UNIT NO. 3

THERAPEUTIC LIFESTYLE CHANGES: NUTRITION & HEALTHY DIET

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ABSTRACT

Lifestyle changes are an integral part of the overall management of macrovascular disease.

Since the release of MOH Clinical Practice Guidelines in Hypertension and Lipids, there have been numerous guidelines from overseas authority bodies pertaining to diet and lifestyle change to reduce the risk of macrovascular disease.

The emerging trends of lifestyle changes pertaining to diet are highlighted, which also explain the rationale of using the American DASH Diet as the recommended diet to advocate to patients with or without macrovascular disease. Some practical areas to assist the family physician to initiate the patient on the DASH Eating Plan are outlined. Details in the practical areas will be presented in the follow-up lecture/ workshop.

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INTRODUCTION

Lifestyle changes are an integral part of the overall management of macrovascular disease. They are the mainstay in population based primary prevention strategies. In addition, it is important to continue these lifestyle changes in patients who have been started on drug therapy[1-6].

The key lifestyle changes recommended by the MOH Clinical Practice Guidelines for Hypertension[7] and Lipids[5] include smoking cessation, weight reduction, increased physical activity and diet (Table 1). The Hypertension's guidelines are general non-specific recommendations, and the subsequent Lipids' guidelines are more guided, similar to the NCEP ATPIII reported in 2001[2] (Table 2).

Table 1: Lifestyle modifications/Non-pharmacological therapy[5]

- Smoking cessation
- Weight reduction
- Moderation of alcohol consumption
- Reduction of intake of salt
- Reduction of intake of cholesterol and saturated fats
- Maintenance of adequate intake of dietary potassium
- Increased physical activity

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Within 2006 and 2007, there have been numerous updated guidelines published. The American Heart Association has updated their Diet and Lifestyle Recommendations for cardiovascular disease risk reduction in the general population[4]; dietary approaches to prevent and treat hypertension[8]; primary prevention of ischaemic stroke[9]; secondary prevention for patients with coronary and other atherosclerotic vascular disease[10]; cardiovascular disease prevention in women[11]. There were also reported results of the low-fat dietary pattern and risk of cardiovascular disease of the Women's Health Initiative study[12] and the PREMIER lifestyle modifications on participants with and without the metabolic syndrome[13].

The Joint British Societies (JBS2) have also updated their guidelines on prevention of cardiovascular disease in clinical practice[14]. The American Dietetics Association and Dietitians of Canada lately wrote a joint position to clarify the role of dietary fatty acids in the diet[15]; Singapore Nutrition & Dietetics Association has also added a chapter on the medical nutrition therapy on dyslipidaemia in their Association's manual of Dietetics Practice[16].

The effectiveness of the various lifestyle changes is well documented. There are several emerging trends, in particularly the PREMIER study[13,17,18] suggesting that established recommendations such as weight control, sodium reduction, reduced alcohol and increased physical activity when incorporating the Dietary Approaches to Stop Hypertension (DASH) dietary pattern has marked improvement in both reducing one's blood pressure and lowering one's cardiovascular risk.

The following section will highlight some of the emerging trends of lifestyle changes pertaining to diet and why the DASH Diet seems the recommended diet to advocate to patients with or without macrovascular disease. It will then highlight some practical areas to assist the family physician to initiate the patient on the DASH Eating Plan.

EMERGING TRENDS

Different Diseases, but Similar Lifestyle Change Recommendations

Coronary, cerebrovascular and peripheral vascular diseases have a common set of risk factors, namely hyperlipidaemia, hypertension and diabetes, and obesity (= metabolic syndrome). Although pharmacological management differs for the different conditions, the diet and lifestyle changes recommended appear similar[4].

Table 2: Lifestyle Changes

- Smoking cessation
- Weight reduction
- Exercise
- Diet* (*The diet shown below emphasises intake of fruit, vegetables, grains ,cereals and legumes as well as skinless poultry, fish, lean meats and low-fat dairy products. To lower TG, it is important, in addition to the above measures, to restrict the intake of alcohol and simple carbohydrates (e.g. glucose)*

	MOH CPG Lipids[5]	**NCEP / ATP III Nutrient Composition of the Therapeutic Lifestyle Changes (TLC) Diet**[2]
Nutrient	**Recommended Intake**	**Recommended Inake**
Total fat	20 to 30% of total calories	25 – 35% of total calories
Saturated fat	< 7% of total calories	< 7% of total calories
Polyunsaturated fat	6 to 10% of total calories	Up to 10% of total calories
Monounsaturated fat	Difference of Total fat minus Saturated and Polyunsaturated fat i.e. Total fat - (Saturated fat + Polyunsaturated fat).	Up to 20% of total calories
Trans-fatty acid	< 1% of total calories	At a low intake
Carbohydrate	50 to 60% of total calories (mainly from complex carbohydrates)	50 to 60% of total calories (mainly from complex carbohydrates)
Dietary fibre	20 to 30 gm per day	20 to 30 gm per day
Protein	About 15% of total calories	About 15% of total calories
Cholesterol	< 200 mg/day	< 200 mg/day
Food Group	**Recommended Intake**	
Fruit and vegetables	2 + 2 servings (> 400 gm) per day	
Total calories	Enough to achieve and maintain a bodymass index (BMI) of 18.5 to 23 kg/m2	

Synergistic Treatment Using Diet, Lifestyle Factors and Medication

Although great advances have been made in prevention and treatment of macrovascular diseases through drug therapies and procedures, diet and lifestyle therapies remain the foundation of clinical intervention for prevention. This has financial implications and bypassing the side-effects of medication. Patients on drug therapies are expected to continue adhere to the therapeutic lifestyle changes[5].

