

6 Conclusions and Implications

Through an analysis of the data on Ontarians collected in CCHS 2.2, we have elucidated three areas of public health concern. The data from CCHS 2.2 are important because this marks the first rigorous, comprehensive, population-level assessment of Ontario adults' and children's dietary intakes in more than 30 years. Although the food intake data collected in CCHS 2.2 were not available to us for analysis, we have conducted an extensive examination of energy and nutrient intakes. The survey also provides much needed data on problems of overweight and obesity and household food insecurity in Ontario. The strengths of the survey lie in the size and representativeness of the sample and in the calibre of the study measurements. Although measurements of height and weight were conducted with only 53% of respondents, given the biases associated with self-reported height and weight data, the results from this survey are invaluable. Furthermore, with CCHS 2.2 we have, for the first time, a measure of household food insecurity based on a standardized, multi-item questionnaire with known measurement properties. Thus CCHS 2.2 provides a broad spectrum of high quality data on the nutritional health of Ontarians upon which to develop program and policy interventions. It also provides a model for nutrition monitoring and surveillance in the future.

6.1 Key Findings

6.1.1 Dietary Intakes

Through an examination of Ontarians' energy and nutrient intakes from food, we assessed their usual intakes in relation to current estimates of requirements. Although we found little evidence of suboptimal nutrient intakes in children 1-3 years and 4-8 years of age, some prevalence of inadequate nutrient intakes was noted for older children, adolescents and adults. We also found some indications of underreporting among adults in this sample, but it is unlikely that underreporting accounts for the evidence of inadequate nutrient intakes reported here. The highest estimates of prevalence for nutrient inadequacies were observed for vitamin A and magnesium. While the prevalence of inadequacy varied by age and sex, in some groups as many as 50-60% of individuals appeared to have inadequate intakes of vitamin A. The results were similar for magnesium, with the prevalence of inadequacy reaching 73% among elderly men. The prevalence of inadequacy was not as high or as widespread across age and sex groups for other nutrients examined. However, the elderly, and particularly elderly women, appear vulnerable to inadequacies across a wide array of nutrients. As well, intakes of several nutrients were inadequate among almost one quarter of younger women and girls. For example, vitamin B12 intakes were generally adequate among young children, boys and men of all ages, but prevalence estimates of 15-28% were noted among adolescent girls, young women, and women over 50. Among adult women, the estimated prevalence of inadequacy was 25-44% for folate, 21-35% for vitamin B6, and 12-30% for zinc, with exact prevalence rates varying by age. Iron intakes were insufficient to meet requirements in 20-23% of women, 19-50 years of age. Approximately 20% of girls 9-13 years and 14-18 years also had inadequate zinc intakes. In addition, 15-27% of adults over 30 had vitamin C intakes that

were insufficient to meet their needs, with these prevalence estimates rising by 5-10% when the added vitamin C requirements of smokers were taken into account.

In considering the public health implications of our results, it is important to recognize that the estimates of prevalence of nutrient inadequacy presented here are not estimates of nutrient deficiency. The requirement estimates against which usual nutrient intakes have been evaluated take into account intake requirements for the avoidance of signs and symptoms of nutrient deficiency but also, where evidence was considered strong enough, these requirement estimates encompass nutrient needs for optimal health (i.e., maximizing nutrient stores and nutrient functions linked to the reduction of risk of chronic diseases). Thus one should not expect to find corresponding clinical evidence of nutrient deficiencies. The prevalences of nutrient inadequacy reported here reflect intakes that are deemed insufficient for optimal health.

For nutrients with Adequate Intakes (AIs), but no EARs, prevalence estimates could not be generated. However, it should be noted that children of all ages, adolescents, and adults of all ages had usual fibre and potassium intakes below their respective AIs, and adults' usual calcium intakes generally fell below the AIs for this nutrient. Median vitamin D intakes approximated or exceeded the AI for this nutrient in all age and sex groups except women and men over 50 years of age. While it is more difficult to interpret the public health implications of findings for nutrients that do not have EARs established, the wide gaps between average usual intakes and current understanding of what constitutes adequate intake for these nutrients suggest that the intakes of Ontarians are in need of improvements.

