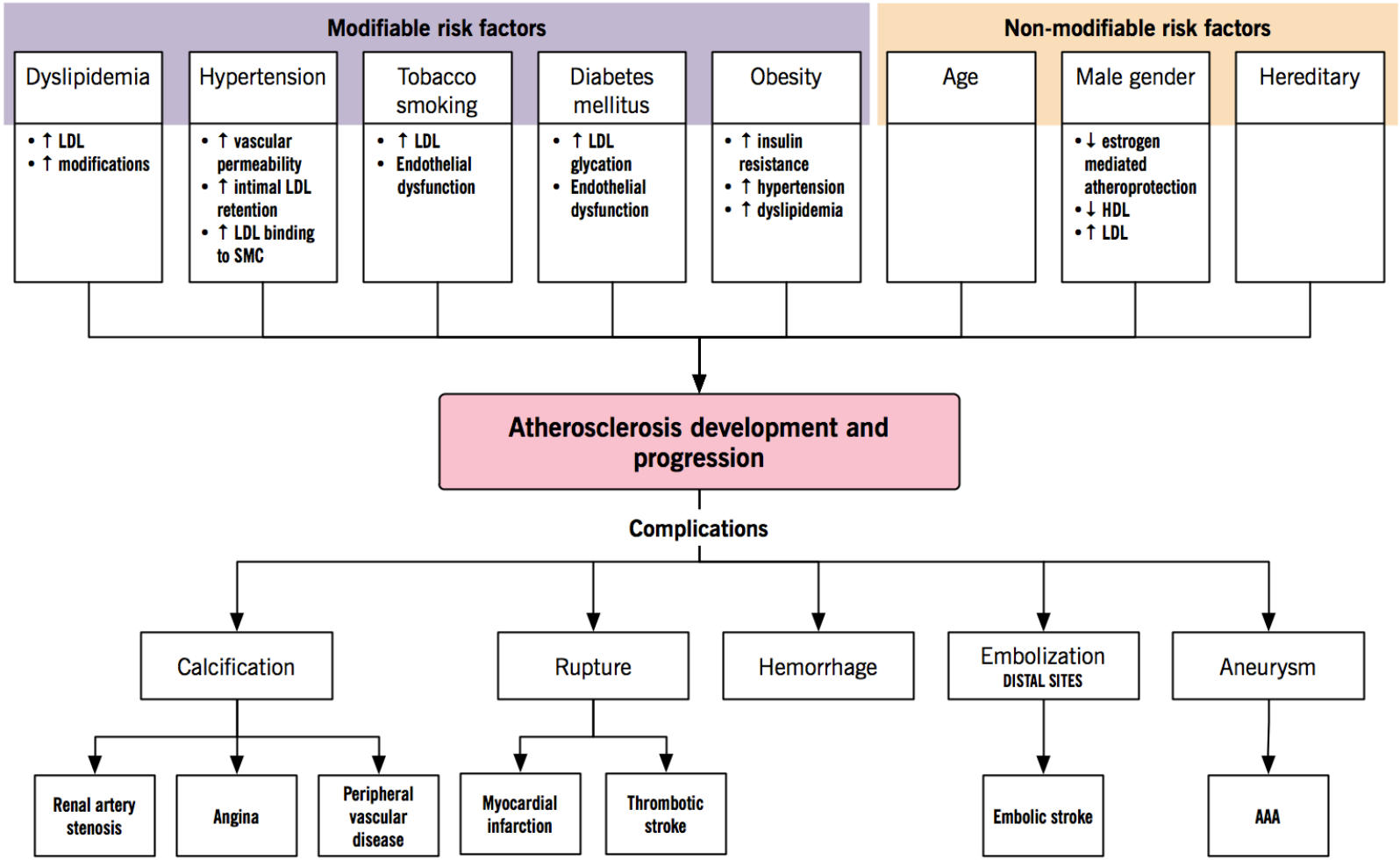
TATALAKSANA GIZI
FAKTOR RESIKO PENYAKIT JANTUNG KORONER: OBESITAS DAN DISLIPIDEMIA

DR. TIRTA PRAWITA SARI, M.SC.,SP.GK

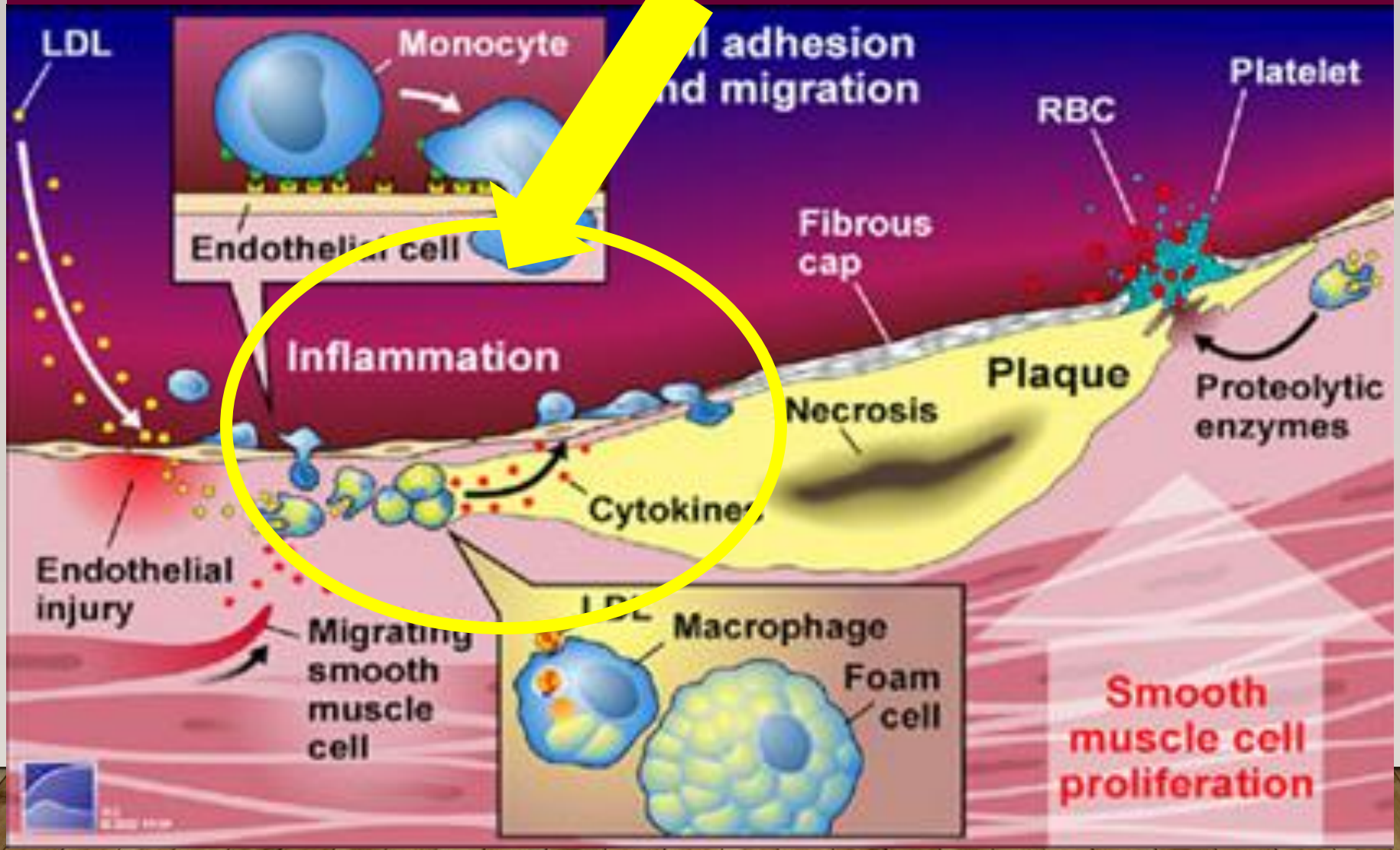
BAGAIMANA
PENYAKIT
JANTUN
KORO
TERJAD

BERAWAL DARI:
ATEROSKLEROSIS!

ATHEROSCLEROSIS | Risk factors and complications of atherosclerosis

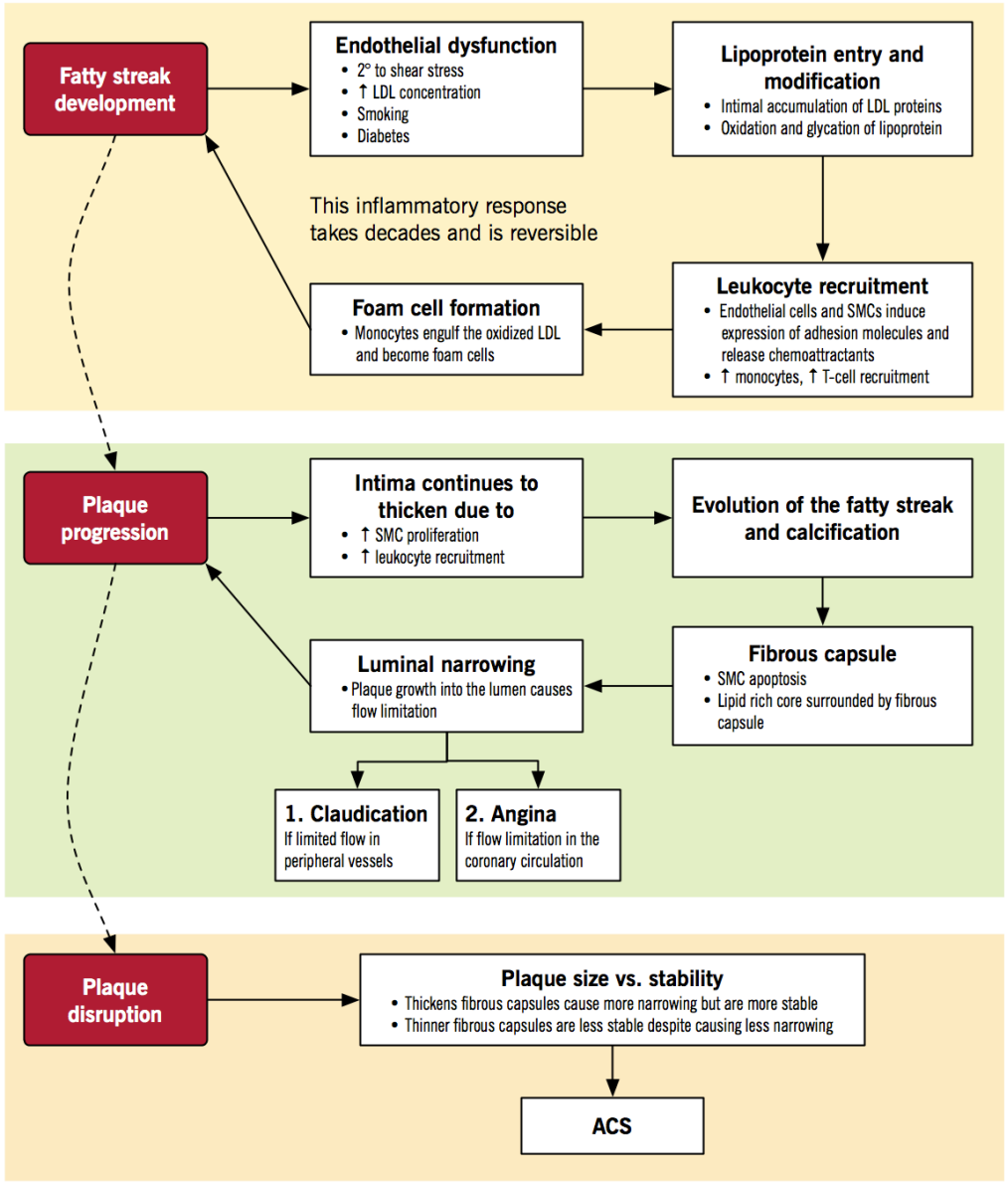


ATEROSKLEROSIS: PENYAKIT INFLAMASI!