When counseling, one must also consider the environmental factors such as finances, living circumstances and eating out habits.

Prevention and Treatment

Although "therapeutic lifestyle changes" (TLC) was originally used as a treatment for people with elevated lipids[2], reports have indicated that maintaining a healthy diet and lifestyle can help reduce the risk of CVD in the general public. The term TLC or lifestyle changes are now used for both preventing and managing the diseases as well as to minimise the complications[4].

Food-based Guidelines as a Total Diet Approach instead of Nutrient-based Guidelines

Eating is an important source of pleasure. Although majority applauds for a holistic approach to healthy diet, it is a widespread perception that individuals must choose between good taste and nutritional quality. In fact, no single food or type of food ensures good health, just as no single food or type of food is necessarily detrimental to health. Rather, the consistent excess of food, or absence of a type of food over time, may diminish the likelihood of a healthful diet. For example, habitual, excessive consumption of energy-dense foods may promote weight gain and mask possible under consumption of essential nutrients[19]. Yet small quantities of energy-dense foods on special occasions have no discernible influence on health.

In most situations, nutrition messages are more effective when focused on positive ways to make healthful food choices over time, rather than individual foods to be avoided[20-22].

The total diet approach is based on overall eating patterns that have important benefits and health consequences and that provide adequate nutrients within calorie needs. Health Promotion Board (HPB) has over the years been advocating the

Healthy Diet Pyramid as a model of "eat-in-moderation in balance and variety" as the foundation of a health-promoting diet.

Although most dietary guidelines are based on clinical recommendations and defined nutrients, the emerging trend of nutrition counseling has shifted from nutrient-based to food-based guidelines for maximal flexibility.

For example, the MOH Lipids guidelines are nutrient-based, with one food group mentioned "increase in fruits and vegetables"[5]. The revised AHA 2006 Diet and Lifestyle recommendations[4] explain their guidelines to "provide a general framework to aid health practitioners in giving general, practical food-group-based guidance…. The importance of an overall healthy diet and lifestyle cannot be overemphasised".

Transfer of Dietetic Skills to Family Physician and Using Self-help Resources

A 2003 Cochrane Database of Systematic Review[23] concluded that dietary advice by dietitians to lower blood cholesterol is more effective than advice by doctors (in the short to medium term), but lack evidence to suggest the advice is more effective than that given by nurses or self–help resources.

In practice there are insufficient dietitians to see every patient. Ideally, the patients should get the best treatment, but this has to fit within current resources and financial constraints. Although dietitians are specifically trained to provide high quality and individualised dietary advice, much of the dietary advice has to be delivered by physicians and nurses, if not through self-help resources. The Health Promotion Board has produced several such self-help booklets which may be more cost effective than individual dietary advice by any dietitian, nurse or doctor. Dietitians can then concentrate on patients who have more complex medical problems, who require more in depth nutrition education or need more support in encouragement and motivation to make dietary changes. The review suggests that presence of a doctor for individual or group education may also aid compliance and sustainability.

A more recent Cochrane review[24] reviewed the effectiveness of different modes of dietary advice for reducing cardiovascular risk, focused primarily on reduction of salt and fat intake and an increase in the intake of fruit, vegetables, and fibre. Modest improvements were shown in cardiovascular risk factors. There is increased compliance and effectiveness by perceived disease risk. The extent of dietary change is influenced by the intensity (i.e. one-to-one contact, group sessions, or written materials), duration of intervention (one contact per study participant to 50 hours of counselling over four years), and by perceived disease risk.

This review further suggests that the average changes in individual nutrients and related risk factors obtained through dietary advice are small, but several small changes in food habits may aggregate to lead to greater health gains. This is in line with the DASH Eating Plan that consists of food-based recommendations advocating a healthy balanced diet although it is clinically based on the effects of specific nutrients.

The review also noted that there is minimal gain in effectiveness by locating health promotion in primary care in contrast to work places and other non-healthcare settings. Brief dietary interventions aimed at the whole population are likely to produce more health gain.

Both Cochrane reviews[23,24] somehow suggest that perhaps it is not warranted for the family physician to spend excessive time giving individualised dietary advice to each patient, but rather to highlight the risks and consequences to the patient, and to provide self-help resources to the patient to DIY, and then monitor regularly the patient's motivation and compliance to the lifestyle changes.