Our results suggest that the dietary intakes of a substantial proportion of Ontario adults are insufficient to meet their requirements for some nutrients, but these findings need to be interpreted with caution because only nutrient intakes from food sources were included in the analyses. The use of vitamin and mineral supplements is fairly widespread among the Ontario population. In this survey, as many as two-thirds of adults in some age groups reported taking supplements in the past month. The data on supplement use were not available for analysis at the time of this project, but if nutrient intakes from supplements were taken into account, the estimated prevalence of inadequacy for some nutrients, for some age and sex groups, would undoubtedly fall. It is highly unlikely that all of the indications of suboptimal dietary intakes found in the present analysis would disappear, however. Other research suggests that supplement use is more prevalent among those with relatively good dietary habits (15). Furthermore, supplement formulations vary widely and supplement use by individuals is often sporadic. Thus in instances where a 15-25% prevalence of inadequacy has been noted, there may be little change in these numbers once supplement use is taken into account. As well, the use of vitamin and mineral supplements will have no impact on the very low fibre intakes documented among adults and children alike, the high fat intakes found among some adult groups, and the high sodium intakes found throughout the population.

Most Ontario children, adolescents, and adults had sodium intakes that were well above the Tolerable Upper Intake Level for this nutrient. Excess sodium intakes were

apparent among all age groups. Insofar as there is underreporting for some adults' intakes and our intake estimates do not include sodium from salt added at the table, the true levels of sodium intake in the population can only be higher than those reported here. These results reflect the high levels of sodium in processed foods, coupled with the sodium that resides in certain vegetables, milk products, and seafood. The high sodium levels documented here constitute a serious public health concern given the evidence of a link between high sodium intakes and hypertension.

Our results in some ways challenge conventional notions of nutritional vulnerability in relation to the life cycle. Young children and the elderly are often regarded as the most nutritionally vulnerable groups in the population because they have high nutrient needs but relatively low energy requirements and so must consume nutrient-dense diets in order to meet their nutrient requirements. As well, nutrition is critical to the healthy growth and development of children. However, there are few indications from this analysis that young children's food intake patterns place them at risk of nutrient inadequacies. Although prevalences of inadequacy in the range of 20-40% were noted for some nutrients among 9-13 year olds and 14-18 year olds (most notably for vitamin A and magnesium), even for these age groups usual intakes appeared adequate for most of the nutrients examined here. In contrast, our assessment of nutrient adequacy among adults revealed relatively widespread nutrient inadequacies across a broad spectrum of vitamins and minerals. Among adults, women and the elderly appear to be at greater risk of nutrient inadequacies than adult men. The estimated prevalence of nutrient inadequacies among adults may be biased upward because of dietary intake underreporting, and intakes may appear more in line with requirements once nutrient intakes from supplements are taken into consideration. However, taken at face value, our results suggest that the most nutritionally vulnerable group in this province is adults.

6.1.2 Overweight and Obesity

Almost one quarter of the adult population of Ontario was obese at the time of the CCHS 2.2 survey (2004), and close to 60% was either overweight or obese. A significantly higher proportion of men (64%) than women (53%) were overweight or obese. Nineteen percent of children and adolescents, aged 2 to 17 years, were overweight and 8% were obese.

Considerable regional variation was observed in the prevalence of overweight and obesity among men, women, adolescents, and children. However, the regional differences observed varied considerably by age and sex. While our analysis of geographic and socio-demographic factors in relation to overweight and obesity suggests that some specific subgroups may be more at risk than others, the magnitude of the overall prevalence estimates clearly indicates that this is a population problem.

The high prevalence of overweight and obesity observed in this survey indicates an unhealthy imbalance between food intake patterns and physical activity levels among a majority of Ontario adults and a substantial number of children and adolescents. Although

not reflected in the estimated energy intakes reported here, the habitual energy intakes of many Ontarians must be in excess of their needs. The lack of congruence between estimated energy intakes and requirements is likely explained by systematic underreporting of food intakes among a substantial proportion of adults in this sample. As expected, we found significant associations between various indicators of physical activity and body weight status for adults and children, but the physical activity measures included in CCHS 2.2 are limited to estimates of leisure time physical activity only. This means that activity levels linked with occupation cannot be taken into consideration. Furthermore, the cross-sectional nature of this survey means that it cannot be used to address questions of causation.

