given by the Ethics Committee at McGill University and, where required, by the boards of the participating agencies.

Questionnaire

A dietitian administered the food security* questionnaire orally so that the reading level of the participants would not affect the survey results. Five previously validated questions concerning country of origin, years in Canada, status as a refugee or landed immigrant, marital status and education level were adopted from a survey by Mailhot and colleagues.[25] Other questions were devised to

*Food security is a condition in which all people at all times have access to safe, nutritionally adequate and personally acceptable foods in a manner that maintains human dignity.[24]

determine the characteristics of the household (number of people usually fed, age and sex of household members), sources of food and food shopping practices, beliefs about food availability, feelings about seeking food aid or receiving food gifts, and coping strategies related to food. Questions were also formulated about health status and household income and expenses.

The language level and content of the questions were reviewed by an epidemiology research assistant, 2 community-based dietitians, 2 food depot directors, 2 food depot volunteers and a food bank communications coordinator. The English questionnaire was translated into French and back-translated into English to ensure that the versions were comparable.

The questionnaire was pretested with 141 food bank clients, revised and re-reviewed. To check the validity of self-reported data, clients involved in the pretesting phase were occasionally asked to supply proof of income (source and amount) and expenses by providing cheque stubs and household receipts. Twelve additional food bank users tested the revised questionnaire for language complexity and suitability of words (e.g., social assistance v. welfare). Their reaction to the content of the questionnaire was also considered. The final questionnaire consisted of 27 questions and 10 sub-questions.

Dietary assessment

A dietary recall interview was conducted, during which the dietitian-interviewer used 3-dimensional food portion models to determine what food each survey participant had consumed in the previous 24 hours. Information on the number of cigarettes smoked within that period, the intake of nutrient supplements and the use of other food assistance programs (e.g., soup kitchens) was also obtained. Detailed dietary analyses will be reported elsewhere.

Data analysis

Reported food intake was coded for nutrient analysis by the dietitian-interviewers, who used data from the Canadian Nutrient File (Food Processor version 5.03, ESHA Research, Salem, Ore.). Descriptive statistics were generated with SAS version 6.04 software (SAS Institute Inc., Cary, NC). General linear models procedures combined with Tukey's HSD (honestly significant difference) test as well as χ^2 tests were used to test associations between nutrient intake and each variable on the questionnaire.

Results

Sixty percent of all clients approached (490/816) agreed to participate in the study (62.9% of the men and 57.2% of the women). Participation was highest at medium-sized food banks, where 66.7% of those approached agreed to participate; at large food banks 59.9% agreed and at small food banks 45.8% agreed. Most interviews were conducted during the week because many food banks were not open on weekends.

The number of men and women was about equal (256 and 234 respectively). The mean age was 41 years for both men (SD 12.3) and women (SD 13.0); the overall range was 18 to 85. In total, 210 participants (42.8%) had been born in Canada. When we compared data from our sample with Quebec census data,[16–18] we found that fewer food bank clients were married or living with a partner and more had been born outside Canada (Table 1). Almost half of the men who participated had completed technical school or had a college or university education (Table 1). There was no association between food bank size and age, sex, refugee status, marital status or education level of the users.

Most clients (371 [75.7%]) reported being in good health. However, the mean body mass index (BMI), calculated from self-reported height and weight, was 27 (SD 11; for men 26 [SD 9], for women 28 [SD 13]), which exceeds the upper limit of the recommended healthy range.[19] The median BMI for participants between 18 and 49 years of age was 24, whereas clients 50 years of age or older were heavier; in that age group the median BMI was 26 for men and 27 for women. For all ages, 61 (23.8%) of the men and 73 (31.2%) of the women had a BMI greater than 27, whereas 6 (2.3%) of the men and 22 (9.4%) of women had a BMI of less than 20. Of the 126 people who reported health problems or conditions of some type, 52 (41.3%) reported physical problems such as backache, headache, and eye or ear problems, 44 (34.9%) reported medical conditions such as high blood pressure, diabetes mellitus, tuberculosis or cancer, 19 (15.1%) reported psychological problems, 9 (7.1%) reported concerns about their diet and 2 (1.6%) reported other problems.

The study participants represented 490 households in which a total of 1170 people were fed on a regular basis. Of these 1170 people, 356 (30.4%) were younger than 18 years of age, and about one-third of these children lived in single-parent households. Single-parent households with children under 18 accounted for 12.6% of the 490 households represented in our sample; half of these (6.5% of the total) had 1 child, a quarter (3.1%) had 2 children, and another quarter (3.0%) had more than 2 children. Of the 490 participants 204 (41.6%) were usually responsible for feeding only themselves and thus were assumed to live alone.

The mean number of people fed in each household every day was 2.4 (SD 1.5), which is similar to national data[16] and to results from a recent survey of francophones

in Montreal.[27] Eighty-eight (18.0%) of the respondents said that they fed more people on weekends.

The principal source of income was social assistance benefits (Table 1). Very few participants (13 [2.6%]) were employed, and those that were had low incomes. The mean monthly household income of less than $900 (Table 2) was well below the low-income cutoff for family units of similar size ($1816 for 2.5 people[28,30]). An alternative definition of low income is the expenditure of at least a certain percentage (56.2% at the time of our study) of income on food, shelter and clothing.[30] On average, food, housing, heating and telephone costs absorbed more than 90% of the monthly income of food bank users in our sample. Telephone service alone was a major expense for

Table 1: Sociodemographic characteristics of food bank users in Montreal compared with the general population in Quebec