Dietary Approaches to Stopping Hypertension (DASH Eating Plan)

The DASH Eating Plan is primarily an eating plan that is low in saturated fat, cholesterol and total fat and that emphasises fruits, vegetables and fat-free or low-fat milk and milk products, including whole grain products, fish, poultry and nuts. It is reduced in lean red meat, sweets, added sugars and sugar-containing beverages. Nutrient-wise, it is rich in potassium, magnesium, calcium, protein and fibre (Table 3).

This DASH Eating Plan is recommended by The National Heart, Lung, and Blood Institute (one of the National Institutes of Health, of the US Department of Health and Human Services)[25], The American Heart Association[7], The 2005 Dietary Guidelines for Americans, US guidelines for treatment of high blood pressure[26]. The DASH Eating Plan had shown to be effective in lowering one's CVD risk and blood pressure that it is used to form the basis for the new USDA MyPyramid model[27].

Recently reports from the PREMIER study showed that lifestyle interventions incorporating the DASH dietary pattern have added potential benefits to reduce blood pressure, total cholesterol and insulin resistance[13,17] than by advice alone or just by adopting the established lifestyle changes.

The DASH Eating Plan diet based on daily nutrient goals are more stringent that the (NCEP / ATP III) and Singapore Dietary guidelines (Table 3). When adjusted against the serving sizes of the Healthy Diet Pyramid, the major differences are increased servings of fruit and vegetable, low fat dairy and nuts every week, and fewer servings of bread and cereals. This is congruent with the macronutrient distribution where the energy contribution from protein is higher in the DASH diet.

The basic components of the DASH Eating Plan are not too different from the typical heart-healthy diet that most health organisations and doctors prescribe. The DASH Eating Plan differs in its mix of nutrients due to its emphasis on such foods as fruits, vegetables and low-fat dairy products. These foods provide potassium, calcium and magnesium, which together have a beneficial effect on blood pressure. Also, some research suggests that substituting some carbohydrates with protein, mostly from plant sources, further lowers blood pressure[28].

Table 3: Comparison between the DASH Eating Plan and Singapore's Recommended Dietary Guidelines and Healthy Diet Pyramid

	Daily Nutrient Goals used in DASH studies (4,25)	Singapore Dietary Guideline	Healthy Diet Pyramid	S'pore DASH (serving size adjusted)
Total Calories	2100 kcal/day (1500 mg sodium is more effective at lowering blood pressure but not practical for majority)	Enough to achieve & maintain a BMI of 18.5 – 23 kg/m2	1800 kcal	1800 kcal
Total fat	27% of total calories	25 – 30% of total calories		
Saturated Fat	6% of total calories	1/3 of total fat		
Polyunsaturated fat	-	2/3 of total fat		
Monounsaturated fat	-			
Trans-fatty acid		< 2g or < 1% of daily energy intake.		
Carbohydrate	55% of total calories	55 – 60%		
Dietary fibre	30g	-		
Protein	18%	< 15%		
Cholesterol	150 mg	300 mg		
Sodium	2300 mg (1500 mg for middle-aged and older individuals, and those who already had high blood pressure	< 2000 mg		
Calcium	1250 mg	800 – 1000 mg		
Potassium	4700 mg			
Magnesium	500 mg			
Grains	6 – 8 servings per day		5 – 7	4 – 8
Vegetables	4 – 5 servings per day	2+2 servings	2	3 – 4
Fruits	4 – 5 servings per day	(>=400g) per day	2	4 – 5
Fat-free or low-fat milk	2 – 3 servings per day		1	1 – 1.5
Lean meats, poultry, and fish	< 6 oz per day		2 – 3	2 – 3
Nuts, seeds, and legumes	4 to 5 servings per week		0 – 1	0 – 1
Fats and Oils	2 to 3 servings# per day		Sparingly	Sparingly
Sweets and Added sugars	5 or fewer servings per week		-	

Balance Calorie Intake and Physical Activity to Achieve or Maintain a Healthy Body Weight

A physically active lifestyle is recommended to reduce risk for CVD in all individuals, regardless of body weight.

To avoid weight gain, individuals must control calorie intake so that energy balance is achieved. To control calorie intake, individuals should increase their awareness of the calorie content of foods and beverages per portion consumed and should control portion size. The DASH Eating Plan has graduated serving sizes pending on the total energy requirement (Table 4).

Although macronutrient manipulation within same calorie intake may affect the blood lipid and blood pressure profiles[28], it has little effect on energy balance unless the macronutrient manipulation influences total energy intake or expenditure[29].

Lifestyle changes relating to physical activity and weight control is discussed in another chapter.

Consume a Diet Rich in Vegetable and Fruits

The Dietary Approaches to Stop Hypertension (DASH) trials reported that diets high in fruit and vegetables were effective in reducing blood pressure[31]. Although these diets were high in potassium, they were also high in other nutrients and low in fat and cholesterol, and so it is difficult to identify their effective components.