6.1.3 Household Food Insecurity

Based on the assessment of household food insecurity included in CCHS 2.2, an estimated 379,100 Ontario households (8.4%) were food insecure in 2004. While this is similar to the prevalence nationally, it is important to recognize that, according to the estimates generated from CCHS 2.2, approximately one-third of all food-insecure households in Canada reside in this province.

Household food insecurity is associated with increased nutritional vulnerability. Although our exploratory analysis of this issue included only five key nutrients, a more comprehensive examination of dietary intake in relation to household food security status would likely yield even more results. We found that women and men in food-insecure households had significantly lower intakes of vitamin A, magnesium, and calcium when compared to those in food secure households. Significantly lower vitamin A intakes were also found among girls and, to a lesser extent, boys 9 to 18 years of age in food insecure households. Thus household food insecurity is a serious public health concern in this province.

Vulnerability to food insecurity appears greatest among households with low income adequacy, those dependent on social assistance as the main source of income, and those who do not own their dwelling. The prevalence of food insecurity increased markedly as the adequacy of household income declined; almost half of those in the lowest category of income adequacy were food insecure. Further, 60% of those on social assistance (Ontario Works or Ontario Disability Support Program) were food insecure. Compared to households where the main source of income was salary or wages, households reliant on social assistance were significantly more likely to experience food insecurity. They comprise 23% of food-insecure households in this province. It is important to recognize, however, that while households on social assistance are more vulnerable to food insecurity, 55% of those who are food insecure in Ontario are reliant on employment for their incomes. Thus the public policy implications of food insecurity go beyond social assistance.

Within the province, there are marked differences in the prevalence of household food insecurity across health regions. The rates of households that experienced some

degree of income-related food insecurity during 2004 ranged from 1 in 15 households in the South West and Central East health regions to 1 in 10 households in the Toronto and North Ontario health regions. The multivariate analyses we conducted to further explore this regional variation suggest that it is largely a function of the regional variations in income, income source, and home ownership. Nonetheless, the findings indicate the greater burden of problems of household food insecurity in some health regions than others.

6.2 Discussion

6.2.1 Policy Implications

An examination of food intake patterns is central to understanding the origins of problems of nutrient inadequacies. However, the food intake data collected in CCHS 2.2 are not available to the Share partners. Thus our discussion of the needs for improvements in food intake patterns among Ontario adults, adolescents and children is based on inferences from our examination of patterns of nutrient intakes. More complete, population-specific guidance on needed dietary improvements could and should be developed from a detailed analysis of food intake patterns in relation to observed nutrient inadequacies in CCHS 2.2, but this requires access to the food intake data from the survey.

Among adults and adolescents in Ontario, we have identified extremely high prevalences of inadequacy, ranging from 37% to 73%, for vitamin A and magnesium. Although the prevalences of inadequacy were somewhat lower in children 9 to 13 years of age, intakes of these two nutrients were still suboptimal. From this, it can be inferred that many Ontarians are consuming insufficient quantities of fruits and vegetables, especially dark green leafy vegetables and orange coloured fruits, as well as whole grains, legumes, nuts, and milk and alternatives for optimal health. This inference is further supported by the suboptimal intakes of potassium and fibre throughout the population.

Among children aged 9 to 13 years, the prevalence of inadequate phosphorus intakes ranged from 14% for boys to 33% for girls. This prevalence remained high for adolescent girls and points to a need for greater consumption of legumes and foods from the milk and meat groups, especially for girls, among these age groups.