Characteristic	In Montreal (this study), no. (and %) Men n = 256	Women n = 234	Total n = 490	In Quebec,* %
Age, yr				
18–49	207 (80.8)	177 (75.6)	384 (78.4)	72.1
≥ 50	49 (19.1)	57 (24.4)	106 (21.6)	27.9
Region of birth				
Canada	108 (42.2)	102 (43.6)	210 (42.8)	90.4
Eastern Europe	62 (24.2)	34 (14.5)	96 (19.6)	—
South America	27 (10.5)	27 (11.5)	54 (11.0)	—
Africa or Arab states	28 (10.9)	14 (5.9)	42 (8.6)	—
Caribbean	10 (3.9)	42 (17.9)	52 (10.6)	—
Asia, India, other	21 (8.2)	15 (6.4)	36 (7.3)	—
Refugee status	50 (19.5)	29 (12.4)	79 (16.1)	—
Marital status				
Single	113 (44.2)	86 (36.8)	199 (40.6)	23.4
Married or living with a partner	96 (37.5)	75 (32.0)	171 (34.9)	66.5
Separated, divorced, widowed	47 (18.4)	73 (31.2)	120 (24.5)	10.1
Education				
Did not complete high school	77 (30.1)	103 (44.0)	180 (36.7)	40.5
Completed high school	53 (20.7)	67 (28.6)	120 (24.5)	35.7
Completed technical school, college or university	126 (49.2)	64 (27.4)	190 (38.8)	23.8
Body mass index†				
< 20	6 (2.3)	22 (9.4)	28 (5.7)	11.9
20–25	140 (54.7)	95 (40.6)	235 (48.0)	47.5
26–27	46 (18.0)	38 (16.2)	84 (17.1)	14.0
> 27	61 (23.8)	73 (31.2)	134 (27.3)	26.7
No data	3 (1.2)	6 (2.6)	9 (1.8)	0.0
No. of people in household				
1	139 (54.3)	65 (27.8)	204 (41.6)	27.2
2	37 (14.4)	52 (22.2)	89 (18.2)	31.5
3	35 (13.7)	46 (19.6)	81 (16.5)	17.9
4	26 (10.2)	35 (15.0)	61 (12.4)	—‡
5	13 (5.1)	24 (10.2)	37 (7.6)	—‡
≥ 6	6 (2.3)	12 (5.1)	18 (3.7)	2.1
Primary source of household income				
Social assistance benefits	222 (86.7)	187 (79.9)	409 (83.5)	—§
Employment insurance	15 (5.8)	8 (3.4)	23 (4.7)	11.5
Seniors' pension	4 (1.6)	10 (4.3)	14 (2.8)	—§
Full-time employment	2 (0.8)	3 (1.3)	5 (1.0)	—¶
Part-time employment	1 (0.4)	7 (3.0)	8 (1.6)	—¶
Seasonal employment	2 (0.8)	0 (0.0)	2 (0.4)	—§
Other	4 (1.6)	11 (4.7)	15 (3.1)	10.3
None	6 (2.3)	8 (3.4)	14 (2.8)	—§

*Source: Quebec census data.[28,29]
†Body mass index = weight (kg) ÷ [height (m)]².[30] Based on self-reported weight and height.
‡Quebec data: 21.3% had 4 or 5 people per household.
§Included in "other" for Quebec data.
¶Quebec data: 78.2% had full-time or part-time employment.

many clients: 161 (32.8%) paid phone bills of at least $66 per month. Ghadirian and colleagues[27] reported that 29.6% of francophones surveyed in Montreal smoked, but a much larger proportion (240 [49.0%]) of the participants in our study did so; the mean number of cigarettes smoked per day by those who did smoke (20.2, SD 17.8) was the same as in the earlier study (20.2). In our sample, 116 (23.7%) people reported spending an average of $2.17 per week (SD $5.90) on alcohol. Information on debts or costs for services such as cable television was not obtained. Although women reported higher total household incomes than men ($p < 0.001$), they generally lived in households with more people and therefore the monthly income per person was lower ($p < 0.001$).

The questionnaire assessed the reasons people sought food assistance (Table 3). The main reason, given by 417 people (85.1%), was insufficient money after paying other bills. A large proportion of participants (357 [72.8%]) said that they had enough food on hand for one more day. Although 222 (45.3%) would have delayed seeking food until the next day had the food bank been closed, 77 (15.7%) would have gone to another food bank and 126 (25.7%) would have sought relief from family; less than 1% would have stolen food or simply gone to sleep to avoid the problem. Only 35 (13.7%) of the men and 37 (15.8%) of the women were first-time users of a food bank.

On the day before seeking food assistance, mean dietary intake of the macronutrients protein, fat and carbohydrate, as a percentage of energy intake, approximated health recommendations:[29] the energy intake for men younger than 50 was 15.8% protein, 30.4% fat and 53.4% carbohydrates; for women younger than 50 it was 16.5% protein, 31.0% fat and 53.1% carbohydrate. The energy intake of participants 50 years of age and older was similar. Fat intake was lower than that reported by Ghadirian and colleagues[27] and by the Quebec nutrition survey.[28]

The relation between determinants of total energy intake and sociodemographic characteristics was investigated for men and women separately. No differences were found between the sexes for energy intake in relation to total household income, country of origin, education level or whether or not a person smoked.

Interpretation

This study represents the first sociodemographic and nutritional characterization of a random sample of urban food bank users in Canada. We found that men and women were equally likely to use food banks and that food bank users were relatively young. Their main source of income was social assistance, which was inadequate to cover monthly expenses. BMI did not indicate undernutrition. In fact, there were no consistent predictors of low dietary intake to identify those most in need of food assistance.

An earlier study in Montreal[19] showed that the mean age of women who sought food for themselves and their families was 36 (SD 3.8) years; that of men in the same situation was 37 (SD 3.6) years. The mean age of all people receiving social assistance benefits in Quebec is 39.3 years.[31] The large number of food bank users who are of working age raises concern about the stress that shrinking emergency food resources may experience in future. This observation also raises the question of why we did not see the low-income subgroups often thought to be associated with food bank use (e.g., single parents, elderly people). In our study 12.6% of households were single-parent households with children under 18, whereas 18.2% of Quebec social assistance recipients live in family units headed by one parent.[31] From this discrepancy we speculate that some single-parent families may be seeking food assistance from programs other than food banks, such as com-

Table 2: Income and expense profile of food bank users

	Men *n* = 256		Women *n* = 234	
Income or expense item	Mean (and SD)	% of monthly income	Mean (and SD)	% of monthly income
Monthly income, $				
Per household*	762 (326)	NA	866 (323)	NA
Per person*†	450 (191)	NA	391 (155)	NA
Monthly expenses per household, $				
Rent	353 (130)	46.3	388 (155)	44.8
Electricity	52 (46)	6.8	69 (55)	8.0
Gas or oil heating	39 (28)	5.1	64 (64)	7.4
Telephone	37 (28)	4.8	43 (25)	5.0
Food	224 (284)	29.4	216 (140)	24.9
Cigarettes	28 (40)	3.7	22 (39)	2.5

Note: SD = standard deviation, NA = not applicable.
*Significant difference between men and women ($p < 0.001$).
†Midpoint of monthly income per household ÷ number of people fed.

munity meals or collective kitchens. The proportion of single men in our study (44.2%) was similar to the proportion of single Canadians whose income is below the low-income cutoff (43.6%).