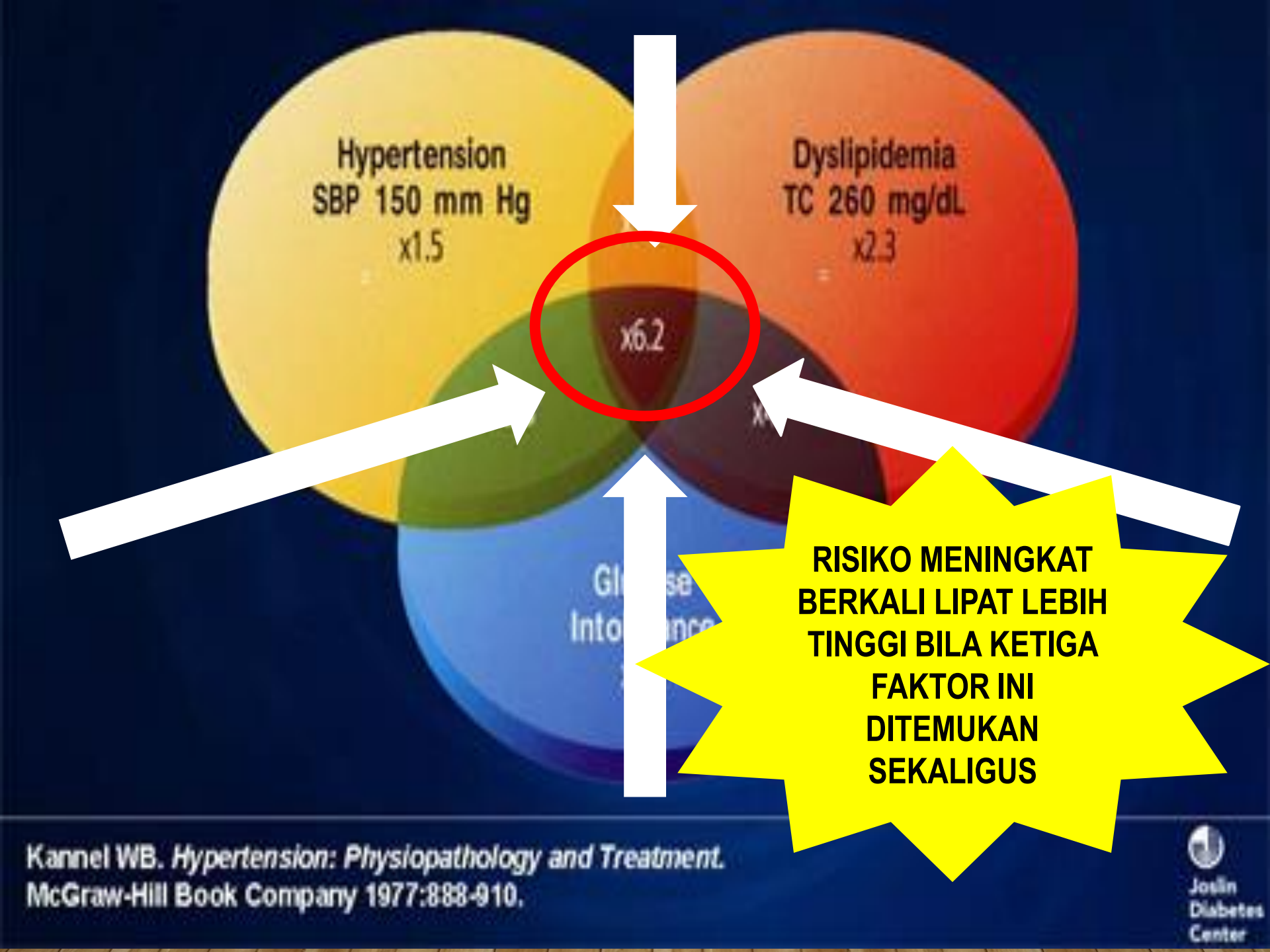


ATHEROSCLEROSIS | Stages of development

Sultan Chaudhry



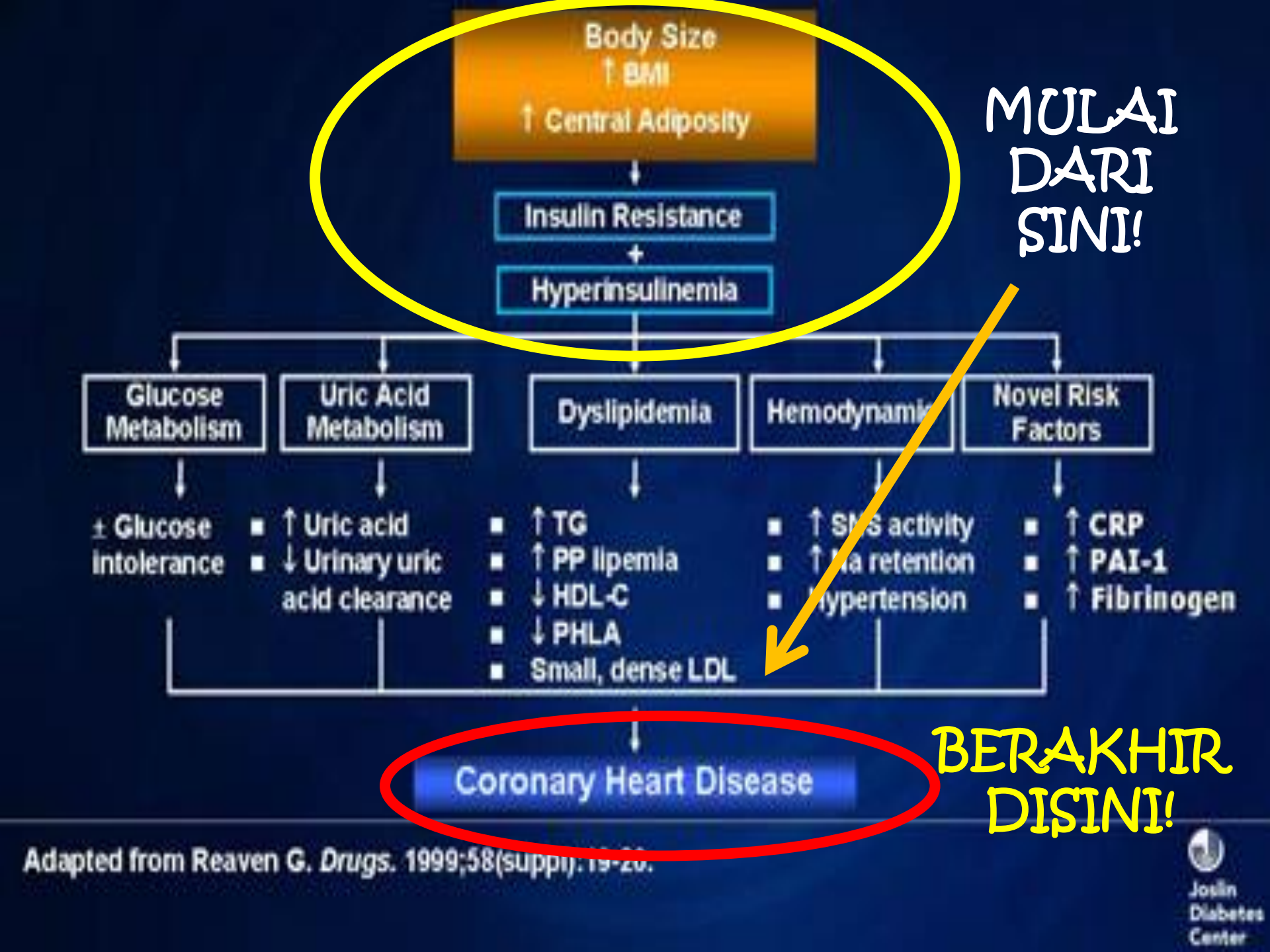
INTI DARI PENCEGAHAN ATEROSKLEROSIS: ATASI INFLAMASI DAN FAKTOR DISLIPIDEMIA

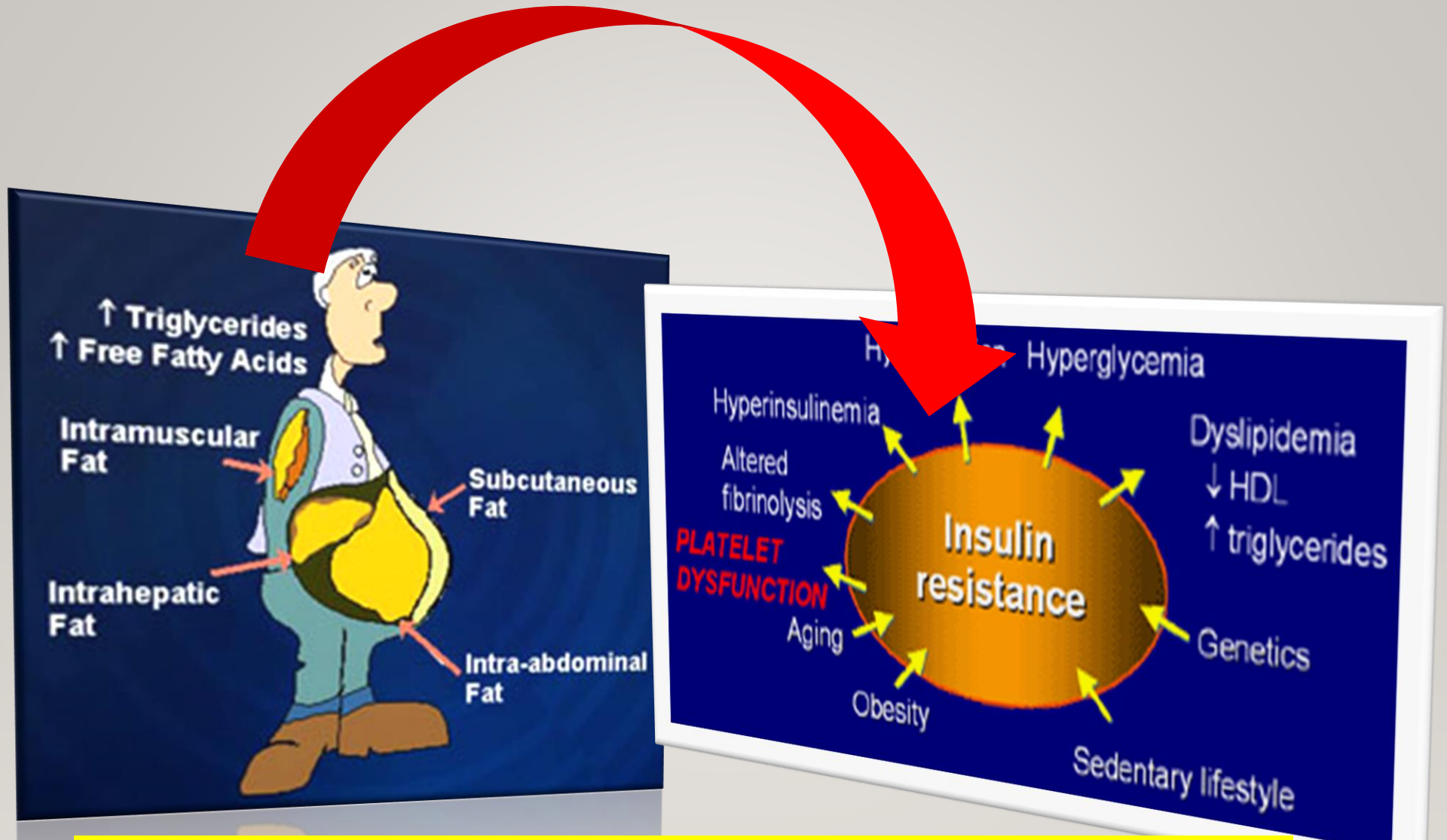


Kannel WB. *Hypertension: Physiopathology and Treatment.* McGraw-Hill Book Company 1977:888-910.