For adolescent girls and women of childbearing age (19 to 50 years old) an additional concern is the prevalences of inadequacy, ranging from approximately 15% to 30%, for nutrients such as folate, zinc, and vitamins B6, B12, C, and thiamin. This suggests that they could benefit from increased consumption of whole grain and enriched breads and cereal products, fortified cereals, meats and alternatives such as legumes and nuts, and fruits (including citrus) and vegetables (including dark green leafy ones). Furthermore, for women aged 19 to 50 years, prevalences of inadequacy of 20% to 30% for iron and folate were noted. However, without inclusion of intake from supplements for these two nutrients in particular, one should be cautious about inferring too much about food intake based on prevalence levels of this magnitude.

Aside from the aforementioned widespread problems with vitamin A and magnesium intakes, the only additional prevalence of inadequacy to be noted for adolescent boys and men aged 19 to 50 years old is that of vitamin C which ranged between 15% and 30%. As mentioned above, it can be inferred from this that intakes of fruits (including citrus) and vegetables within this group are lacking.

Amongst men and women over 50 years of age, there are some nutrients of particular concern. For women, prevalences of inadequacy ranging from approximately 30% to 50% were observed for vitamin A, folate, and magnesium. For men, prevalences of inadequacy for vitamin A and magnesium ranged from 46% to 73%, and were significantly higher for men over 70 years old than for those between 51 and 70 years old. Of additional concern for women are vitamins B6, B12, C, and zinc, the prevalences of which ranged between 15% and 30%. For men, prevalences of inadequacy for vitamin C and zinc ranged from 21% to 42%. Men over 70 years old also had increased prevalences of inadequacy for vitamin B6 and folate (22% and 29%, respectively). These results speak to the need to encourage continued consumption of fruits and vegetables, especially dark green leafy vegetables and orange coloured fruits (including citrus), as well as whole grain and enriched breads and cereal products, fortified cereals, meats and alternatives such as legumes and nuts, and milk and alternatives, throughout the lifespan. This inference is further supported by the suboptimal intakes of calcium, vitamin D, and potassium for men and women in this age range.

Suboptimal food intake patterns are also implied by the high prevalence of overweight and obesity among Ontario adults. Although diet is only one of the factors that contribute to weight gain, our results suggest that Ontarians would benefit from healthier eating patterns. The food intake patterns described in the recently revised Canada's Food Guide (66) provide a sound basis for making food-based dietary recommendations to the public.

The very high prevalence of overweight and obesity among Ontario adults points to an urgent need for improvements in both physical activity and diet. The prevalence of overweight and obesity is lower among children and adolescents than adults, but our results suggest that these groups are also at risk. While the measures of physical activity included on CCHS 2.2 are somewhat limited, present activity levels among many adults, adolescents, and children appear to be insufficient for the maintenance of healthy body weights. Healthier eating patterns and more active lifestyles will help Ontarians achieve and maintain healthy body weights. Without access to the full complement of data from CCHS 2.2, which would enable us to examine food choices and location of consumption, it is not possible to derive more specific recommendations than this though. Other research must be drawn upon to identify the most effective means to improve dietary practices and physical activity levels in the population.

Sodium intakes in the Ontario population are much higher than the levels recommended for good health. This is a problem nationwide (12), and it reflects the extraordinary amounts of sodium now present in processed foods. Even if people follow

Canada's Food Guide, their sodium intakes are likely to exceed the tolerable upper intake level (48). Health Canada has consequently included several directional statements in the food guide to encourage the consumption of foods that are low in salt. This guidance could be complemented by nutrition education campaigns to educate people as to the sources of sodium in their diets and encourage them to make low-sodium choices. However, the effectiveness of such campaigns are likely to be limited for three reasons: i) The success of consumer education initiatives hinges on the availability of sodium content information for all foods, but current labeling regulations do not apply to foods sold in restaurants and fast-food outlets. ii) Low-sodium alternatives are available for some products, but not all, so in many instances product substitution is simply not an option. iii) There is some evidence to suggest that 'nutritionally enhanced' products, designed and marketed for their healthfulness, often have higher prices than their 'regular' counterparts (67). If sodium-reduced products are marketed at higher prices, the benefits of nutrition education campaigns to encourage consumers to select these products may only be felt by health conscious consumers who do not have budgetary constraints. Because 'point of purchase' campaigns are unlikely to benefit price-conscious consumers, they have limited effectiveness as strategies for population health. Thus we recommend that government work with representatives of the food industry (including representatives of the restaurant and fast-food industries) to develop strategies to lower the sodium content of food. It will also be imperative to monitor this problem, to ensure that real progress is made.