When asked, 72 (14.7%) of study participants reported that the current visit was the first time they had ever used a food bank; 328 (67.0%) of participants reported weekly, biweekly or monthly food bank visits. These data support the views expressed by clients that the food bank is a community service and a necessity rather than an embarrassment. In view of this perspective on the part of users, it may be inappropriate to refer to food banks as emergency food resources.

The proportion of older food bank users who were overweight has health implications, since these people may be at increased risk for chronic diseases. Almost 50% of the study group smoked, and smoking is a risk factor for heart disease and cancer.[29]

The food bank users in this study were better educated than their peers in the general Quebec population. Almost half of the men in our study had completed technical school or had a college or university education. Significant correlations between education and the quality of diet have been previously documented.[32]

Kinsey[33] reported that as income increases a smaller percentage is spent on food. In our study, men reported spending 29.4% and women 24.9% of household income on food. These values are higher than the 21.8% reported in other recent work[34] but are in line with national data (26.7%).[1,26] In terms of absolute dollars, food bank users spent $2.99 to $3.10 per person each day on food. The minimum food cost for an adequate diet during the winter has been estimated at $4.53 per day,[35] which means that these food bank users had a monthly shortfall of between $43.04 and $46.35. It is unlikely that the food banks can compensate for this shortage. Many of our respondents were long-term food bank users, and studies have found that emergency food supplies do not provide adequate food variety or nutrition.[19,21,36]

Conclusions

The majority of food bank users in this study were not those usually thought to be the most vulnerable in terms of nutritional status (the very young, those with chronic health conditions and the elderly); rather, they were healthy single individuals. Our findings indicate that food banks serve mainly the non-working poor, are used regularly and are seen by clients as a necessary community resource.

Table 3: Factors related to food bank use among survey participants

Factor	No. (and %) of survey participants		
	Men *n = 256*	Women *n = 234*	Total *n = 490*
Main reason for food bank visit			
Not enough or no food at home	81 (31.6)	90 (38.5)	171 (34.9)
To stretch food budget	73 (28.5)	69 (29.5)	142 (29.0)
Ran out of money for food	64 (25.0)	50 (21.4)	114 (23.3)
Other (e.g., excessive expenses, disaster)	38 (14.8)	25 (10.7)	63 (12.8)
Food on hand for one more day			
Yes	190 (74.2)	167 (71.4)	357 (72.8)
No	66 (25.8)	67 (28.6)	133 (27.1)
Perception of the food bank			
A community service	120 (46.9)	99 (42.3)	219 (44.7)
A necessity	104 (40.6)	116 (49.6)	220 (44.9)
An embarrassment	14 (5.5)	8 (3.4)	22 (4.5)
Other (e.g., big help, stop-gap measure)	18 (7.0)	11 (4.7)	29 (5.9)
Greatest impediment to getting food			
Not enough money after paying other bills	211 (82.4)	206 (88.0)	417 (85.1)
Food too expensive	18 (7.0)	14 (6.0)	32 (6.5)
Physical disability or illness	5 (2.0)	2 (0.8)	7 (1.4)
Other (e.g., store too far away, lack of time)	22 (8.6)	12 (5.1)	34 (6.9)
Frequency of food bank use			
Every week	53 (20.7)	58 (24.8)	111 (22.6)
Every 2–3 weeks	41 (16.0)	29 (12.4)	70 (14.3)
Once a month	80 (31.2)	67 (28.6)	147 (30.0)
Every 4–6 weeks	18 (7.0)	15 (6.4)	33 (6.7)
Only once before current visit	29 (11.3)	28 (12.0)	57 (11.6)
First time	35 (13.7)	37 (15.8)	72 (14.7)

The trust and cooperation of participating food banks and the many food bank users we met formed the cornerstone of this project. Special thanks are extended to the dietitian-interviewers for their thoughtful and thorough work.

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Community and International Nutrition

Nutrient Intake of Food Bank Users Is Related to Frequency of Food Bank Use, Household Size, Smoking, Education and Country of Birth[1]

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ABSTRACT The number of individuals and families accessing food assistance programs has continued to grow throughout the 1990s. Despite the increased health risk among low-income people, few studies have addressed nutrient intake throughout the month or at the end of the month when food and financial resources are thought to be compromised, and no study has described dietary status of a random sample of food bank users. Nutrient intakes of adult female and male food bank users in metropolitan Montreal, Quebec, Canada, were monitored week-by-week over a month by dietitian-administered 24-h recall interviews. A total of 428 participants from a stratified random sample of 57 urban area food banks completed all four interviews. Mean energy intake, as an indicator of diet quantity, was similar to other adult populations (10.2 ± 4.8 and 7.9 ± 3.6 MJ for men and women, respectively, age 18–49 y) and not related to sociodemographic variables except the expected biological variation of age and sex. Macronutrient intake was stable throughout the month. Overall median intakes of calcium, vitamin A, and zinc were below recommended levels for all age and sex groups. Intakes of several micronutrients were related to frequency of food bank use, household size, smoking, education, and country of birth. High nutrient intake variability characterized these adult food bank users. J. Nutr. 129: 883–889, 1999.

KEY WORDS: • *food security and nutrient intake* • *urban food banks and nutrition* • *urban food security* • *food bank users' nutrient intake* • *food bank users' diet*

Increasing numbers of people continue to turn to food banks and soup kitchens for personal and family food assistance (Davis and Tarasuk 1994, Jacobs Starkey 1994). In Canada, a 20% increase in the number of food banks was seen from 1992 to 1996 (Canadian Association of Food Banks 1997). Recent reports from the United States show that the demand for these and other forms of emergency food assistance continues to grow (Kendall and Kennedy 1998).

The term "food bank" initially referred to a central collection and distribution center that provided bulk food to local food relief programs; the local food depot or food pantry then gave food assistance directly to those in need. Today the media, community workers, and the clients themselves most often refer to the local food assistance sites as food banks; we use the term food bank in the local food relief context. The food bank obtains emergency food supplies from a central collection center, market discards, or food company donations; augments supplies through purchases from fund-raising drives or from food donations by residents of communities (Riches 1989; Vozenilek 1998); and gives the collected food to those in need of it. Emergency food bags were found to vary greatly in the amount of nutrients they provide (Jacobs Starkey and Kuhnlein 1996), and the food bank system was criticized as providing limited nutritional support in a community (Riches 1989).