Joslin Diabetes Center


"Apple" vs. "Pear"
ADIPOSITAS SENTRAL:
ITU AKAR MASALAHNYA!
ADAM


Body Size
↑ BMI
↑ Central Adiposity
Insulin Resistance
+
Hyperinsulinemia
Glucose Metabolism
Uric Acid Metabolism
Dyslipidemia
Hemodynamic
Novel Risk Factors
± Glucose intolerance
↑ Uric acid
↓ Urinary uric acid clearance
↑ TG
↑ PP lipemia
↓ HDL-C
↓ PHLA
Small, dense LDL
↑ SNS activity
↑ Na retention
Hypertension
↑ CRP
↑ PAI-1
↑ Fibrinogen
Coronary Heart Disease
MULAI DARI SINI!
BERAKHIR DISINI!
Adapted from Reaven G. Drugs. 1999;58(suppl):19-20.
Joslin Diabetes Center



WASPADAI BERAT BADAN BERLEBIH DAN RESISTENSI INSULIN!

PENINGKATAN KADAR ASAM LEMAK BEBAS: PENYEBAB UTAMA RESISTENSI INSULIN

Adapted from Tan MH. *Exp Clin Endocrinol Diabetes*. 2000;113(suppl):54-62.

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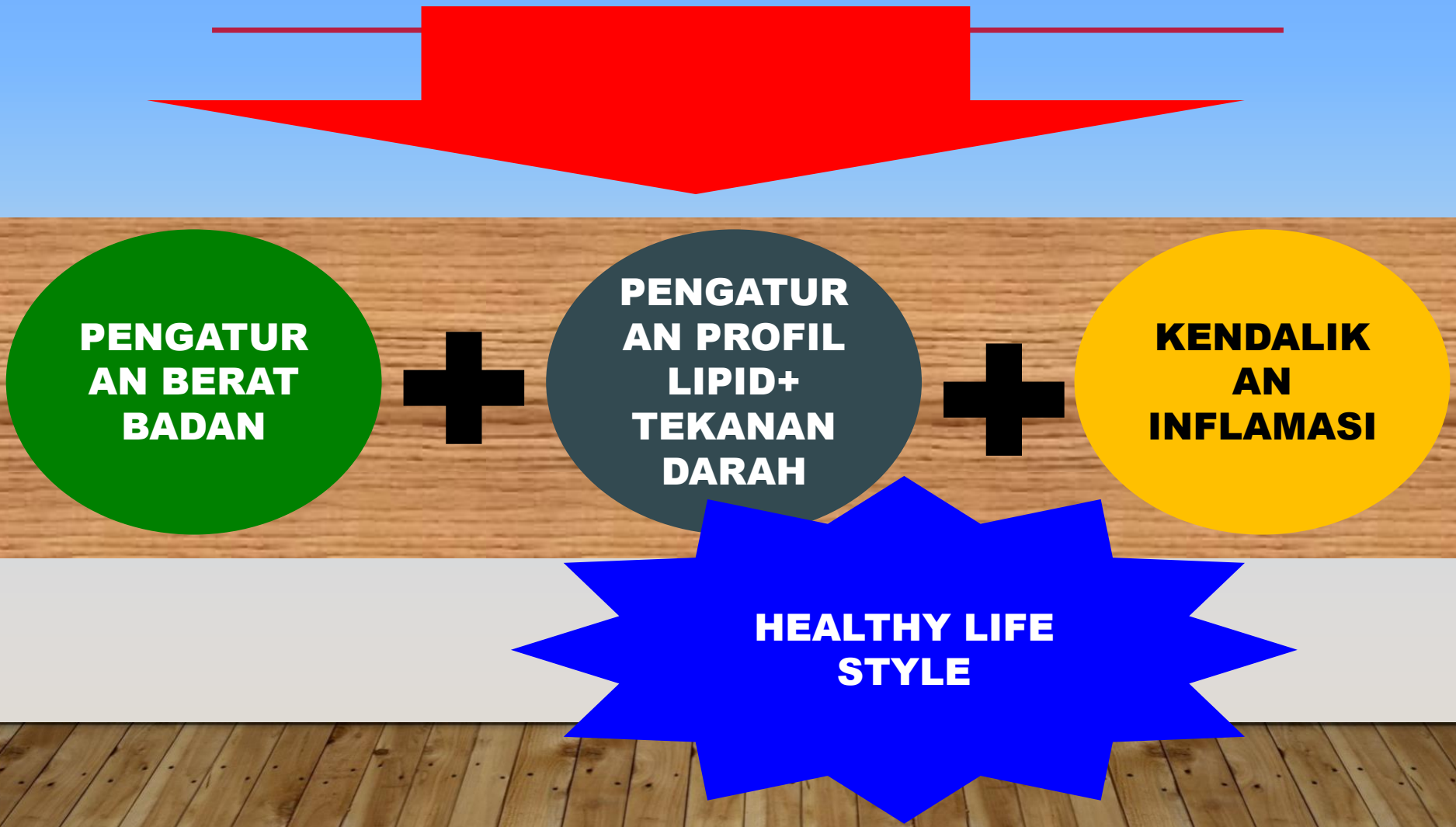
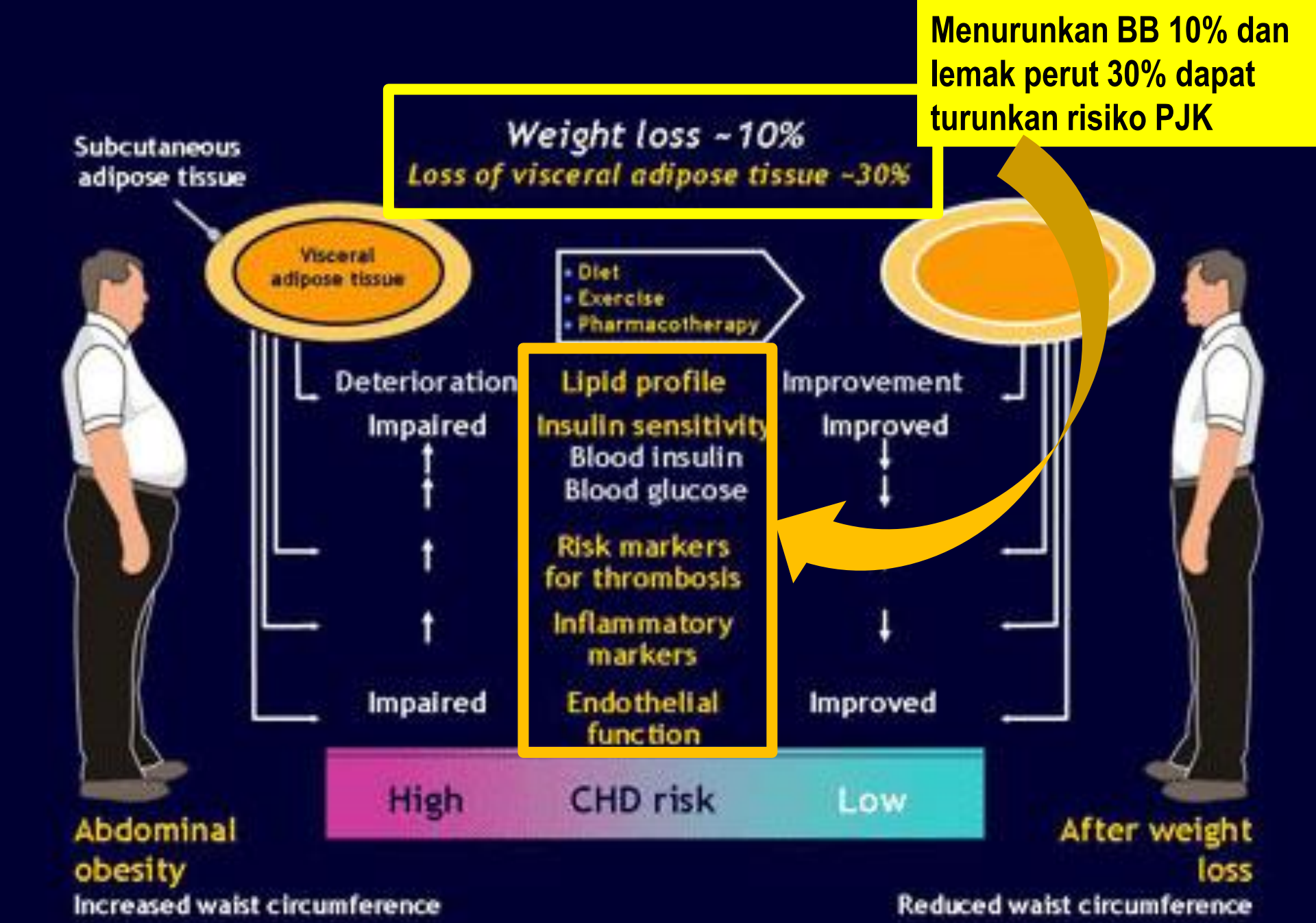
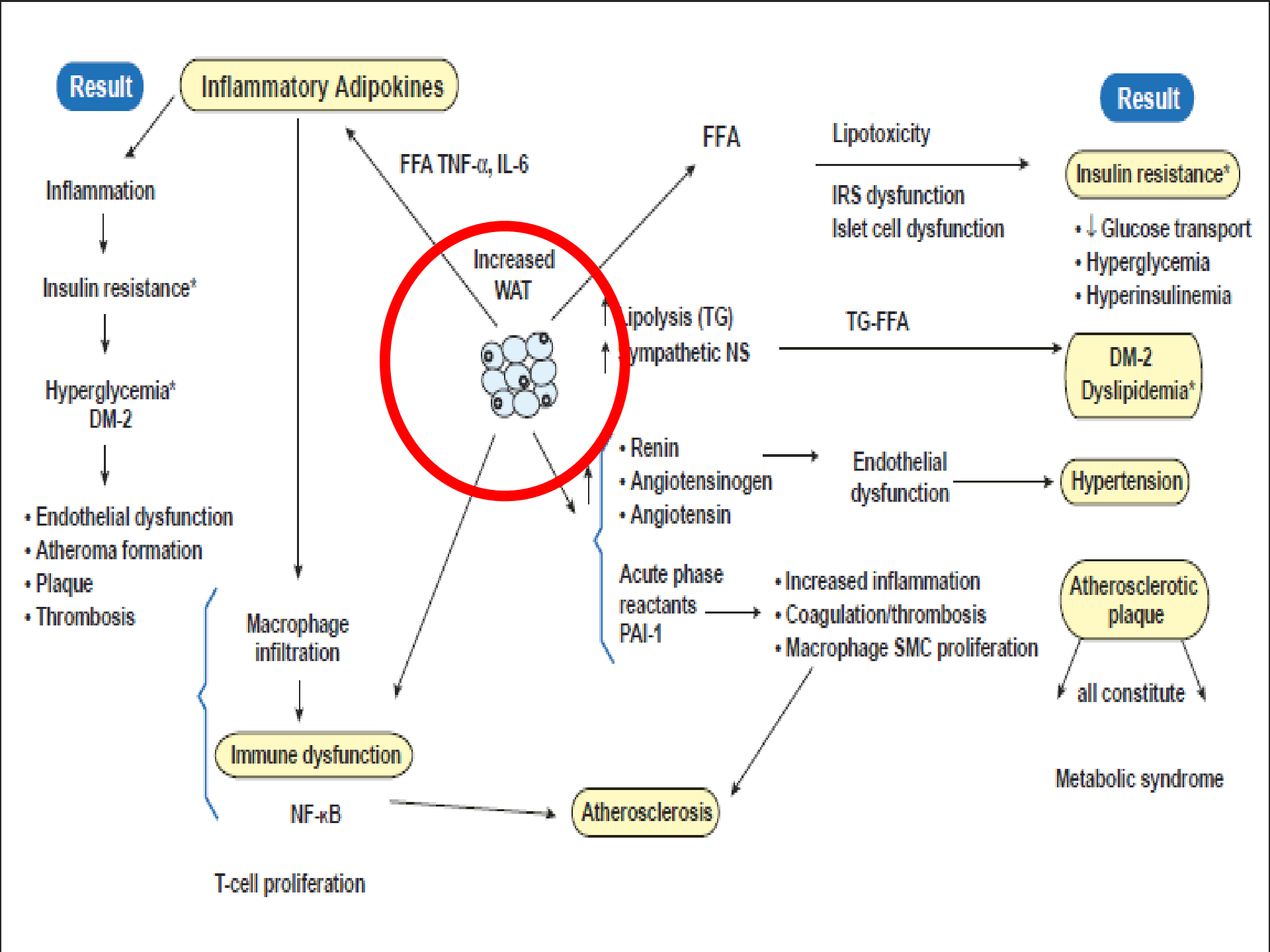
TUJUAN TERAPI GIZI