The prevalence of household food insecurity and the evidence of dietary compromise among adults, and to a lesser extent, children in food insecure households signify the failure of existing policies and programs to ensure that all low-income Ontarians have access to the basic prerequisites to health. Household food insecurity is a problem of income adequacy. The prevalence and nutritional implications of this problem point to the need for more effective income-support programs to ensure that individuals and families who are reliant on social assistance or employment incomes from low-waged jobs have sufficient financial resources to purchase the food they need. Income support programs at both the federal and provincial level should be aligned with basic living costs. Such policy reforms need to be recognized as a cornerstone of population health and health promotion.

It is beyond the scope of this report to provide specific recommendations for policy changes that would ensure household food security for all Ontarians. Although a recent analysis of policy options for improving food security in British Columbia sheds some light on this question (68), given the inter-provincial differences, an analysis of the policy options in Ontario is needed. We recommend that the province undertake a systematic examination of the interrelationship between a broad spectrum of current policies and programs and household food security (considering those related to minimum wages, Ontario Works, the Ontario Disability Support Program, and other income support programs, as well as policies that relate to the affordability of housing, child care, public transportation, higher education, dental care, prescription medications, special dietary needs, and other expenditures that can impact the food budgets of low-income households). We also recommend that in the future, the impact of proposed policy changes on household food security be routinely assessed as part of the process of evaluating the merit of policy options. Only when food security becomes an objective of social policy in Ontario will

problems of household food insecurity diminish.

6.2.2 Research and Monitoring

Given the extraordinary costs of collecting food intake data on a representative sample of the population, it is likely not feasible to conduct another dietary intake survey of the magnitude of CCHS 2.2 in the near future. However, this makes it all the more important to glean as much as possible from the data that have been collected in CCHS 2.2. The analyses presented in this report barely ‘scratch the surface’ of what can be learned about the food intake patterns of Ontarians from this rich data source. Some specific suggestions for further analysis emerge from our work.

Pending access to the data on supplement intakes, it will be important to re-examine the prevalence of nutrient inadequacies across all age/sex subgroups. With the increased use of vitamin and mineral supplements, there is a need to understand the impact of this practice on the prevalence of nutrient inadequacies and excessive intakes in the population. The widespread prevalence of nutrient inadequacies observed among elderly women, for example, may diminish substantially once supplement use is taken into account, but if this is not the case, targeted interventions to improve the adequacy of nutrient intakes among this subgroup are warranted. Additionally, the supplement data collected in CCHS 2.2 provide an important opportunity to assess the extent to which Ontarians are adhering to current recommendations regarding supplement use for specific ‘at-risk’ subgroups (e.g., folic acid for women of child-bearing age, vitamin D for adults over 50, etc),

To better understand the specific food intake patterns that underpin the nutrient problems identified here, it will be important to examine the food intake data should it be made available to Share partners. Because Canada’s Food Guide is the primary tool for nutrition communications and education programs, it is very important to examine the population’s intakes in relation to this guidance. Some very basic, descriptive tables have been published by Statistics Canada (17), but interpretation of this work is limited because intakes were compared to the 1997 version of Canada’s Food Guide and there was no detailed examination of food selection patterns within population subgroups. Much more analysis could be conducted, using the newly released Food Guide, if the province were to gain access to the food intake data from CCHS 2.2. In order to develop effective public health programs to promote healthier food choices, for example, it would be useful to know what kinds of foods people are choosing now and how these relate to the recommendations and directional statements in the recently-revised Canada’s Food Guide. It would also be informative to examine common food sources of nutrients of particular concern, to gain insight into what modifications in food selection might be most feasible. In targeting interventions, it would also be helpful to understand the extent to which adults’ and children’s food intakes include commercially prepared meals and snacks, and foods consumed away from home. An understanding of the extent to which commercially prepared meals and snacks contribute to problems of excess sodium would importantly help to prioritize targets for intervention to address this problem. These are but a few examples of the kinds of analyses that can be conducted with CCHS 2.2 data to extend our understanding of the barriers to healthy eating among Ontarians and the opportunities for

improvements.