Despite the concern for food security and nutrient intake adequacy among urban food assistance recipients (Jacobs Starkey et al. 1995, Kendall et al. 1996, Radimer et al. 1990, Wolfe et al. 1996), most studies provide only a snapshot of the food assistance program participants from a single interview or from synthesis of focus group discussions (Badun et al. 1995, Hargrove et al. 1994, Smith and Hoerr 1992, Tarasuk and MacLean 1990). Few studies of food bank users address nutrient intake throughout the month, looking at week-to-week variation in food intake, or at the end of the month when the time since income was received is greatest and food and financial resources are considered to be most limited. Taren et al. (1990) reported the number of servings of different food items per week decreased during the last week of the month; however, second or third servings of the same food were not counted. Other studies have been limited by the use of small convenience samples (Emmons 1986, Villalon 1998).

Increased health risk among low-income people is well documented; nutritional status is one indicator of wellness, and an important health monitoring parameter (Margetts and Jackson 1993, Najman 1993). Definitive nutrient intake data are not available from difficult-to-sample populations, such as emergency food recipients. The need for greater understanding of obesity, protein-energy malnutrition, iron, vitamin A, and folate status among these people, as well as diet variety, was

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expressed (Anderson 1990). Further, two priorities from the International Conference on Nutrition are relevant to food assistance programs in industrialized countries: *1)* to assess, analyze, and monitor nutrition situations; and *2)* to improve household food security (Food and Agriculture Organization 1995).

We investigated the week-by-week over the income month food and nutrient intakes of adult Quebec female and male food bank users, to describe the overall nutrient intake and to characterize the variation in ability to meet nutrient recommendations as the month progressed. An earlier publication described the sociodemographic characteristics of the study group (Jacobs Starkey et al. 1998). The objectives of this analysis were threefold: *1)* to assess the average diet over a month (mean of four recalls) and determine correlates of poor overall intake; *2)* to describe any decline in intake over the income month and determine for which clients this decline was most pronounced; and *3)* to describe the characteristics of clients who had the most highly variable diet over the income month, as this may reflect food insecurity.

MATERIALS AND METHODS

Food depot and client enrollment. Fifty-seven community organizations (sites) whose primary purpose was to direct food aid to clients were identified from a census of 167 agencies receiving supplies from a central food bank in metropolitan Montreal. Sites were stratified into three groups based on the number of people served per month: small sites ($n = 21$) provided food to <100 clients per month, medium ($n = 20$) 100–499, and large sites ($n = 16$) served >500 people per month, for a total of >22,000 people served each month. A total of 20 individual sites were randomly selected in numbers proportionate to their representation of food banks of that size, and clients were then systematically selected at each site, based on the percentage of people served in each stratum (5.5% small, 20.7% medium, and 73.8% from large sites). A random number was generated each sampling day to designate the first client to be interviewed; after completion of that interview, the next person in line was approached for an interview, and so forth.

Participating clients signed a consent form. Eligibility criteria were 18 y of age or older; from a household of known address within two bus transfers from the food assistance site, and spoken English or French in the home unless an interpreter was available. Clients entered the study at any time during the month, when they came to the food bank to obtain supplies; only one respondent per household was enrolled. Based on when study participants received their income, largely as one social assistance check per month, we determined whether they were in income-week 1, 2, 3 or 4 of the month. Income-week served as an indicator of financial risk (more money at hand in income-week 1 than income-week 4). Interviews were conducted in winter (February to April 1995) when disposable income for food was expected to be most limited by other seasonal costs. All procedures were approved by the McGill University Ethics Committee.

Measurement sequence. Once enrolled, while still at the food bank, clients completed a dietitian-administered structured questionnaire, including self-reported height and weight, and initial 24-h dietary recall interview. They were interviewed weekly thereafter at home or other convenient location, to complete three additional 24-h recalls. Thus, each person who completed the study was interviewed a total of four times. These clients were paid an honorarium ($25) at the final visit. All days of the week were represented in the recall data.

Repeated in-person 24-h recalls were used because preliminary work revealed a number of food assistance recipients without a telephone or with access only to a common-use telephone. Trained dietitian-interviewers used household food portion models to enhance correct estimation of portion size and decrease respondent bias. Clients were asked if they had visited a food bank in the interval since the previous interview; however, data on the source of foods consumed were not collected during the recall interviews.

Data analysis. Each 24-h recall was coded by the dietitian who conducted the interview, using food codes representing the Canadian Nutrient File (The Food Processor, Version 5.03; ESHA Research, Salem, OR). The software program selected was reported to be appropriate for the nutrients analyzed (Lee et al. 1995). The percentage contribution of protein, fat, and carbohydrate to energy intake was determined for each income-week and compared to the Nutrition Recommendations for Canadians (Minister of National Health and Welfare 1990).

The contribution of recalled food to the food groups of Canada's Food Guide to Healthy Eating (Health and Welfare Canada 1992) was determined using serving sizes provided in the *Guide*. Volume and dimensions were converted to gram weights, as needed. For comparison with the Quebec Nutrition Survey (Santé Québec 1995), servings for the meat and alternatives group were calculated using 60 g of meat, fish, or poultry; 200 mL of canned beans; and 50 mL of peanut butter.

Mean energy and nutrient intake over the four recalls was calculated. ANOVA, stratified for age and gender, followed by Tukey's multiple comparison test, was used to compare mean intakes by income-week (Hatcher and Stepanski 1994). Mean intakes of the number of food servings for each of the food groups of Canada's food guide to healthy eating (Health and Welfare Canada 1992) were compared to minimum recommended intake levels for each food group. To investigate the relationship between overall intake of nutrients and correlates of intake, continuous variables were analyzed using multiple regressions. Change in energy and nutrient intake (from income-week 1 to income-week 4) was divided into quintiles; the association of these quintiles with sociodemographic variables was assessed using the chi-square test of independence. To assess whether greater day-to-day variability in energy intake was associated with different levels of intake of any of the micronutrients, the mean intakes per energy variability quintile were compared using ANOVA. Differences at the level of $P < 0.05$ were considered significant. Statistics were generated using SAS/STAT 6.11 (SAS Institute, Cary, NC).

RESULTS

Client profile. A total of 60% or 490/816 clients approached were enrolled, 57.2% of women and 62.9% of men. Sociodemographic data obtained upon enrollment are described elsewhere (Jacobs Starkey et al. 1998). Briefly, clients' mean age was 41 y with mean body mass index (BMI)[3] of 27 ± 11 (kg/m^2); 43% were born in Canada. The most common regions of origin for non-Canadian clients were Eastern Europe, South America, and the Caribbean. Refugees represented 16% of clients enrolled in the study. Weekly or biweekly food bank visits were reported by 36.9% of clients.