Menurunkan BB 10% dan lemak perut 30% dapat turunkan risiko PJK

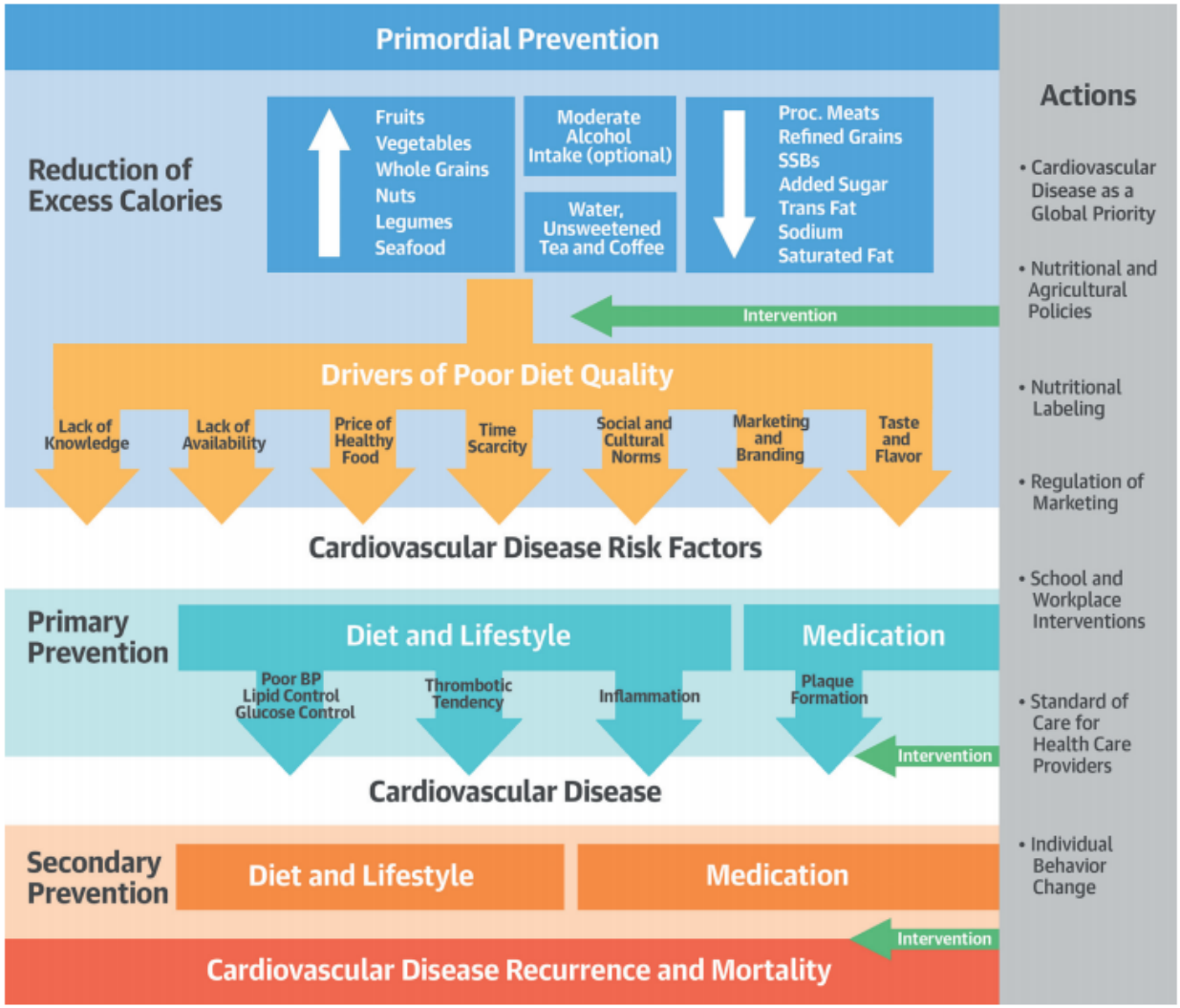


Adapted with permission from Despres JP et al. *BMJ*. 2001;322:716-720.


Result
Inflammatory Adipokines
Inflammation
Insulin resistance*
Hyperglycemia*
DM-2
• Endothelial dysfunction
• Atheroma formation
• Plaque
• Thrombosis
FFA TNF-α, IL-6
Increased WAT
FFA
Lipolysis (TG)
Sympathetic NS
Result
Lipotoxicity
IRS dysfunction
Islet cell dysfunction
Insulin resistance*
• ↓ Glucose transport
• Hyperglycemia
• Hyperinsulinemia
TG-FFA
DM-2
Dyslipidemia*
• Renin
• Angiotensinogen
• Angiotensin
Endothelial dysfunction
Hypertension
Acute phase reactants
PAI-1
• Increased inflammation
• Coagulation/thrombosis
• Macrophage SMC proliferation
Atherosclerotic plaque
all constitute
Metabolic syndrome
Macrophage infiltration
Immune dysfunction
NF-κB
T-cell proliferation
Atherosclerosis

SEJUMLAH STUDI YANG BERHUBUNGAN DENGAN TERAPI DIET DAN RISIKO PJK

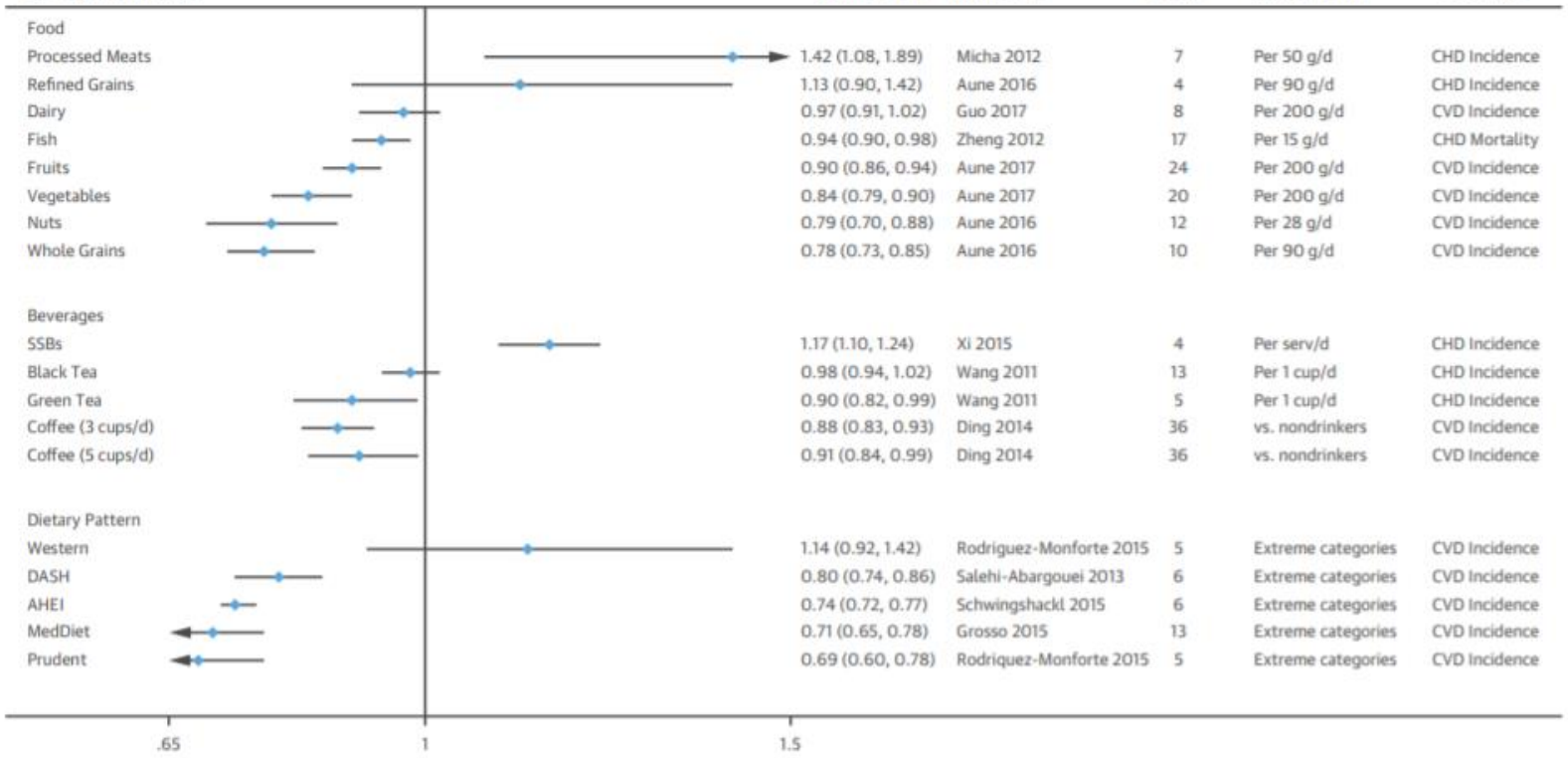
CENTRAL ILLUSTRATION Flow Diagram of the Development of CVD and Possible Prevention by a Healthy Diet



Yu, E. et al. J Am Coll Cardiol. 2018;72(8):914-26.