A recent meta-analysis of cohort studies shows that fruit and vegetable consumption is inversely associated with the risk of CHD[30]. Although the mechanism of this association,

remains to be demonstrated, there are suggestions that their protective constituents such as potassium, folate, vitamins, fiber, and other phenolic compounds act through a variety of mechanisms such as reducing antioxidant stress, improving lipoprotein profile, lowering blood pressure, increasing insulin sensitivity, and improving homeostasis regulation[31,32].

Most vegetables and fruits are also low in calories. Therefore, diets high in vegetables and fruits meet micronutrient, macronutrient, and fiber requirements without adding substantially to overall energy consumption. This is a strategy for lowering energy density of the diet to control energy intake.

However, the recommendation to eat fruit and vegetables to prevent chronic diseases is mainly based on observational epidemiological studies, which leaves much uncertainty regarding the causal mechanism of this association.

A variety of vegetables and fruits are recommended, preferably of different colours because of the phytochemicals. Fruit juice is not equivalent to the whole fruit in fiber content and perhaps satiety value and should be avoided. Equally important is the method of preparation. Techniques that preserve nutrient and fiber content without adding unnecessary calories, saturated or *trans* fat, sugar, and salt are recommended.

HPB has a comprehensive booklet "All about Fruit and Vegetables" which include the layman rationale for eating fruit and vegetables and practical tips on buying, storing, preparing and cooking fruit and vegetables, plus recipes (Ref: http://www.hpb.gov.sg/hpb/default.asp?pg_id=935). When using this booklet, you need to highlight to the patient to eat more than two serves of fruit and two serves of vegetables every day in accordance with the DASH Eating Plan.

Choose Whole-grain, High Fibre Foods

Dietary patterns that are high in whole-grain products and fiber have been associated with increased diet quality and decreased risk of CVD[33]. Soluble or viscous fibers (notably beta-glucan and pectin) modestly reduce LDL cholesterol levels beyond those achieved by a diet low in saturated and *trans* fatty acids and cholesterol alone. Insoluble fiber has been associated with decreased CVD risk and slower progression of CVD in high-risk individuals[34]. Dietary fibre may promote satiety by slowing gastric emptying, leading to an overall decrease in calorie intake[35]. Soluble fiber may increase short-chain fatty acid synthesis, thereby reducing endogenous cholesterol reduction[35].

The AHA recommends that at least half of grain intake come from whole grains whereas the DASH Eating plan is more ambitious and recommends most of the grain servings to be from whole grains as fibre source.

The NNS 2004 shows that 20% of the major contributor of dietary fibre intake in the diet of adult Singaporeans was vegetables. Grain products only contribute 40% while the remaining are from fruit and juices (16.8%).

Although there is an increase in baking industries in Singapore, there are still limited varieties of whole grain breads available. To incorporate fibre, especially soluble fibre, eat oatmeal for breakfast, adding instant oatmeal to the breakfast cereal to 'stretch' the fibre content, adding extra oatmeal in 3-in-1 breakfast cereals) and consuming more beans and legumes.

Limit Saturated and Trans Fat and Cholesterol

Diets low in saturated and *trans* fatty acids and cholesterol reduce the risk of CVD, in large part through their effects on LDL cholesterol levels.

As a set of goals, the AHA recommends intakes of <7% of energy as saturated fat, <1% of energy as *trans* fat, and <300 mg cholesterol per day. Whereas the DASH Eating Plan demands 6% of energy as saturated fat and 150mg cholesterol per day.

Often, saturated fat and cholesterol can be easily reduced by the replacement of cooking oils with unsaturated fats (polyunsaturated and monounsaturated fats) and selecting lower-fat versions of foods (i.e. dairy). Substituting meats with vegetable alternatives (e.g. beans) or fish can reduce the overall cholesterol content.

The NNS 2004 showed reported drinking reduced fat milk

Table 4: DASH Eating Plan's Serving Sizes for various Energy requirement[25]

	Servings / Day			
	1600 kcal / day	**2000 kcal / day**	**2600 kcal / day**	**3100 kcal /day**
Grains (preferably whole grains)	6	6 – 8	10 – 11	12 – 13
Vegetables	3 – 4	4 – 5	5 – 6	6
Fruits	4	4 – 5	5 – 6	6
Fat-free or low-fat milk	2 – 3	2 – 3	3	3 – 4
Lean meats, poultry, and fish	3 – 6	< 6	6	6 – 9
Nuts, seeds, and legumes	3 per week	4 to 5	1	1
Fats and Oils	2	2 to 3	3	4
Sweets and Added sugars	0	< =1	< =2	< =2

in place of full cream milk and having less deep fried food and butter as a fat spread. However, fewer adult Singaporeans reported trimming off visible fat / skin from meat / poultry. More reported using blended oil, which has a higher content of saturated fat compared to healthier options such as corn or olive oil.