All four 24-h recall interviews were completed by 428 (87.3%) subjects (219 men and 209 women): 23 from small, 89 from medium, and 316 from large food assistance sites. Among these food assistance recipients, men and women were equally represented (51.2 and 48.8%, respectively); 77.6% were in the 18–49-y-old age group; 63.1% were single, separated, or widowed; and 66.6% had completed high school or post-secondary studies. Twice as many men as women (49.2 vs. 27.4%) had a technical, college, or university education. The total number of people fed in a household (mean 2.4 ± 1.5) was higher when women versus men presented themselves at the food bank ($P < 0.0001$), 2.8 ± 1.6 versus 2.1 ± 1.4, respectively. Eighty-three percent of food bank users who completed the study received income as social assistance benefits.

Of the 62 dropouts from the study, 59.7% were men. In

[3] Abbreviations used: BMI, body mass index; RE, retinol equivalents; RDA, recommended daily allowance; RNI, recommended nutrient intakes.

TABLE 1

Mean and median daily energy and nutrient intakes of food bank users averaged over 4 d of intake[1]

Nutrient	Age group, y	RNI[2] males	Male[3] (n = 219)	RNI[2] females	Female[3] (n = 209)
Energy, *MJ*	18–49	11.3–12.6	10.2 ± 4.8 (9.5)	8.0–8.8	7.9 ± 3.6 (7.4)
	50+	8.4–9.6	9.5 ± 4.8 (8.2)	7.1–7.5	7.6 ± 3.9 (6.6)
Fat, *g*	18–49	—	84 ± 55 (71)	—	64 ± 43 (56)
	50+	—	78 ± 55 (63)	—	59 ± 50 (45)
Protein, *g*	18–49	61–64	94 ± 51 (85)	50–51	76 ± 41 (69)
	50+	59–63	94 ± 60 (79)	54–55	73 ± 40 (64)
Folate, *μg*	18–49	220–230	313 ± 215 (258)	180–185	269 ± 244 (210)
	50+	215–230	270 ± 187 (217)	195–200	259 ± 174 (209)
Thiamin, *mg*	18–49	1.1–1.2	1.8 ± 1.3 (1.5)	0.8	1.5 ± 1.1 (1.1)
	50+	0.8–0.9	1.8 ± 1.5 (1.4)	0.8	1.6 ± 1.2 (1.2)
Vitamin C, *mg*	18–49	40–60	133 ± 157 (85)	30–45	127 ± 136 (83)
	50+	40–60	119 ± 139 (65)	30–45	121 ± 123 (86)
Vitamin A, RE[4]	18–49	1000	1363 ± 1644 (702)	800	1203 ± 1533 (615)
	50+	1000	1457 ± 1795 (653)	800	1283 ± 1414 (643)
Calcium, *mg*	18–49	800	805 ± 615 (667)	700	698 ± 474 (575)
	50+	800	771 ± 610 (639)	800	703 ± 500 (573)
Iron, mg	18–49	9	16.2 ± 9.3 (14.4)	13	13.2 ± 8.9 (11.0)
	50+	9	16.2 ± 11.1 (13.3)	8	13.9 ± 9.0 (11.7)
Magnesium, *mg*	18–49	240–250	342 ± 238 (303)	200	278 ± 169 (249)
	50+	230–250	327 ± 200 (269)	210	288 ± 183 (246)
Zinc, *mg*	18–49	12	12.2 ± 9.9 (10.2)	9	9.8 ± 6.5 (8.4)
	50+	12	13.9 ± 10.9 (10.8)	9	9.7 ± 6.0 (8.5)

[1] Mean ± SD; medians are in parentheses.
[2] RNI = recommended nutrient intakes (Murray and Beare-Rogers 1990).
[3] The number of men and women aged 18–49 and 50+ y was 176 and 43 for men, and 157 and 52 for women, respectively.
[4] RE = retinol equivalents.

comparison to the completing adults, dropouts were younger (mean age 38 vs. 41 y, $P < 0.05$), lived in smaller households (2.2 ± 1.4 vs. 2.4 ± 1.6, $P < 0.05$), and shopped more often for food (4.5 ± 2.8 vs. 3.4 ± 2.7 times per week, $P < 0.05$) than clients who completed the study. Dropouts also reported spending more on smoking ($9.33 ± 10.38 vs. $6.01 ± 9.84, $P < 0.01$).

Dietary intake status and energy intakes. Energy intakes (means of 4 d) (Table 1) of male and female food bank clients were similar to the general Quebec population (Santé Québec 1995). Further, whereas the vast majority of people received money once a month as a social assistance check, there was no decline in mean energy intake over the income-month (Table 2). Mean energy intake varied with age and gender ($P < 0.01$) in the expected directions, being higher for men and the younger food bank clients. Whereas energy intake variation was high, as evidenced by large standard deviations, it is unlikely that the food bank users chronically lacked enough to eat. Self-reported height-weight data indicated that <6% of subjects had a BMI below 20, 66% between 20–27, and 28% had a BMI ≥28 kg/m^2. There could be a concern that food bank users, entering the study in any income-week, would report lower intakes in later interviews as a result of interview fatigue thus obscuring trends over the month. There were no differences in energy intakes analyzed by visit (week-by-week from the time people entered the study, regardless of income-week).

To check for possible underreporting of intake (Black et al. 1993) in our population, mean energy intakes were also compared to energy needs calculated using the World Health Organization formula (World Health Organization 1985). Goldberg et al. (1991) determined that a ratio of energy intake to calculated energy needs of 1.35 was adequate for normal living circumstances. Mean energy intake of food bank users met the 1.35 cut-off ratio, indicating that our energy intake data reflected neither important underreporting nor undernutrition.

To further examine the week-to-week variability in energy intake, quintiles of the coefficient of variation of energy intake were formed (data not shown). There were no differences in the mean (4 d) energy intake by quintile of variation in energy intake. For men, mean energy intake at the lowest quintile of variability (13%) was 10.2 MJ, similar to the 10.4 MJ obtained by those with the highest variability in energy intake (65%). Multivariate analysis of the correlates of variability in energy intake indicated that the week-to-week variability in energy intake was higher among smokers ($P < 0.002$) and among Canadian-born clients ($P < 0.02$) and lower when more people usually ate together ($P < 0.004$). Age and gender were not associated with variability of intake. The correlates of variability of intake from week-to-week appeared to reflect lifestyle, whereas the correlates of mean energy intake over the 4-wk period were age and sex, indicators of biological variability between subjects.