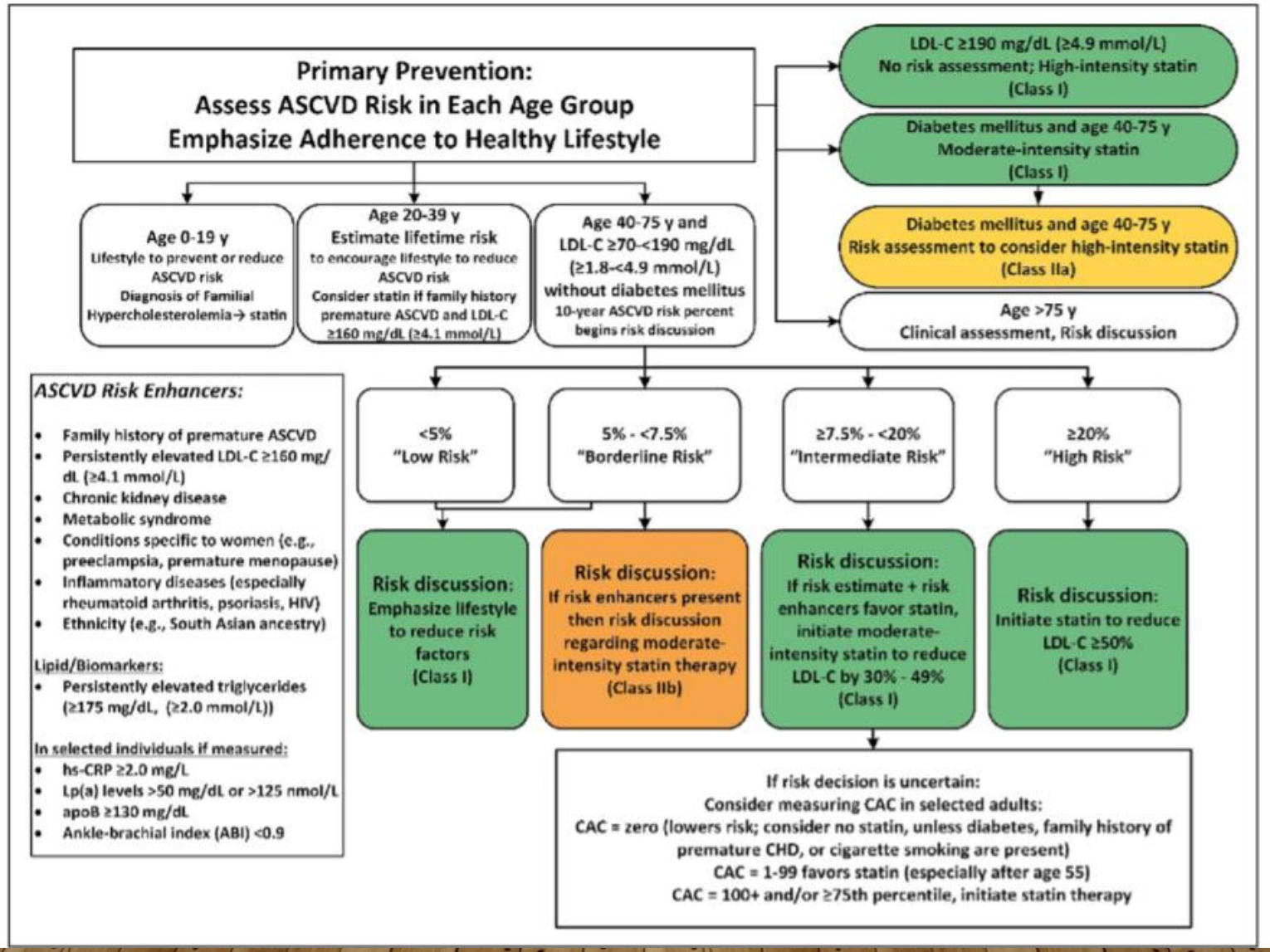
Avoiding excess calories is an integral part of halting the development of cardiovascular disease risk factors (i.e., primordial prevention). Unfavorable eating patterns are driven by a variety of biological, social, economic, and psychological factors, and a robust intervention from all levels of society may steer populations toward a healthier diet and prevent disease progression. Diet and other lifestyle changes remain crucial steps in primary and secondary prevention of cardiovascular disease, although the relative importance of medication and clinical procedures increases over time with disease progression. CVD = cardiovascular disease; SSB = sugar-sweetened beverage.

FIGURE 1 Summary of Various Meta-Analyses for the Associations of Key Foods and Food Groups, and Dietary Patterns With Incident CVD



Dietary Component	RR (95% CI)	Reference	No. of Studies	Analysis Unit	Outcome
Food					
Processed Meats	1.42 (1.08, 1.89)	Micha 2012	7	Per 50 g/d	CHD Incidence
Refined Grains	1.13 (0.90, 1.42)	Aune 2016	4	Per 90 g/d	CHD Incidence
Dairy	0.97 (0.91, 1.02)	Guo 2017	8	Per 200 g/d	CVD Incidence
Fish	0.94 (0.90, 0.98)	Zheng 2012	17	Per 15 g/d	CHD Mortality
Fruits	0.90 (0.86, 0.94)	Aune 2017	24	Per 200 g/d	CVD Incidence
Vegetables	0.84 (0.79, 0.90)	Aune 2017	20	Per 200 g/d	CVD Incidence
Nuts	0.79 (0.70, 0.88)	Aune 2016	12	Per 28 g/d	CVD Incidence
Whole Grains	0.78 (0.73, 0.85)	Aune 2016	10	Per 90 g/d	CVD Incidence
Beverages					
SSBs	1.17 (1.10, 1.24)	Xi 2015	4	Per serv/d	CHD Incidence
Black Tea	0.98 (0.94, 1.02)	Wang 2011	13	Per 1 cup/d	CHD Incidence
Green Tea	0.90 (0.82, 0.99)	Wang 2011	5	Per 1 cup/d	CHD Incidence
Coffee (3 cups/d)	0.88 (0.83, 0.93)	Ding 2014	36	vs. nondrinkers	CVD Incidence
Coffee (5 cups/d)	0.91 (0.84, 0.99)	Ding 2014	36	vs. nondrinkers	CVD Incidence
Dietary Pattern					
Western	1.14 (0.92, 1.42)	Rodriguez-Monforte 2015	5	Extreme categories	CVD Incidence
DASH	0.80 (0.74, 0.86)	Salehi-Abargouei 2013	6	Extreme categories	CVD Incidence
AHEI	0.74 (0.72, 0.77)	Schwingshackl 2015	6	Extreme categories	CVD Incidence
MedDiet	0.71 (0.65, 0.78)	Grosso 2015	13	Extreme categories	CVD Incidence
Prudent	0.69 (0.60, 0.78)	Rodriquez-Monforte 2015	5	Extreme categories	CVD Incidence

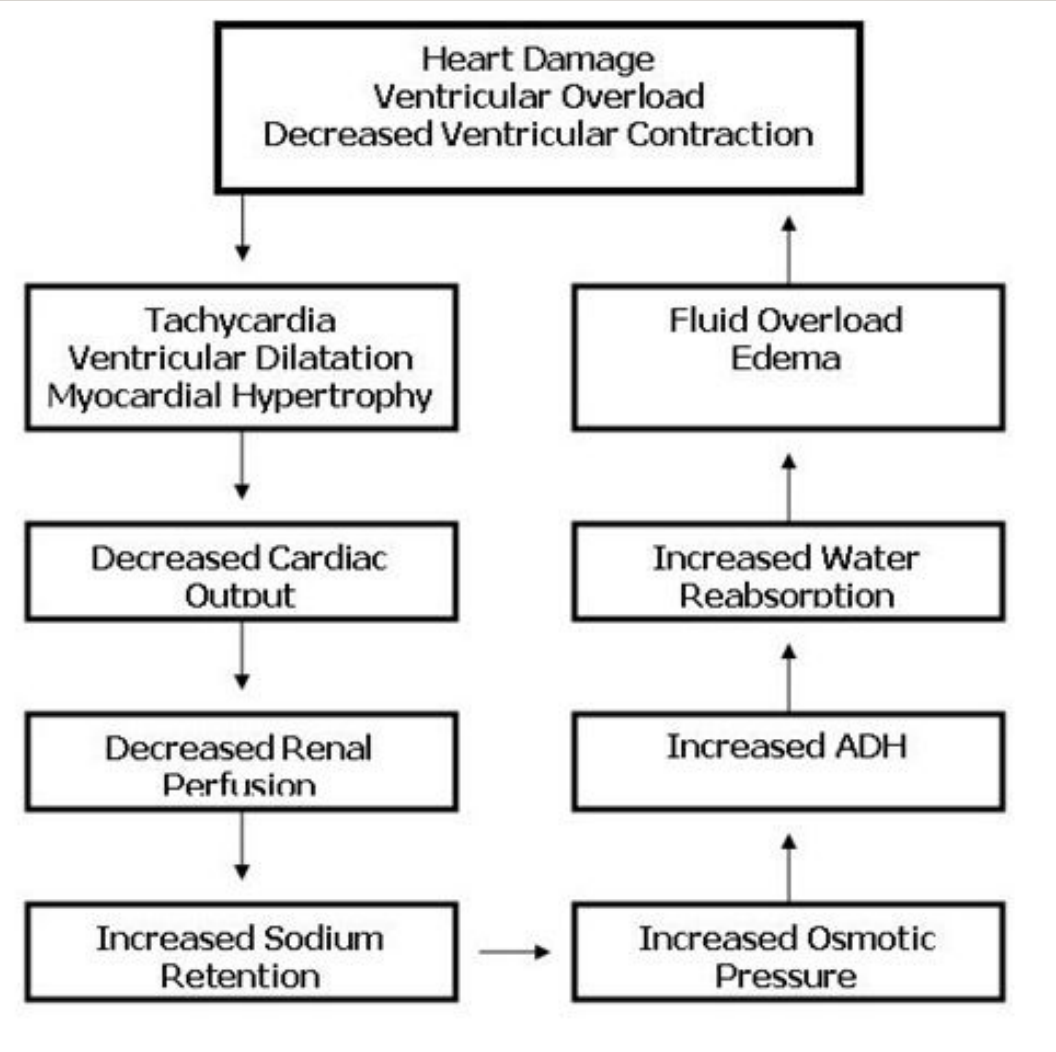
High amounts of processed meat, SSBs, and refined grain consumption are associated with greater CVD incidence; moderate coffee and alcohol intake, and high fruit/vegetable, dairy (low-fat), whole grain, fish, and nut intake are associated with lower incidence. High adherence to Mediterranean, DASH, AHEI, and Prudent dietary patterns are significantly predictive of lower CVD incidence. AHEI = Alternative Healthy Eating Index; CHD = coronary heart disease; CI = confidence interval; CVD = cardiovascular disease; DASH = Dietary Approaches to Stop Hypertension; MedDiet = Mediterranean diet; RR = risk ratio; SSB = sugar-sweetened beverage.