These dietary practices resulted in almost 39% of the total fat in the average adult Singaporean diet was saturated fat which was higher than the recommended intake of saturated fat (no more than one third of total dietary fat). The main sources of saturated fat were flavored rice, fried noodles, meat dishes and desserts coconut milk/cream and cooking oils containing higher content of saturated fat. There is no mention of trans fatty acid in the NNS 2004 report.

Although there is mandatory *trans* fat labeling in US since 2006, this is not a requirement in Singapore[36]. HPB has issued a very comprehensive guide on trans fat for members of the public. (ref: http://www.hpb.gov.sg/hpb/default.asp?pg_id=865&aid=280#D1)

Choose and Prepare Foods with Little or No Salt

On average, as salt (sodium chloride) intake increases, so does blood pressure. A reduced sodium intake can prevent hypertension in nonhypertensive individuals, lower blood pressure in the setting of antihypertensive medication, and facilitate hypertension control. A reduced sodium intake is associated with a blunted age-related rise in systolic blood pressure and a reduced risk of atherosclerotic cardiovascular events and congestive heart failure.

Diets rich in potassium lower blood pressure and also blunt the blood pressure-raising effects of an increased sodium intake[37]. Because of the progressive dose-response relationship between sodium intake and blood pressure, it is difficult to set a recommended upper level of sodium intake, which could be as low as 1.5 g/d (65 mmol/d). In view of the available high-sodium food supply and the currently higher levels of sodium consumption, a reduction in sodium intake to 1.5 g/d (65 mmol/d) is not easily achievable at present. In the interim, an achievable recommendation is 2.3 g/d (100 mmol/d)[4].

BEYOND THE DASH DIET

Based on current reports, and the abundant DIY resources easily accessible on the internet, the DASH Diet seems a practical approach to advise Singaporeans. If the Singapore Healthy Diet Pyramid is preferred as a teaching base, the DASH can easily be localised by tweaking the serving sizes without causing much confusion for the patient.

The DASH Diet is also more stringent in the number of servings from each food group and sub-food groups (i.e. milk and nuts). In view that this is likely a convenient teaching tool for the family physicians.

OmniHeart Randomised Trial

For patients who are successful using the DASH Diet to lower their blood pressure and elevated lipids, you may wish to consider a challenge to try macronutrient manipulation as shown in the OmniHeart trial (Table 5)[28]. During this trial, partial substitution of carbohydrate with either protein or monounsaturated fat have been shown to further lower blood pressure, improve lipid levels, and reduce estimated cardiovascular risk[28].

Table 5: Macronutrient Goals[28]

	Carbohydrate Diet	Protein Diet	Unsaturated Fat Diet
Carbohydrate (% kcal)	58	48	48
Protein (% kcal)	15	25	15
Fat (% kcal)	27	27	37
Monounsaturated (% kcal)	13	13	21
Polyunsaturated (% kcal)	8	8	10
Saturated (% kcal)	6	6	6

Singapore Heart Foundation 3:5:7 Healthy Heart Diet Principles

The Singapore Heart Foundation adopts the "Healthy Heart Diet Principles" namely the '3-5-7 way' to adopt a heart-healthy lifestyle (Table 6)[38]. There is no available reports validating the effectiveness of this model. This will suit a patient who may find the DASH Eating Plan too restrictive and prefers another model that contains only qualitative advice.

Omega 3 fatty acids

Fish, especially oily fish (tuna, king mackerel), is rich in very long chain omega-polyunsaturated fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) that reduce risk of both sudden death and death from coronary artery diseases in adults.

The American Heart Association recommends that individuals without coronary heart disease (CHD) to eat a variety of fish, especially oily fish at least twice a week. Patients with CHD should consume approximately 1g of EPA+DHA per day from oily fish although supplementation could be considered in consultation with their physician.

A recent study on healthy premenopausal female volunteers randomly assigned to consume a daily average of 485 mg eicosapentaenoic (EPA) and docosahexaenoic (DHA) acids either from two servings of oily fish (i.e. salmon and tuna) per week or from 1–2 capsules per day. These findings suggest that the consumption of equal amounts of EPA and DHA from oily fish on a weekly basis or from fish-oil capsules on a daily basis is equally effective at enriching blood lipids with omega-3 fatty acids[39].

Statin-Grapefruit juice interaction

Statin-grapefruit juice have been a well discussed drug–food interaction topic[40]. Most statins are chiefly metabolised in

Table 6: Healthy Heart Diet Principles[38]

Principles	Description
3 Highs (high in fibre, freshness, plant-based protein)	For a diet high in fibre, freshness and plant-based protein, you should consume plenty of fruit, vegetables, soy products, beans and legumes. Besides fibre, especially soluble fibre which helps to lower cholesterol in your body, these colourful goodies also provide a wide range of vitamins, minerals ad antioxidants.
5 Lows (low in fat, cholesterol, salt, sugar and alcohol)	You can greatly reduce the fat and cholesterol in your diet by choosing lean meat and skinless poultry cooked in healthy way (steam, poach, grill, stir fry, bake, boil, stew). Go easy on table salt, seasoning and pickles to keep your sodium intake low. If you have sweet tooth, have your sweet or sugar sparingly. Wine may be beneficial for heart health, but only do so in moderation.
70% Full	Do you burp out loud after a meal? Chances are that you may have overeaten. If you think your stomach is 70% full, it is probably just right. Have small frequent meals instead of 3 big meals.

the body by CYP3A4, an enzyme present in the liver and intestine. Grapefruit juice appears to selectively reduces intestinal CYP3A4 activity while having little effect on liver, thus increasing the oral availability of these statins[40].