Food group servings. The proportion of food bank users who met the minimum recommended number of servings from Canada's food guide to healthy eating (Health and Welfare Canada 1992) (Table 3) was similar to the general Quebec population (Santé Québec 1995). The proportion of clients who met minimum intake recommendations for milk products was lower than for Quebecers in general; only 32.5% of Quebecers and 21% of food bank clients met the recommended intakes. Mean intake of milk products (data not shown) was below the recommended minimum of two servings for all age and sex groups; mean intakes of the other three food groups exceeded the recommended minimum number of servings.

Micronutrient intakes. With the exception of calcium, mean nutrient intakes (4 recalls) (Table 1) met the Recom-

TABLE 2

Mean and median daily energy and nutrient intakes of food bank users by each income-week (n = 428)[1,2]

Nutrient	Sex	Age group, y	Income-week 1	Income-week 2	Income-week 3	Income-week 4
Energy, *MJ*	M	18–49	10.0 ± 4.7 (9.5)	10.9 ± 5.8 (9.8)	9.8 ± 4.3 (9.4)	10.0 ± 4.3 (9.4)
		50+	8.7 ± 4.7 (7.8)	9.7 ± 4.0 (9.2)	10.7 ± 5.8 (8.1)	9.0 ± 4.4 (9.1)
	F	18–49	8.0 ± 3.5 (7.5)	8.0 ± 3.4 (7.3)	8.1 ± 3.6 (7.5)	7.6 ± 3.8 (7.1)
		50+	7.4 ± 4.1 (6.2)	7.8 ± 3.9 (7.3)	7.0 ± 3.1 (6.5)	8.2 ± 4.3 (6.8)
Fat, *g*	M	18–49	85 ± 57 (74)	88 ± 64 (70)	81 ± 48 (70)	83 ± 51 (71)
		50+	69 ± 57 (60)	87 ± 51 (71)	83 ± 63 (60)	73 ± 48 (61)
	F	18–49	67 ± 43 (58)	64 ± 39 (57)	64 ± 43 (52)	63 ± 46 (55)
		50+	61 ± 67 (45)	59 ± 44 (45)	54 ± 38 (43)	63 ± 49 (46)
Protein, g	M	18–49	91 ± 55 (87)	99 ± 52 (87)	89 ± 47 (79)	95 ± 49 (85)
		50+	80 ± 55 (66)	89 ± 46 (75)	106 ± 63 (85)	99 ± 72 (82)
	F	18–49	79 ± 44 (69)	76 ± 42 (70)	76 ± 39 (73)	72 ± 40 (64)
		50+	70 ± 39 (57)	74 ± 39 (68)	65 ± 32 (63)	82 ± 50 (72)
Folate, *µg*	M	18–49	305 ± 226 (263)	330 ± 206 (267)	298 ± 190 (257)	319 ± 235 (254)
		50+	267 ± 179 (231)	276 ± 163 (206)	236 ± 130 (194)	299 ± 255 (215)
	F	18–49	283 ± 320 (217)	265 ± 216 (200)	269 ± 202 (221)	259 ± 221 (200)
		50+	256 ± 179 (190)	253 ± 171 (244)	256 ± 192 (201)	272 ± 158 (230)
Thiamin, *mg*	M	18–49	1.8 ± 1.4 (1.4)	1.9 ± 1.4 (1.5)	1.7 ± 1.1 (1.5)	1.9 ± 1.5 (1.5)
		50+	1.5 ± 1.1 (1.2)	1.8 ± 1.3 (1.4)	1.9 ± 1.5 (1.5)	2.0 ± 1.9 (1.1)
	F	18–49	1.4 ± 1.0 (1.2)	1.4 ± 1.0 (1.1)	1.5 ± 1.1 (1.2)	1.5 ± 1.3 (1.0)
		50+	1.5 ± 1.4 (1.2)	1.7 ± 1.1 (1.5)	1.5 ± 1.3 (1.2)	1.6 ± 1.0 (1.2)
Vitamin C, *mg*	M	18–49	132 ± 171 (79)	143 ± 160 (98)	122 ± 125 (77)	136 ± 167 (82)
		50+	130 ± 141 (70)	134 ± 132 (74)	113 ± 157 (78)	100 ± 126 (49)
	F	18–49	133 ± 153 (84)	129 ± 128 (97)	129 ± 124 (90)	116 ± 137 (82)
		50+	124 ± 138 (69)	126 ± 127 (103)	111 ± 107 (75)	123 ± 121 (90)
Vitamin A, RE[3]	M	18–49	1264 ± 1579 (615)	1540 ± 1838 (828)	1284 ± 1606 (632)	1362 ± 1536 (878)
		50+	1743 ± 2043 (728)	1248 ± 1727 (508)	1480 ± 1630 (726)	1357 ± 1779 (626)
	F	18–49	1226 ± 1518 (694)	1249 ± 1679 (641)	1132 ± 1212 (629)	1207 ± 1699 (503)
		50+	1082 ± 1205 (564)	1329 ± 1492 (630)	1359 ± 1786 (568)	1360 ± 1090 (961)
Calcium, *mg*	M	18–49	773 ± 538 (662)	852 ± 789 (654)	726 ± 415 (643)	869 ± 649 (737)
		50+	717 ± 449 (667)	805 ± 582 (634)	756 ± 658 (503)	805 ± 731 (654)
	F	18–49	709 ± 427 (644)	728 ± 510 (579)	701 ± 484 (569)	654 ± 473 (542)
		50+	634 ± 504 (539)	763 ± 517 (587)	626 ± 366 (541)	787 ± 579 (648)
Iron, *mg*	M	18–49	15.5 ± 8.3 (14.1)	17.8 ± 10.6 (15.3)	15.4 ± 8.0 (13.8)	16.3 ± 10.0 (14.4)
		50+	14.4 ± 11.5 (8.7)	15.6 ± 8.0 (14.7)	17.4 ± 11.1 (14.2)	17.6 ± 13.3 (11.6)
	F	18–49	13.3 ± 9.9 (11.5)	12.9 ± 8.7 (10.8)	14.1 ± 8.5 (12.7)	12.8 ± 8.5 (10.7)
		50+	13.0 ± 8.6 (11.1)	13.9 ± 7.8 (13.3)	13.6 ± 10.7 (10.6)	14.9 ± 8.9 (12.4)
Magnesium, *mg*	M	18–49	333 ± 212 (291)	376 ± 348 (308)	333 ± 192 (299)	327 ± 152 (316)
		50+	299 ± 173 (247)	322 ± 159 (291)	356 ± 215 (313)	332 ± 246 (270)
	F	18–49	281 ± 175 (250)	282 ± 177 (254)	293 ± 171 (263)	255 ± 152 (222)
		50+	261 ± 133 (227)	289 ± 186 (261)	279 ± 185 (241)	322 ± 217 (259)
Zinc, *mg*	M	18–49	11.4 ± 7.0 (9.8)	14.2 ± 15.5 (11.3)	11.4 ± 7.5 (9.6)	11.7 ± 6.6 (9.9)
		50+	11.5 ± 9.5 (8.1)	14.1 ± 11.3 (10.8)	16.3 ± 11.7 (12.3)	13.4 ± 10.6 (10.7)
	F	18–49	10.1 ± 6.4 (9.1)	9.8 ± 7.2 (8.1)	10.1 ± 6.4 (8.9)	9.4 ± 6.2 (8.0)
		50+	8.9 ± 4.8 (8.3)	9.6 ± 5.7 (8.3)	9.0 ± 6.0 (7.7)	11.5 ± 7.0 (10.3)