In thinking about future analyses to conduct with data from CCHS 2.2, it is important to also build on the methodologic insights gained from this project. Despite the fact that data were available for roughly 10,000 Ontarians, sample size limitations quickly surfaced when we endeavoured to conduct analyses of specific subgroups. For example, very few analyses could be conducted at the level of individual health regions, because once the sample was subdivided into meaningful age and sex groups, the cell sizes were often too small to yield stable estimates across variables of interest. Similarly, it was not feasible to examine the influence of ethnicity and immigration on dietary intake patterns or body weight status. These limitations lead us to conclude that the data from CCHS 2.2 are most effectively used to examine patterns at a provincial level. The feasibility of additional studies of within-province differences in dietary intake or body weight status by region, income, education, immigration status, etc is questionable.

The use of 24-hour dietary recall methodology to collect intake data on CCHS 2.2 also poses some limitations that should be considered in the development of future analytic projects. As discussed elsewhere in this report, the survey was designed to furnish the data needed to estimate distributions of usual intake in the population and thus permit the estimation of prevalences of nutrient inadequacy. However, this means there is very little data on the intakes of individual respondents. Thus although the dietary intake data can be used to describe food intake patterns in the population, these data are not well suited to the exploration of questions about factors that influence intake patterns within the population.

Monitoring dietary intakes, body weights, and food security status is important in ensuring the policies and programs remain relevant to population health. While it may only be feasible to conduct population-level dietary intake assessments once every 5-10 years, there are other indicators of nutritional health and well-being that can and should be measured more frequently. As discussed below, these include food insecurity and body weight status. However, the province should also explore other, less costly ways to measure and monitor key food intake behaviours over time. A six-item fruit and vegetable ‘screener’ has been included on several population health surveys now, including CCHS 2.2, but the usefulness of this questionnaire as a tool to monitor changes in fruit and vegetable intakes over time in the Canadian population remains unknown. We recommend that more work be done to evaluate this ‘screener’ and, if necessary, explore other alternatives. We also suggest that the province explore the use of household food expenditure data, collected periodically by Statistics Canada, as a means to examine changes in food purchasing patterns around broad categories of foods of particular relevance to nutritional health (e.g., milk products, fruits, vegetables, whole grain products). Although the survey does not include detailed information on foods purchased and consumed away from home, the bulk of food purchasing happens in stores, so understanding food selection at this level is meaningful.

The only way to track the impact of policy and programmatic changes on household food insecurity is with effective monitoring of this problem. The use of different indicators of food security in earlier population surveys makes it impossible to compare prevalence

rates for household food insecurity over time. Household food insecurity needs to be a core component of future population surveys, but it is imperative that survey designs and sampling frameworks remain consistent across surveys and that the Household Food Security Survey Module used on CCHS 2.2 be repeated. Measuring food insecurity on population surveys is only worthwhile if the results can be compared over time. That said, we also suggest that serious consideration be given to measuring and monitoring household food insecurity on an expenditure survey (e.g., Statistics Canada's Survey of Household Spending or Survey of Labour and Income Dynamics) rather than a population health survey. This would facilitate identification of the specific features of household income and expenditures that underpin food insecurity and thus enable examination of the roles that various policies and programs play in relation to household food insecurity.

It is also important to collect measured data on the height and weight on Ontario adults and children in subsequent provincial surveys to track problems of overweight and obesity in our population. Consideration should also be given to the inclusion of measurements on waist circumference, given its importance as an indicator of chronic disease risk. The biases associated with self-reported data mean that it cannot be used to effectively monitor this problem. Thus it will not be valid to compare the prevalence estimates from CCHS 2.2 with future or past prevalence estimates derived from self-report data.