To date the active ingredient in grapefruit has yet to be identified. Although the clinical relevance of this food-drug interaction has also been questioned[41], ZOCOR® (simvastatin) finds it warranted to include in their patient product information handout to "avoid large quantities of grapefruit juice (>1 quart daily)" [42].

In Singapore, grapefruit is an imported fruit, expensive and unlikely a favourite fruit of choice amongst majority of Singaporeans. Commercial grapefruit juices are available in various concentrations and are often advertised as a breakfast beverage.

Based on reported studies, it is premature to substitute statins with grapefruit. To avoid increased potency effects of statins from the grapefruit interaction, patients should limit consumption of grapefruit to no more than one cup of juice or one-half grapefruit per day (= one serving of fruit). Since simvastatin is usually taken at night, avoid drinking grapefruit juice in the evenings. These precautions should apply to pomelos (an "ancestor" of the grapefruit family) and tangelo (a hybrid grapefruit) as they may contain similar active ingredient(s)[44].

Other dietary factors that have some effects on macrovascular risk, such as alcohol, plant steanols / sterols, soy protein, nutrient supplementation, phytochemicals, folate and other vitamins, are discussed elsewhere[4,45-47].

PRACTICAL SKILLS in APPLYING THE DASH EATING PLAN

Assessing Food Diaries

A food diary encourages self realisation and discipline[13,17,18]. By recording, what one eats daily, one can realise the description of foods eaten, quantities eaten, and then tally to the respective serving sizes. It can further strengthen one's determination to adhere to the guidelines and serving sizes permitted. As the patient become accustomed to making these journal entries, the discipline involved can transfer to other aspects of lifestyle changes such as regular exercise.

An example of a DASH Food Diary is shown in Appendix A. By reviewing the food diary on a regular basis the family physician is able to assess the patient's food knowledge and subsequent adherence to the diet.

Fundamentally, to adhere to the DASH Food Plan, one must know the serving sizes of the different food groups before adhering to the number of serving sizes. This is possible only if one is able to describe the food item and quantity eaten before transcribing into qualitative serving sizes. From the food diary, the family physician is also able to assess if the patient has over-eaten or under-eaten any of the food groups, identify the high calories / fat / cholesterol / salt items. When one increase awareness of food eaten at every meal time, one is likely to increase compliance thus eat wiser.

The participants of the PREMIER study were able to successfully reduce total and saturated fats to the targets recommended. This success may be due to the fact that these participants were asked to keep regular food diaries and monitor their own intakes of these nutrients. By such a monitoring process and the availability of both food guides and product nutrition labels, participants became more aware of the sources of these nutrients and were able to make adjustments where feasible.

In the case of the DASH diet, if participants were given numeric targets of servings from each designated food groups and were asked to monitor the intakes, they could have been more likely to reach the targets.

Calculating Energy Requirement

The DASH Eating Plan has different number of daily servings of the respective food groups for different energy levels (Table 7).

If the patient is internet savvy and likely to self-check internet for DASH resources, than it is better to adhere to the

original serving sizes. If the patient is likely to be given HPB's resources, then it is important to convert the serving sizes meant for the Singapore Diet Pyramid.

To calculate energy levels, the Family Physician can direct the internet savvy patient to the HPB website's calorie counter (http://www.hpb.gov.sg/hpb/default.asp?pg_id=1652). Alternatively, an pre-calculated reference table is available in the HPB Booklet "Keeping Fat in Check" (pg 19).

Food Groups

It is important to emphasise a healthy diet, and to ensure the patient eats from all the different food groups to obtain the nutrients (Table 7). Areas of concern arising from the National Nutrition Survey 2004 (NNS 2004) will be highlighted during the lecture / workshop to assist the family physician in assessing the patient's food diaries and reinforcing the DASH Eating Plan.

Serving Size & Portion Size

Portion distortion can lead to overeating (Figure 1)[48]. Therefore, it is important to highlight verify the serving sizes with the patient. For example, the serving sizes of the Food Groups Grains, vegetables, lean meats / poultry / fish are smaller than the Healthy Diet Pyramid.

The Americans are realising from the film "Super Size Me" that the prevalence of overweight and obesity may be related to increased consumption of fast foods[19]. Attempts are made to downsize one's consumption norms.

It is easier for patients to decipher from the food label the fixed serving size of the packaging. For patients who have distorted portion size (which can be picked up by the food diaries) and eating out, they may need to be reminded to eat only the lowest price dish and be conscious not to upsize their meals unnecessarily.