[1] Values are means ± sd; medians are in parentheses.

[2] Most study participants received income as one social assistance check per month. Therefore, we determined what income-week they were in for each interview. This approach allowed determination of week-to-week variation in intake from the time income was received until the end of the month, when financial resources were considered to be limited.

[3] RE = retinol equivalents.

mended Nutrient Intakes (RNI), levels thought to meet the needs of most healthy people (Murray and Beare-Rogers 1990). Mean calcium intakes were below the RNI for women aged 18–49 y and both men and women aged 50+ years. Analysis of food group data support these observations (Table 3).

Mean nutrient intakes by income-week (Table 2) showed very little change over the month; nutrient intake was not influenced by how close clients were to their next check. It is possible that our participants obtained food bank provisions before running out of food, thus maintaining a stable intake over the weeks. ANOVA revealed an effect for income-week only for one nutrient, calcium [$F(3,1272) = 3.08$; $P < 0.03$]. Calcium intake was not consistent over time; during weeks 1 and 3 intakes were significantly lower than during weeks 2 and 4 ($P < 0.04$) for all age and sex groups.

Mean nutrient intake was also not different by quintile of energy intake variability; those people with the most erratic daily eating pattern obtained micronutrients similar to their more energy-consistent peers.

Correlates of nutrient intake. Multivariate correlates of nutrient intake were identified (Table 4). Overall intakes (means of 4 d) were regressed on the linear combination of age, sex, country of origin, education level, civil status, number of people fed, frequency of using the food bank, telephone costs, rent payment, and smoking. Civil status and rent payment showed no relationship to nutrient intake ($P > 0.05$) and were deleted from the final models. As expected, men had a higher intake than women for energy (2.1 MJ) and all nutrients, with the exception of vitamins A and C. Food bank clients not born in Canada (58.8% of subjects) had higher intakes of folate ($P < 0.0002$) and vitamin C ($P < 0.001$).

TABLE 3

Proportion of food bank users who met the minimum recommended number of servings of Canada's Food Guide to Healthy Eating based on four 24-h recalls[1]

	Food groups, minimum recommended servings[2]			
	Milk products, 2	Meat & alternatives, 2	Grain products, 5	Vegetables & fruit, 5
	%			
Québec Nutrition Survey[3]	32.5	62.2	57.5	43.4
Food bank users	21.0	71.7	62.9	49.5

[1] Health and Welfare Canada 1992.
[2] Recalled foods were classified according to food group, and portion sizes were converted to food group servings using volumes, dimensions, and weights.
[3] Santé Québec 1995.

Similarly, education was positively associated with intake of folate ($P < 0.008$), vitamin C ($P < 0.01$), and vitamin A ($P < 0.001$).

The number of people in the household was negatively correlated with folate, vitamin C, iron, and thiamin intakes. Frequent food bank users had lower intakes of folate, protein, vitamin C, calcium, magnesium, and zinc. This may be explained by the finding that food bank users are exposed to limited distribution of meat, fresh vegetables, and fruit in emergency food supplies (Jacobs Starkey 1994); in our study, those with the most reliance on food bank supplies fared least well for these nutrients. Smokers' intakes of five nutrients (folate, protein, vitamin C, iron, and thiamin) were significantly lower than for nonsmokers, but total energy intake was not lower in smokers. Finally, those without a telephone had a lower calcium intake ($P < 0.04$).

DISCUSSION

This is the first report of monthly (week-to-week) nutrient intake of a random sample of food bank users and the first paper to define correlates of usual nutrient intake. Study participants appeared to achieve a level of nutrition not unlike the general Quebec population, but under the restraint of a lower income. Variation in energy intake from week-to-week was substantial and was associated with lifestyle factors, but was not associated with lower overall intake of energy or other nutrients.

The 60% enrollment success in this study compares favorably with other large scale studies in Canada (69%) and the United States (61%) (Santé Québec 1995; US Department of Health and Human Services and US Department of Agriculture 1986). The <13% dropout rate over four contacts was not unreasonable.

Mean energy intakes below recommended levels (Murray and Beare-Rogers 1990), such as we found for food bank users, was also reported by Badun et al (1995) in a low-income group in Ontario and by Dowler and Calvert (1995) among lone-parents in Britain. Nonetheless, our study participants did not have low mean BMI. Although Kendall et al (1996) hypothesized that occasional bingeing behaviors may predispose food-insecure individuals to obesity, we found the distribution of BMI among food bank users to be similar to the general Quebec population (Santé Québec 1995) .

The mean of four 24-h dietary recalls is considered valid to represent the overall nutrient intake of a group (Bingham 1991). Mean energy intakes in this study were higher than reported in other low-income groups, for example, by Crotty et al (1992) using weighed food records and by Dowler and Calvert (1995) using two 24-hour recalls. Energy intakes reported in the NHANES III report (US Department of Health and Human Services 1994) and in the Quebec Nutrition Survey (Santé Québec 1995) were similar to those in the present study for women and older men. Men aged 18–49 y in both of these surveys had higher mean energy intakes than food bank users; however, the low income subgroup in the

TABLE 4

Regression models for average daily intake (mean of 4 recalls) of macro and micronutrients by food bank users