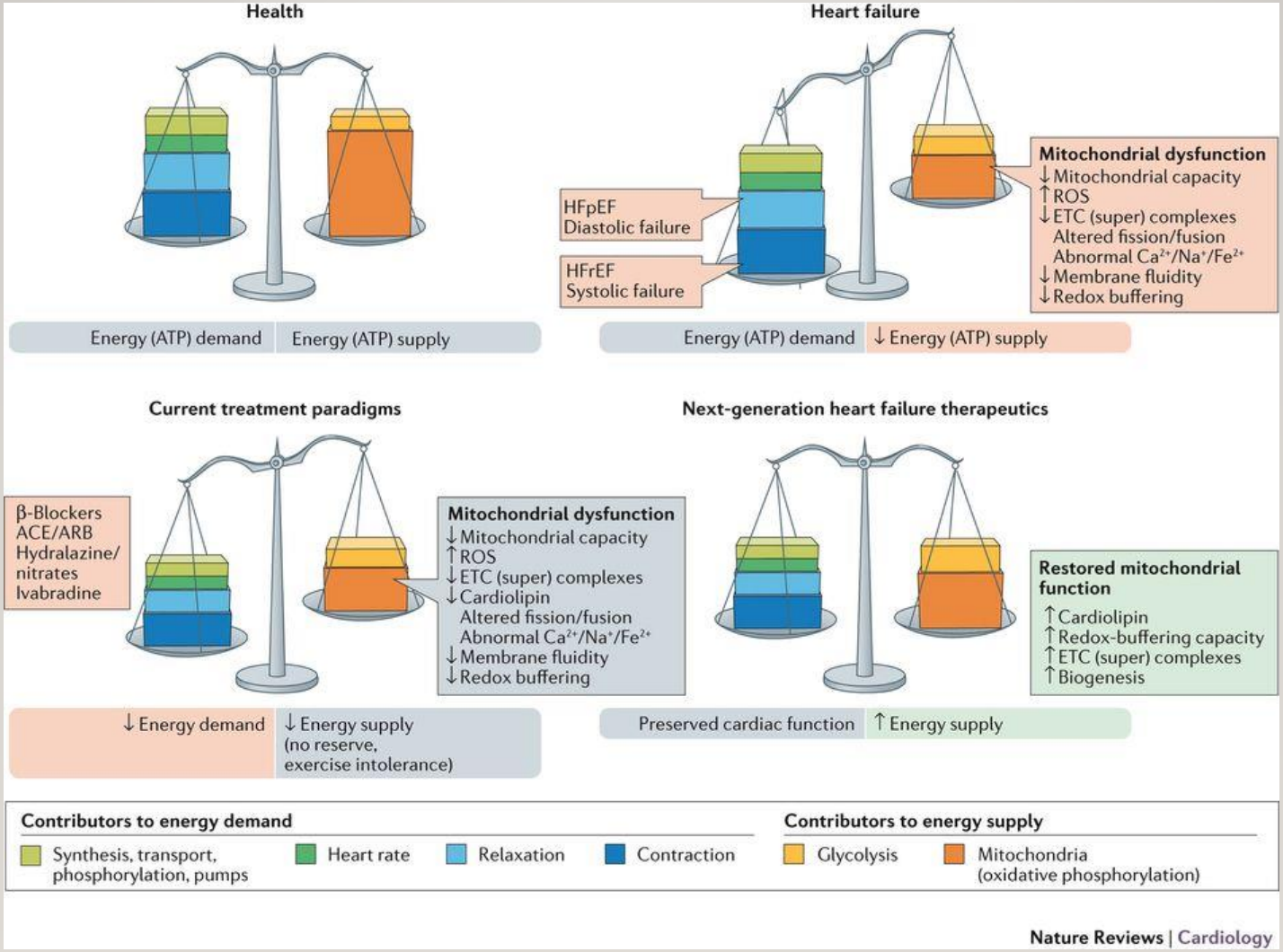

Primary Prevention:
Assess ASCVD Risk in Each Age Group
Emphasize Adherence to Healthy Lifestyle
LDL-C ≥190 mg/dL (≥4.9 mmol/L)
No risk assessment; High-intensity statin
(Class I)
Diabetes mellitus and age 40-75 y
Moderate-intensity statin
(Class I)
Diabetes mellitus and age 40-75 y
Risk assessment to consider high-intensity statin
(Class IIa)
Age >75 y
Clinical assessment, Risk discussion
Age 0-19 y
Lifestyle to prevent or reduce ASCVD risk
Diagnosis of Familial Hypercholesterolemia→ statin
Age 20-39 y
Estimate lifetime risk
to encourage lifestyle to reduce ASCVD risk
Consider statin if family history premature ASCVD and LDL-C ≥160 mg/dL (≥4.1 mmol/L)
Age 40-75 y and LDL-C ≥70-<190 mg/dL (≥1.8-<4.9 mmol/L) without diabetes mellitus
10-year ASCVD risk percent begins risk discussion
ASCVD Risk Enhancers:
Family history of premature ASCVD
Persistently elevated LDL-C ≥160 mg/dL (≥4.1 mmol/L)
Chronic kidney disease
Metabolic syndrome
Conditions specific to women (e.g., preeclampsia, premature menopause)
Inflammatory diseases (especially rheumatoid arthritis, psoriasis, HIV)
Ethnicity (e.g., South Asian ancestry)
Lipid/Biomarkers:
Persistently elevated triglycerides (≥175 mg/dL, (≥2.0 mmol/L))
In selected individuals if measured:
hs-CRP ≥2.0 mg/L
Lp(a) levels >50 mg/dL or >125 nmol/L
apoB ≥130 mg/dL
Ankle-brachial index (ABI) <0.9
<5%
"Low Risk"
5% - <7.5%
"Borderline Risk"
≥7.5% - <20%
"Intermediate Risk"
≥20%
"High Risk"
Risk discussion:
Emphasize lifestyle to reduce risk factors
(Class I)
Risk discussion:
If risk enhancers present then risk discussion regarding moderate-intensity statin therapy
(Class IIb)
Risk discussion:
If risk estimate + risk enhancers favor statin, initiate moderate-intensity statin to reduce LDL-C by 30% - 49%
(Class I)
Risk discussion:
Initiate statin to reduce LDL-C ≥50%
(Class I)
If risk decision is uncertain:
Consider measuring CAC in selected adults:
CAC = zero (lowers risk; consider no statin, unless diabetes, family history of premature CHD, or cigarette smoking are present)
CAC = 1-99 favors statin (especially after age 55)
CAC = 100+ and/or ≥75th percentile, initiate statin therapy

Recommendations	NHLBI Grade	NHLBI Evidence Statements
DIET		
LDL-C: Advise adults who would benefit from LDL-C lowering* to:		
1. Consume a dietary pattern that emphasizes intake of vegetables, fruits, and whole grains; includes low-fat dairy products, poultry, fish, legumes, nontropical vegetable oils, and nuts; and limits intake of sweets, sugar-sweetened beverages, and red meats.	A (Strong)	**CQ1:** ES4 (high), ES6 (low), ES8 (moderate), ES9 (moderate)
a. Adapt this dietary pattern to appropriate calorie requirements, personal and cultural food preferences, and nutrition therapy for other medical conditions (including diabetes).		
b. Achieve this pattern by following plans such as the DASH dietary pattern, the USDA Food Pattern, or the AHA Diet.		
2. Aim for a dietary pattern that achieves 5%–6% of calories from saturated fat.	A (Strong)	**CQ1:** ES11 (high)
3. Reduce percent of calories from saturated fat.	A (Strong)	**CQ1:** ES11 (high), ES12 (moderate), ES13 (moderate)
4. Reduce percent of calories from trans fat.	A (Strong)	**CQ1:** ES14 (moderate), ES15 (moderate)

BP: Advise adults who would benefit from BP lowering to:		
1. Consume a dietary pattern that emphasizes intake of vegetables, fruits, and whole grains; includes low-fat dairy products, poultry, fish, legumes, nontropical vegetable oils, and nuts; and limits intake of sweets, sugar-sweetened beverages, and red meats. a. Adapt this dietary pattern to appropriate calorie requirements, personal and cultural food preferences, and nutrition therapy for other medical conditions (including diabetes). b. Achieve this pattern by following plans such as the DASH dietary pattern, the USDA Food Pattern, or the AHA Diet.	A (Strong)	**CQ1:** ES1 (low) ES3 (high), ES5 (high), ES6 (low), ES7 (low), ES8 (moderate)
2. Lower sodium intake.	A (Strong)	**CQ2:** ES1 (high), ES2 (moderate), ES3 (high), ES4 (high), ES5 (high), ES8 (low), ES9 (low)
3. a. Consume no more than 2,400 mg of sodium/d; b. Further reduction of sodium intake to 1,500 mg/d can result in even greater reduction in BP; and c. Even without achieving these goals, reducing sodium intake by at least 1,000 mg/d lowers BP.	B (Moderate)	**CQ2:** ES2 (moderate), ES3 (high)
4. Combine the DASH dietary pattern with lower sodium intake.	A (Strong)	**CQ1:** ES3 (high), ES5 (high), ES8 (moderate) **CQ2:** ES1 (high), ES2 (moderate), ES3 (high), ES4 (high), ES5 (high), ES6 (moderate)

	PHYSICAL ACTIVITY	
Lipids		
1. In general, advise adults to engage in aerobic physical activity to reduce LDL-C and non–HDL-C: 3–4 sessions per wk, lasting on average 40 min per session, and involving moderate- to vigorous-intensity physical activity.	B (Moderate)	**CQ3:** ES1 (moderate), ES2 (moderate), ES5 (low)
BP		
1. In general, advise adults to engage in aerobic physical activity to lower BP: 3–4 sessions per wk, lasting on average 40 min per session, and involving moderate- to vigorous-intensity physical activity.	B (Moderate)	**CQ3:** ES1 (high)


Heart Damage
Ventricular Overload
Decreased Ventricular Contraction
Tachycardia
Ventricular Dilatation
Myocardial Hypertrophy
Decreased Cardiac Output
Decreased Renal Perfusion
Increased Sodium Retention
Increased Osmotic Pressure
Increased ADH
Increased Water Reabsorption
Fluid Overload
Edema



Nature Reviews | Cardiology

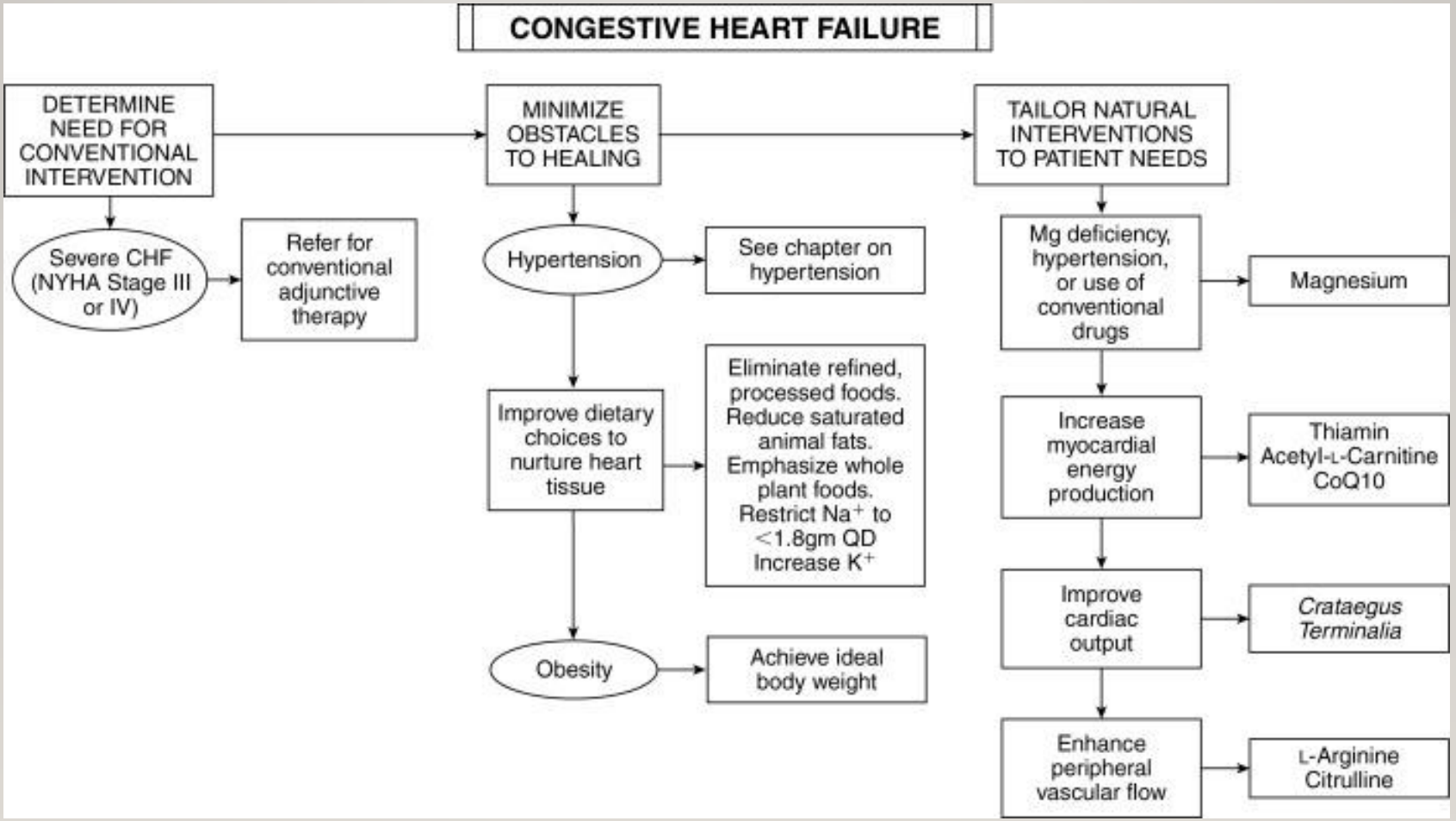

CONGESTIVE HEART FAILURE
DETERMINE NEED FOR CONVENTIONAL INTERVENTION
Severe CHF (NYHA Stage III or IV)
Refer for conventional adjunctive therapy
MINIMIZE OBSTACLES TO HEALING
Hypertension
See chapter on hypertension
Improve dietary choices to nurture heart tissue
Eliminate refined, processed foods. Reduce saturated animal fats. Emphasize whole plant foods. Restrict Na+ to <1.8gm QD Increase K+
Obesity
Achieve ideal body weight
TAILOR NATURAL INTERVENTIONS TO PATIENT NEEDS
Mg deficiency, hypertension, or use of conventional drugs
Magnesium
Increase myocardial energy production
Thiamin
Acetyl-L-Carnitine
CoQ10
Improve cardiac output
Crataegus
Terminalia
Enhance peripheral vascular flow
L-Arginine
Citrulline

Table V.2–1 Ess... of T...
Changes (T...