6.3 Conclusions

The foregoing analysis of data from the Ontario Share File of the CCHS, Cycle 2.2 has yielded important new information about the nutritional health of the Ontario population. Our examination of body weight status confirms that overweight and obesity are serious public health problems in Ontario. Household food insecurity also appears to pose a very real threat to the nutritional health and well-being of many low-income Ontarians. Through an examination of adults' and children's nutrient and energy intakes we have identified some relatively widespread problems of nutrient inadequacy in the population. While some of the specific nutrient inadequacies reported here would likely appear less severe if vitamin and mineral intakes from supplements were taken into account, our findings nonetheless indicate that food intake patterns are suboptimal among some segments of the population. The present results highlight the need for Ontario adults in particular to practice healthier eating habits in order to achieve and maintain healthy body weights and minimize risks of diet-related chronic diseases. Our results also highlight the need for widespread intervention to lower the levels of sodium consumption throughout the population.

6.4 Implications of the Findings

What follows is a brief summation of what we see as the key implications emerging from the results of the analyses presented in this report (not in order of priority).

1. The results of this survey provide strong evidence of the need to promote and support healthier eating patterns and more active lifestyles among Ontario adults and children, to help them achieve and maintain healthy body weights.
2. The pattern of nutrient inadequacies identified among adults, and to a lesser extent, adolescents and children, speaks to the need for increased consumption of vegetables, fruit, whole grains, and milk and alternatives. While some of the micronutrient problems identified here may appear less serious once nutrient intakes from supplements are considered, there are still many indications that food habits need to be improved for optimal health.
3. Pending access to the data on supplement intakes from CCHS 2.2, it is imperative that the prevalences of nutrient inadequacies reported here be re-assessed, considering nutrient intakes from both food and supplements. Apart from the promotion of healthy eating, no interventions should be considered to address specific problems of vitamin or mineral inadequacy identified in this report until the prevalence estimates are confirmed.
4. Government needs to work with representatives of the food industry (including representatives of the restaurant and fast-food industries) to develop strategies to lower the sodium content of food. It will also be imperative to monitor this problem, to ensure progress is made.
5. More effective income-support programs are required to ensure that individuals and families who are reliant on social assistance or employment incomes from low-waged jobs have sufficient financial resources to purchase the food they need. To this end, we recommend that the province undertake a systematic examination of the interrelationship between a broad spectrum of current policies and programs and household food security and that in the future, the impact of proposed policy changes on household food security be routinely assessed as part of the process of evaluating the merit of policy options.
6. To monitor progress in lessening problems of household food insecurity in Ontario, food security needs to be measured consistently and repeatedly on future population surveys.
7. It will be important to collect measured data on the height and weight of adults and children in subsequent provincial surveys to monitor problems of overweight and obesity. Consideration should also be given to the inclusion of measurements on waist circumference, given its importance as an indicator of chronic disease risk.
8. To better understand the specific food intake patterns that underpin the nutrient problems identified here, further examination of the food intake data from CCHS 2.2 should be conducted, if access to these data can be obtained. Because Canada's Food Guide is the primary tool for nutrition communications and education programs, it is important to examine the population's intakes in relation to this guidance. In targeting

interventions, it would also be helpful to understand the extent to which adults' and children's food intakes include commercially prepared meals and snacks, and foods consumed away from home.

9. In the development of future analyses of data from CCHS 2.2, it is important to build on the methodologic insights gained from this project. The data from CCHS 2.2 are most effectively used to examine patterns at a provincial level. Given sample size limitations, the feasibility of additional studies of within-province differences in dietary intake or body weight status by health region, income, education, immigration status, and other socio-demographic variables is questionable.
10. Monitoring dietary intakes is important in ensuring the policies and programs remain relevant to population health, but the high costs of conducting 24-hour dietary intake recalls on a representative sample of the population limit the frequency with which this kind of assessment can and should be conducted. The province should also explore other, less costly ways to measure and monitor key food intake behaviours over time. We recommend evaluation of the six-item fruit and vegetable 'screener' questionnaire included on CCHS 2.2 and several other population health surveys to assess its usefulness as an indicator of intake patterns. We also suggest that the province explore the use of household food expenditure data, collected periodically by Statistics Canada, as a means to examine changes in food purchasing patterns around broad categories of foods of particular relevance to nutritional health.