	Explanatory variables: Correlates of average intake									
Nutrients	Intercept	Age (y)	Sex (male vs. female)	Country-of-Origin (nonCan. vs. Can.)	Education (level)	People fed in household (n)	Food bank use (visits/mo)	Telephone (cost/mo)	Smoking (yes vs. no)	R2 (%)
Energy, *MJ*	12.9	—	2.1	—	—	—	—	—	—	6.9
Protein, *g*	111.4	—	16.0	—	—	—	−4.6	—	−5.1	4.7
Folate, *μg*	200.0	—	23.8	48.1	18.1	−20.6	−21.7	—	−29.3	5.9
Vitamin C, *mg*	58.4	—	—	33.6	14.4	−9.9	−11.0	—	−22.2	5.0
Ca, *mg*	954.7	—	91.0	—	—	—	−49.4	−41.8	—	1.9
Fe, *mg*	20.1	—	2.5	—	—	−0.9	—	—	−1.5	3.7
Vitamin A, RE[1]	633.2	—	—	—	160.4	—	—	—	—	1.9
Mg, *mg*	336.0	—	51.7	—	—	—	−20.6	—	—	2.9
Thiamine, *mg*	2.1	—	0.3	—	—	−0.12	—	—	−0.19	3.2
Zn, *mg*	10.4	1.1	2.4	—	—	—	−0.8	—	—	3.4

[1] RE = retinol equivalents.

Quebec survey had lower energy intakes than food bank users (US Department of Health and Human Services 1994, Santé Québec 1995).

Peterkin et al (1982) reported that food stamp program participants in the US meet the recommended daily allowance (RDA) for calcium, iron, magnesium, vitamin A, thiamin, and vitamin C less often than their nonpoor peers. Badun et al (1995) also found calcium, folate, and zinc intake of a small sample of Canadian low-income people to be below recommended levels. Although Levine (1996) found that economic resources are a determinant of zinc status, in our study zinc intake by food bank users was higher in most age/sex groups than that reported in two Quebec surveys (Ghadirian et al. 1995, Santé Québec 1995). Lower zinc intakes (<7.5 mg/d) were found for lower income participants in NHANES II, which were attributed to food selection rather than a low energy intake (Mares-Perlman et al. 1995). These latter results are supported by analysis of Canadian family food expenditure data: Campbell and Horton (1991) found an increased proportion of households with lower protein, iron, folate, and calcium levels among those with lower income. Interpretation of iron intake data must also consider food source. Gibson (1994), upon reporting a study where 44% of iron came from pasta, rice, cereal and bread, cautioned that meal composition may be an important variable for study in vulnerable groups. Given that over 70% of the food bank users had mean meat & alternatives food group intake above the minimum recommended number of servings, their mean zinc and iron intakes above RNI levels were not unexpected.

Mean intakes of folate, vitamin C, iron, thiamin, zinc, and vitamin A were higher in the present study than recently reported for other low-income groups (Crotty et al. 1992, Dowler and Calvert 1995, Santé Québec 1995). Fruit and vegetable intake (important for sources of folate) is related to both income (Myres and Kroetsch 1978) and education (Rogers et al 1995). Low-income women in Maryland reported spending little time on cooking and revealed barriers to fruit and vegetable consumption as preference for other food, time and effort required, perishability, and cost (Trieman et al., 1996). Given the declining earnings of young men and increasing income gaps between higher- and lower-income Canadians (Morissette 1997), the challenge to have an adequate food budget is likely to affect even more people in the future. Stitt et al. (1995) found a 53% difference in the regularity of fresh fruit and vegetable consumption when comparing high and low income groups in Britain. Education level reported in our study group was reflected in mean folate intakes meeting recommended levels, except among older men.

Food bank users in this study who were not born in Canada had higher folate intakes; this may reflect a greater consumption of raw food or of meals that require cooking from raw ingredients. Dowler and Calvert (1995) found that nonwhite respondents' higher nutrient intake could be related to a greater dietary diversity; a more consistent habit of cooking from fresh, raw ingredients; and a less likelihood of smoking. Diets with higher diversity scores are more likely to meet nutrient intake recommendations, and diet diversity is associated with higher income and education (Kant et al. 1991).

Heavy smoking has been reported to be negatively associated with attitudes about healthy eating (Smith et al. 1997). From 7-d weighed food records of British adults, Margetts and Jackson (1993) determined that, while there was little difference in total food energy between smokers and nonsmokers, the smokers had lower fiber, iron, carotene, and ascorbic acid intakes. Our results among low-income smokers show a similar pattern.

Mean calcium intake of participants in this study was below levels reported for French Canadian men and women (Ghadirian et al. 1995), for low-income men (Myres and Kroetsch 1978), and for adult women entering a food bank study (Villalon 1998). Intakes of men and women aged 50+ y were similar to those reported in the Quebec Nutrition Survey, while younger food bank users had intakes below their provincial age counterparts (Santé Québec 1995). Low-income Quebecers' mean intake of calcium (Santé Québec 1995) was similar to that of the food bank users in this study. In an early study of food stamp program participants in the US, Peterkin et al. (1982) reported that households meeting the RDA for calcium consumed more milk, vegetables, and grain products, an area for further investigation among young food bank clients. The need to augment emergency food supplies with milk products was previously documented (Jacobs Starkey 1994).

Comparative data on variability in nutrient intake are limited. The coefficient of variation for energy intake of male food bank users aged 18–49 y was higher than reported by Beaton et al. (1979) (47.3 vs. 35.8%, respectively), as was the variability for six other nutrients: protein, fat, calcium, iron, thiamin, and vitamin C. Using the example of calcium variability in adults, that of food bank users (76.4%) was similar to low income Quebecers (72.4%) and higher than that reported in the US (49.7%) (Beaton et al. 1983, Santé Québec 1995). The response of within-person variance to both environmental and biological pressures (Tarasuk and Beaton 1991) is at play. It may be that the high variation in food bank users' intake protects, in the short term, from overall low intakes.

Food bank users in this study most often reported use of the food bank as a community service (Jacobs Starkey et al. 1998), had a fixed address, and were able to carry the provisions received. The homeless and other poor groups who are less mobile, such as single parents with large families and the frail elderly, are not well represented by these data.

The nutrient intake of adult food bank users is not worse than the general Quebec population. Energy intake was sufficient and was unrelated to clients' social circumstances. Five important correlates of nutrient intake in the study population were determined: frequency of food bank use, household size, smoking, education, and country of birth. These data may be important to health professionals to target nutrition information and intervention activities with food bank clients.

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Related Publication

Jacobs Starkey L, Murphy S, Bertrand, L, Cossette M et al. Summary Report: Ad Hoc Committee on Hunger and Food Security, Montreal, 1992-1994. J Can Diet Assoc 56(3): 110-112, 1995.