Componen...	...e...
LDL-raising nutrie...	
Saturated fats*	Less than 7% of total calories
Dietary cholesterol	Less than 200 mg/day
Therapeutic options for LDL lowering	
Plant stanols/sterols	2 grams per day
Increased viscous (soluble) fiber	10–25 grams per day
Total calories	...l caloric intake to ...
Physical activity	...e... exercis... kcal pe...

* *Trans* fatty acids are another LDL-raising fat tha...

Pemilihan +pembatasan jenis lemak: kurangi trans fatty acid!

Rasio PUFA/SFA > 0,28 berhubungan dengan rendahnya kematian akibat PJK pada laki-laki namun tidak pada perempuan

Serat makanan (serat larut) + flavonoid → kacang kedelai!

Flavonoids menghambat enzim COX-2 dan iNOS dlm memproduksi protaglandin dan nitric oxide = suatu proinflamasi yang poten

Rasio PUFA lebih bermakna dalam prevensi CVD daripada jumlah asupan
Rasio PUFA omega-3/omega-6 = 4/1 secara bermakna menurunkan kematian pada 70% penderita CVD

Table V.2–2. Macronutrient … TLC Diet

Component	
Polyunsaturated fat	Up to 10% of total calories
Monounsaturated fat	Up to 20% of total calories
Total fat	25–35% of total calories*
Carbohydrate†	50–60% of total calories*
Dietary fiber	20–30 grams per day
Protein	A…

* ATP III allows an increase of total fat … reduction in carbohydrate to 50 perc… syndrome. Any increase in fat intake … polyunsaturated or monounsaturated…

† Carbohydrate should derive predomi… carbohydrates including grains—especially whole grains—fruits, and vegetables.

Serat makanan terbukti menurunkan kadar marker inflamasi . Penurunan berbanding terbalik dengan jumlah asupan serat harian.

The Canadian Trial of Carbohydrates in Diabetes (CCD), a 1-y controlled trial of low-glycemic-index dietary carbohydrate in type 2 diabetes: no effect on glycated hemoglobin but reduction in C-reactive protein[1–3]

Thomas MS Wolever, Alison L Gibbs, Christine Mehling, Jean-Louis Chiasson, Philip W Connelly, Robert G Josse, Lawrence A Leiter, Pierre Maheux, Remi Rabasa-Lhoret, N Wilson Rodger, and Edmond A Ryan

Anti-inflammatory properties of dietary flavonoids

J. González-Gallego, S. Sánchez-Campos y M. J. Tuñón

Ciberehd and Institute of Biomedicine. University of Leon. Spain.

ORIGINAL ARTICLE

Whole-Grain, Bran, and Cereal Fiber Intakes and Markers of Systemic Inflammation in Diabetic Women

Lu Qi, MD, PHD[1,2]
Rob M. van Dam, PHD[1]
Simin Liu, MD, PHD[3]
Mary Franz, MS[1]
Christos Mantzoros, MD, PHD[4]
Frank B. Hu, MD, PHD[1,2,3]

The Importance of the Omega-6/Omega-3 Fatty Acid Ratio in Cardiovascular Disease and Other Chronic Diseases

Artemis P. Simopoulos[1]
...r Genetics, Nutrition and Health, Washington, DC 20009

Sejumlah hasil penelitian masih inkonklusif

Relations of Dietary Magn... Biomarkers of Inflammati... Endothelial Dysfunct... Diverse Cohort of Postm...

Sara A. Chacko, MPH[1]
Yiqing Song, MD, SCD[2]
Lauren Nathan, MD[3]
Lesley Tinker, PHD[4]
Ian H. de Boer, MD[5]
Fran Tylavsky, DRPH[6]
Robert Wallace, MD[7]
Simin Liu, MD, SCD[1,8]

...ary heart disease risk:

...'Reilly, Katarina Augustsson, Gary E Fraser, Uri Goldbourt, ...Pietinen, Donna Spiegelman, Jane Stevens, Jarmo Virtamo,

Epidemiology/Health Services Research

Magnesium Intake in Relation to Systemic Inflammation, Insulin Resistance, and the Incidence of Diabetes

Dae Jung Kim, MD[1,2,3]
Pimchanok Xun, MD, PHD[1,2]
Kiang Liu, PHD[4]
Catherine Loria, PHD[5]
Kunihiro Yokota, MD, PHD[6]
David R. Jacobs Jr., PHD[7,8]
Ka He, MD, SCD[1,2]

mechanisms underlying the beneficial effects of magnesium intake on diabetes are not fully understood. Cross-sectional studies have suggested an inverse correla-

...et or exercise: what is more effective in preventing or reducing metabolic alterations?

Simona Bo, Giovannino Ciccone[1], Sabrina Guidi, Roberto Gambino, Marilena Durazzo, Luigi Gentile[2], Maurizio Cassader, Paolo Cavallo-Perin and Gianfranco Pagano

Department of Internal Medicine, University of Turin, Corso Dogliotti 14, 10126 Turin, Italy. [1]Unit of Epidemiology, S. Giovanni Battista Hospital, Turin, Italy and [2]Diabetic Clinic, Hospital of Asti, Asti, Italy

(Correspondence should be addressed to S Bo; Email: sbo@molinette.piemonte.it)

Serum C-Reactive Protein Concentrations Are Inversely Associated with Dietary Flavonoid Intake in U.S. Adults[1]

Ock Kyoung Chun,[2,4] Sang-Jin Chung,[3] Kate J. Claycombe,[2] and Won O. Song[2]*

Dietary Fat Predicts Coronary Heart Disease Events in Subjects With Type 2 Diabetes

Minna Soinio, MD[1]
Markku Laakso, MD[2]
Seppo Lehto, MD[2]
Paula Hakala, PHD[3]
Tapani Rönnemaa, MD[1]

with type 2 diabetes who were free from CHD at baseline.

RESEARCH DESIGN AND

Relations of Dietary Magnesium Intake to Biomarkers of Inflammation and Endothelial Dysfunction in an Ethnically Diverse Cohort of Postmenopausal Women

Asupan magnesium berbanding terbalik dgn kadar marker inflamasi dan disfungsi endotel pada wanita pasca menopause

Diabetes Care 33:304–310, 2010

Am J Clin Nutr 2004;80:1508–20

Antioxidant vitamins and coronary heart disease risk: a pooled analysis of 9 cohorts[1–3]

Paul Knekt, John Ritz, Mark A Pereira, Eilis J O'Reilly, Katarina Augustsson, Gary E Fraser, Uri Goldbourt, Berit L Heitmann, Göran Hallmans, Simin Liu, Pirjo Pietinen, Donna Spiegelman, June Stevens, Jarmo Virtamo, Walter C Willett, Eric B Rimm, and Alberto Ascherio

Konsumsi suplemen vitamin C > 700 mg/hari memiliki efek protektif terhadap penyakit PJK., namun tidak demikian pada konsumsi vitamin E dan carotene

European Journal of Endocrinology (2008) 159 685–691 ISSN 0804-4643

CLINICAL STUDY

Diet or exercise: what is more effective in preventing or reducing metabolic alterations?

Simona Bo, Giovannino Ciccone[1], Sabrina Guidi, Roberto Gambino, Marilena Durazzo, Luigi Gentile[2], Maurizio Cassader, Paolo Cavallo-Perin and Gianfranco Pagano

Department of Internal Medicine, University of Turin, Corso Dogliotti 14, 10126 Turin, Italy, [1]Unit of Epidemiology, S. Giovanni Battista Hospital, Turin, Italy and [2]Diabetic Clinic, Hospital of Asti, Asti, Italy

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PENGARUH BERBAGAI JENIS MAKANAN TERHADAP PENURUNAN RISIKO PJK

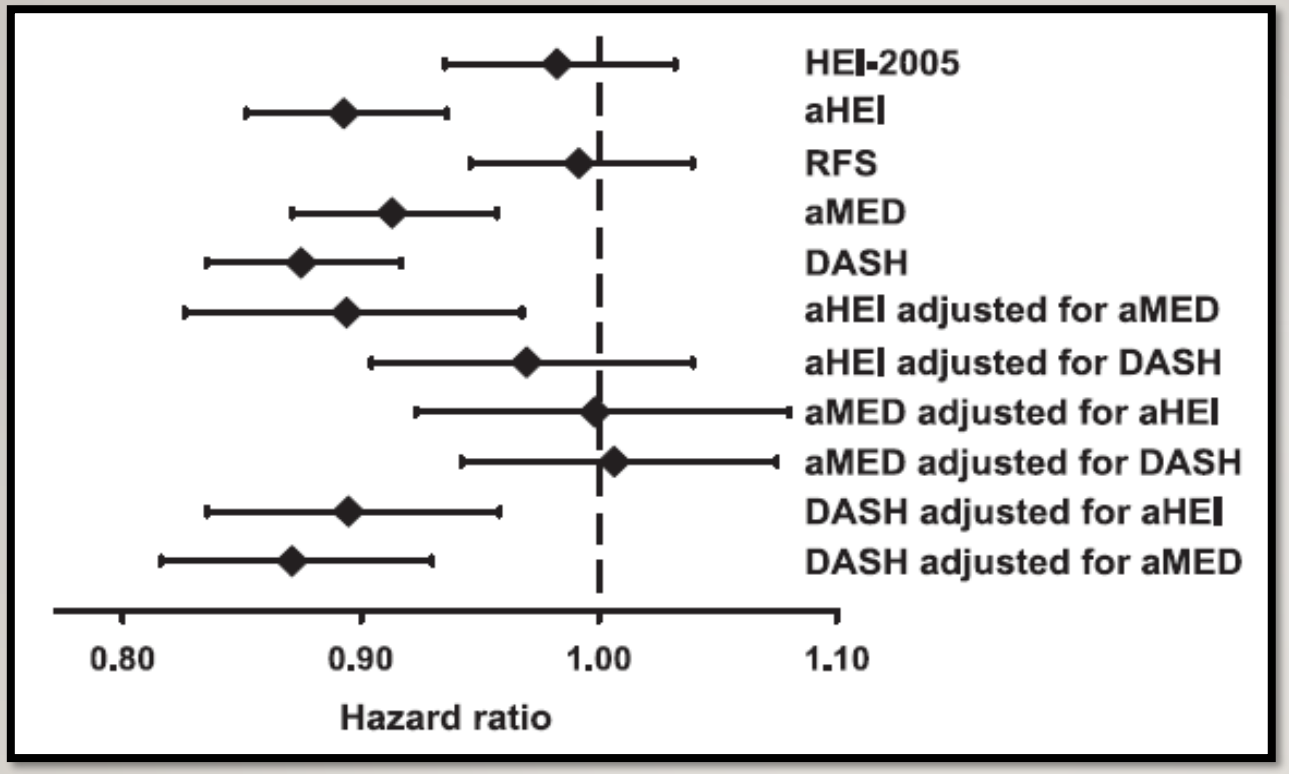
Food	Study duration	Effect
Extra virgin olive oil	1 meal	Decreased TXB2 and LTB4 in comparison with corn oil, non-virgin olive oil
Tomato juice	10 days	Reduced neutrophil airway influx in asthmatics
Tomato drink	26 days	Reduced TNF-α production by whole blood
Whole tomatoes	28 days	No change in CRP
Walnuts	1 meal	Decreased monocyte n… levels
Red wine	4 weeks	Reduced CRP and fib…
Garlic powder	3 months	No effect on CRP, TNF-α
Flaxseed flour	2 weeks	Reduced CRP, fibronectin and serum amyloid A… obese subjects
Tea, black	12 weeks	40-50% reduction of CRP in subjects with CRP>3 mg/L
Tea, black	6 weeks	Decreased CRP and platelet aggregation in healthy men
Tea, green	4 weeks	No effect on CRP in men
Tea, green	4 weeks	No significant effect…
Cherries, sweet	4 weeks	Reduced CRP and…