Often, patients are unaware of their portion sizes.

Following Meal Plans

Meal plans are useful as examples but in practice, patients seldom follow according to meal plans set by the dietitian. The DASH Eating Plan has several meal plans for patients to peruse, but it is more flexible if the patient concentrates on achieving the correct number of servings from the respective food groups.

Reading Food Labels

HPB has a booklet "Choosing Food? Read the Label!" which the patient can download from the HPB website (http://www.hpb.gov.sg/hpb/default.asp?pg_id=935). Some patients may prefer to attend supermarket tours organised by HPB (and hospitals) for better understanding of the foods.

Eating Out

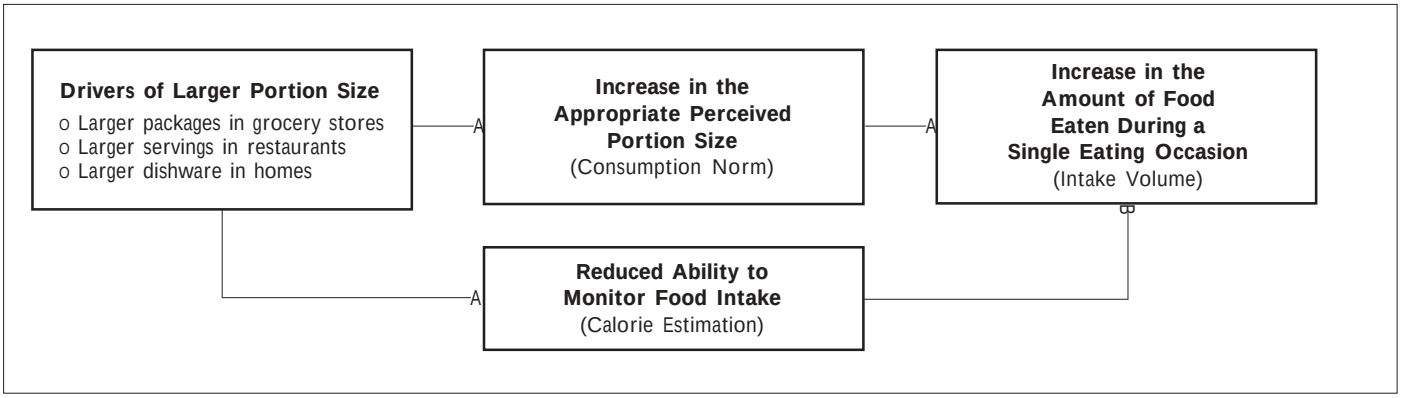
The NNS 2004 shows that adult Singaporeans dined at hawker centres an average of seven times per week and at fast food restaurants less than once a week. Almost half (49.3%) of

Table 7: DASH Eating Plan[25]

	Examples and Notes	Significance of each Food Group to the DASH Eating Pattern*
Grains	Whole wheat bread and rolls, whole wheat pasta, English muffin, pita bread, bagel, cereals, grits, oatmeal, brown rice, unsalted pretzels and popcorn	Major sources of energy and fiber
Vegetables	Broccoli, carrots, collards, green beans, green peas, kale, lima beans, potatoes, spinach, squash, sweet potatoes, tomatoes	Rich sources of potassium, magnesium, and fiber
Fruits	Apples, apricots, bananas, dates, grapes, oranges, grapefruit, grapefruit juice, mangoes, melons, peaches, pineapples, raisins, strawberries, tangerines	Important sources of potassium, magnesium, and fiber
Fat-free or low-fat milk	Fat-free (skim) or low-fat (1%) milk or buttermilk, fat-free, low-fat, or reduced-fat cheese, fat-free or low-fat regular or frozen yogurt	Major sources of calcium and protein
Lean meats, poultry, and fish	Select only lean; trim away visible fats; broil, roast, or poach; remove skin from poultry	Rich sources of protein and magnesium
Nuts, seeds, and legumes	Almonds, hazelnuts, mixed nuts, peanuts, walnuts, sunflower seeds, peanut butter, kidney beans, lentils, split peas	Rich sources of energy, magnesium, protein, and fiber
Fats and Oils	Soft margarine, vegetable oil (such as canola, corn, olive, or safflower), low-fat mayonnaise, light salad dressing	The DASH study had 27 percent of calories
Sweets and Added sugars	Fruit-flavored gelatin, fruit punch, hard candy, jelly, maple syrup, sorbet and ices, sugar	Sweets should be low in fat

Ref: DASH Eating Plan.
* local examples will be highlighted during the lecture/ workshop, in relevance to the findings of the NNS 2004.

Figure 1: Why portion sizes lead us to overeat[45]



adult Singaporeans have their meals at hawker centres six times or more a week, especially male Chinese.

It has also been highlighted that for any lifestyle change, the environment must be taken into consideration. HPB has in the past and present actively educating the various food outlets to provide healthier choices. Some initiatives include Healthier Dining (http://www.hpb.gov.sg/hpb/default.asp?pg_id=2060) and Healthier Canteen Certification Programme (http://www.hpb.gov.sg/hpb/default.asp?pg_id=2034).

CONCLUSIONS

Diet and lifestyle changes can effectively control and lower macrovascular disease risk factors, both in a clinical setting and community setting. To maximise the benefits of lifestyle changes, one should aim for a healthy body weight, be physically active, avoid tobacco exposure and follow a diet of variety, balance and moderation.

The diet encompasses eating adequate calories for to maintain a healthy weight, limiting total fat, cholesterol, and saturated fat intakes, reducing sodium, and increasing low fat dairy products, whole grains and fruits and vegetables for protective factors.

The DASH Eating Plan is an easy model to follow. Although it stems from America, there are numerous self-help resources in the internet that can be used. Family physicians can encourage the patient to search and DIY these resources. This leaves the physician to concentrate on monitoring the patients' progress, leaving the bulk of education to the patient. For those who are unable to follow the DASH, the Healthy Diet Pyramid or Singapore Heart Foundation 7:5:3 model is a compromise to a healthy diet, but may not be stringent enough to warrant a reduction in elevated lipids and control of high blood pressure. For those who want something more challenging, they could try the OmniHeart Macronutrient manipulation model.

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APPENDICES

Food Diary

The Value of a Food Diary

The food diary is the most powerful proven aid if you need help in controlling your food intake. Keeping a food and exercise diary helps to prevent weight gain, and may help to lose some weight also.

Here are some of the reasons:

- **Recording your eating** and exercise habits jolts you into realising just what you do eat and drink each day; and also whether you exercise sufficiently
- **Helps you identify problem foods** and drinks with excessive calories and fat. Also helps plan meals
- **Helps identify moods**, situations and events that lead to excessive eating of unwanted calories. You can then plan to overcome or avoid them
- **Prevents 'calories amnesia'**, the forgetfulness that leads to rebound weight gain after successful weight loss. Recording puts you back on the right track.
- **Helps you develop greater self-discipline**. You will think twice about over indulging if you have to record it – especially if someone checks your diary regularly. It certainly keeps you honest!
- **Motivates you** to carefully plan your meals and to exercise each day.
- **Serves as a check system** for your doctor, nurse counsellor or dietitian to assess your progress and make recommendations.

HOW TO RECORD

- Start a new page for each day.
- Enter the date and the day of the week on each page.

WHAT TO RECORD

1. Describe the **time** and **type** of meal consumed.
2. Type of food or drink and its description.
   - Give as much **detail** as possible
   - Record brand **names** where possible
   - Don't forget **accompaniments** such as gravies, sauces, milk & sugar, etc
3. **Amount of food and/or drink consumed.**
   - Where possible, try to describe the food item in the form of cups, glass, teaspoons, grams, etc.
   - If not possible, describe the type of crockery used (i.e. Chinese porcelain white / blue rice bowl, large udon noodles bowl, etc. and equate to the respective food group's serving sizes
   - Visual cues for amount of food
     - 1 teaspoon = tip of thumb
     - 1 tablespoon = whole thumb
     - 2 tablespoon (1/8 cup) = one cream biscuit, nailpolish bottle
     - ¼ cup (4 Tablespoon) = golf ball, large egg
     - 1/3 cup = espresso cup
     - ½ cup = ½ orange, small fish
     - 1 cup = tennis ball, light bulb
     - 30 g meat = thumbdrive, tube of lipstick
     - 30 g snack food = rounded handful
     - 90 g meat = deck of cards, computer mouse
     - 1 muffin or piece of fruit = tennis ball
4. Calorie and Sodium content of food consumed where possible.
   - Work out **the amount of calories and sodium** consumed using the Nutritional Information Panel where available.
5. **Places** where food and/or drink are consumed and type of activity during consumption.
6. **Level of hunger** using the following hunger scale
   - 1= No Hunger 2= Slight hunger 3= Hungry 4= Very hungry 5= Extremely hungry
7. List any other comments where possible.
   - **Symptoms or illness** that occur during the day e.g. runny nose
   - **Special occasions** e.g. birthday

Dietitian :
Telephone : **Date:** _____

Healthy Diet Pyramid - Food Diary

Name: _____ Day: _____ Date: _____

Time	Place / Activity	Food Item & Description	Amount Eaten	No of Servings				Calories	Hunger 1= least 5 = most
				Rice & Alternate ( )	Fruits ( )	Vegs ( )	Meat & Alternate ( )		
	Total								

DASH - Food Diary

Name: _____ Day: _____ Date: _____

Time	Place / Activity	Food Item & Description	Amount Eaten	No of Servings										Hunger 1= least 5 = most
				Grains	Vegetables	Fruits	Milk Products	Meats, Fish, & Poultry	Nuts, Seeds & Legumes	Fats & Oil	Sweets & Added Sugars	Sodium	Calories	
				( )	( )	( )	( )	( )	( )	( )	( )			
	Total													