CCL5, chemokine (c-c motif) ligand 5; CRP, c-reactive protein; IL… …thro…
TNF, tumor-necrosis factor.

Tomat dalam bentuk jus atau minuman dpt turunkan kadar marker inflamasi drpd tomat utuh

Teh hitam lebih baik dalam menurunkan marker inflamasi pada pria daripada teh hijau

PENGARUH BERBAGAI JENIS DIET TERHADAP PENURUNAN FAKTOR RISIKO PJK



HEI: HEALTHY EATING INDEX
RFS = RECOMMENDED FOOD SCORE
AMED = ALTERNATIVE MEDITERRANEAN DIET
DASH = DIETARY APPROACH TO STOP HYPERTENSION

CONCLUSIONS—Several diet-quality scores were associated with a lower risk of type 2 diabetes and reflect a common dietary pattern characterized by high intakes of plant-based foods such as whole grains; moderate alcohol; and low intakes of red and processed meat, sodium, sugar-sweetened beverages, and *trans* fat. High-quality diets may yield the greatest reduction in diabetes cases when followed by those with a high BMI.

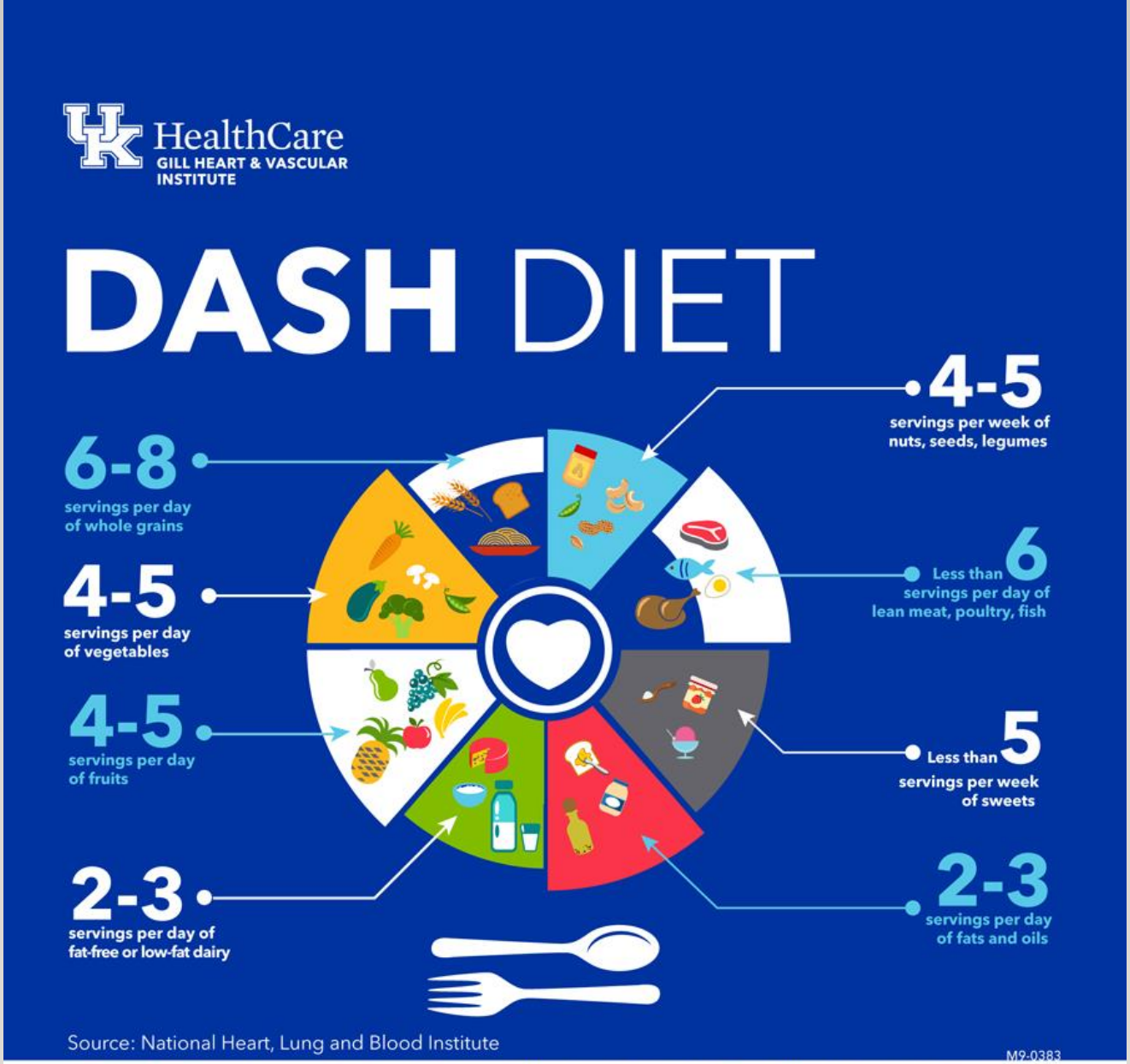
Diabetes Care 34:1150–1156, 2011

KOMPONEN DIET MEDITERANEAN

- Minyak zaitun sebagai sumber lemak utama
- Konsumsi tinggi dari buah sayur, kacang-kacangan, sereal dan ikan serta red wine saat makan

Karakteristik

Tinggi omega 3 = 1% energi total
Rendah omega 6
Rasio omega 3/omega 6 rendah = 1/7



The DASH diet (Dietary Approaches to Stop Hypertension) has been shown to help lower blood pressure and prevent heart disease, stroke, diabetes and even some forms of cancer. It focuses on eating more fresh fruits and vegetables.

This is a guide to how much of each food group you should eat every day, based on eating 2,000 calories per day.

Five colour food

Phytochemical Contained in 5 Colors of Fruits and Vegetables

Purple	grapes, eggplant, blueberry, purple sweet potato anthoxanthins, resveratrol Effect – antioxidant effect, suppression and detoxification of carcinogens
Red	tomato, watermelon, strawberry, cherry Lycopene Effect – suppresses prostate cancer, lung cancer
Green	broccoli, spinach, avocado, green grapes, kale Lutein, sulforaphane Effect – prevents cancer formation and development
Yellow, Orange	orange, tangerine, carrot, pumpkin flavonoid Effect – prevents recurrence of breast cancer
White	garlic, onion, mushroom allicin, quercetin Effect – powerful anti-bacterial effect, prevents stomach cancer

Following the DASH Eating Plan

Use this chart to help clients plan their menus—or take it with them when they go to the store.

Food group	Servings per day			Serving sizes	Examples and notes	Significance of each food group to the DASH eating plan
	1,600 kcal	2,000 kcal	2,600 kcal			
Grains*	6	6–8	10–11	1 slice bread 1 oz dry cereal ½ cup cooked rice, pasta, or cereal	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	3–4	4–5	5–6	1 cup raw leafy vegetable ½ cup cut-up raw or cooked vegetable ½ cup vegetable juice	Broccoli, carrots, collards, green beans, green peas, kale, lima beans, potatoes, spinach, squash, sweet potatoes, tomatoes	Rich sources of potassium, magnesium, and fiber
Fruits	4	4–5	5–6	1 medium fruit ¼ cup dried fruit ½ cup fresh, frozen, or canned fruit ½ cup fruit juice	Apples, apricots, bananas, dates, grapes, oranges, grapefruit, grapefruit juice, mangoes, melons, peaches, pineapples, raisins, strawberries, tangerines	Rich sources of potassium, magnesium, and fiber
Fat-free or low-fat milk and milk products	2–3	2–3	3	1 cup milk or yogurt 1½ oz cheese	Fat-free (skim) or low-fat (2%) 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	3–6	6 or fewer	6	1 oz cooked meats, poultry or fish 1 egg	Select only lean meats; trim away visible fat; broil, roast, or poach; remove skin from poultry	Rich sources of protein and magnesium
Nuts, seeds, and legumes	3 per week	4–6	1	½ cup or 1½ oz nuts 2 T peanut butter 2 T or ½ oz seeds ½ cup cooked legumes (dry beans and peas)	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	2	2–3	3	1 tsp soft margarine 1 tsp vegetable oil 1 T mayonnaise 2 T salad dressing	Soft margarine, vegetable oil (such as canola, corn, olive, or safflower), low-fat mayonnaise, light salad dressing	The DASH study had 27% of calories as fat, including fat in or added to foods
Sweets and added sugars	0	5 or fewer per week	≤2	1 T sugar 1 T jelly or jam ½ cup sorbet, gelatin 1 cup lemonade	Fruit-flavored gelatin, fruit punch, hard candy, jelly, maple syrup, sorbet and ices, sugar	Sweets should be low in fat

* Whole grains are recommended for most grain servings as a good source of fibers and nutrients.
† Serving sizes vary between ½ cup and 1¼ cups, depending on cereal type. Check the product's Nutrition Facts label.
‡ Because eggs are high in cholesterol, limit egg yolk intake to no more than four per week; two egg whites have the same protein content as 1 oz of meat.
§ Fat content changes serving amount for fats and oils. For example, 1 T of regular salad dressing equals one serving; 1 T of a low-fat dressing equals one-half serving; and 1 T of a fat-free dressing equals zero servings.

The key risk factors for cardiovascular disease

KESIMPULAN

- Pola makan mempengaruhi inflamasi sistemik kronik, low grade.
- Berbagai evidens menunjukkan konsumsi PUFA (disertai dengan memperhatikan rasio-nya), serat, MUFA, flavonoids, antioksidan berhubungan dengan penurunan marker inflamasi.
- Diet mediterania dan DASH berhubungan dengan penurunan risiko PJK

nutrients

MDPI

Concept Paper

The Metabolic Concept of Meal Sequence vs. Satiety: Glycemic and Oxidative Responses with Reference to Inflammation Risk, Protective Principles and Mediterranean Diet

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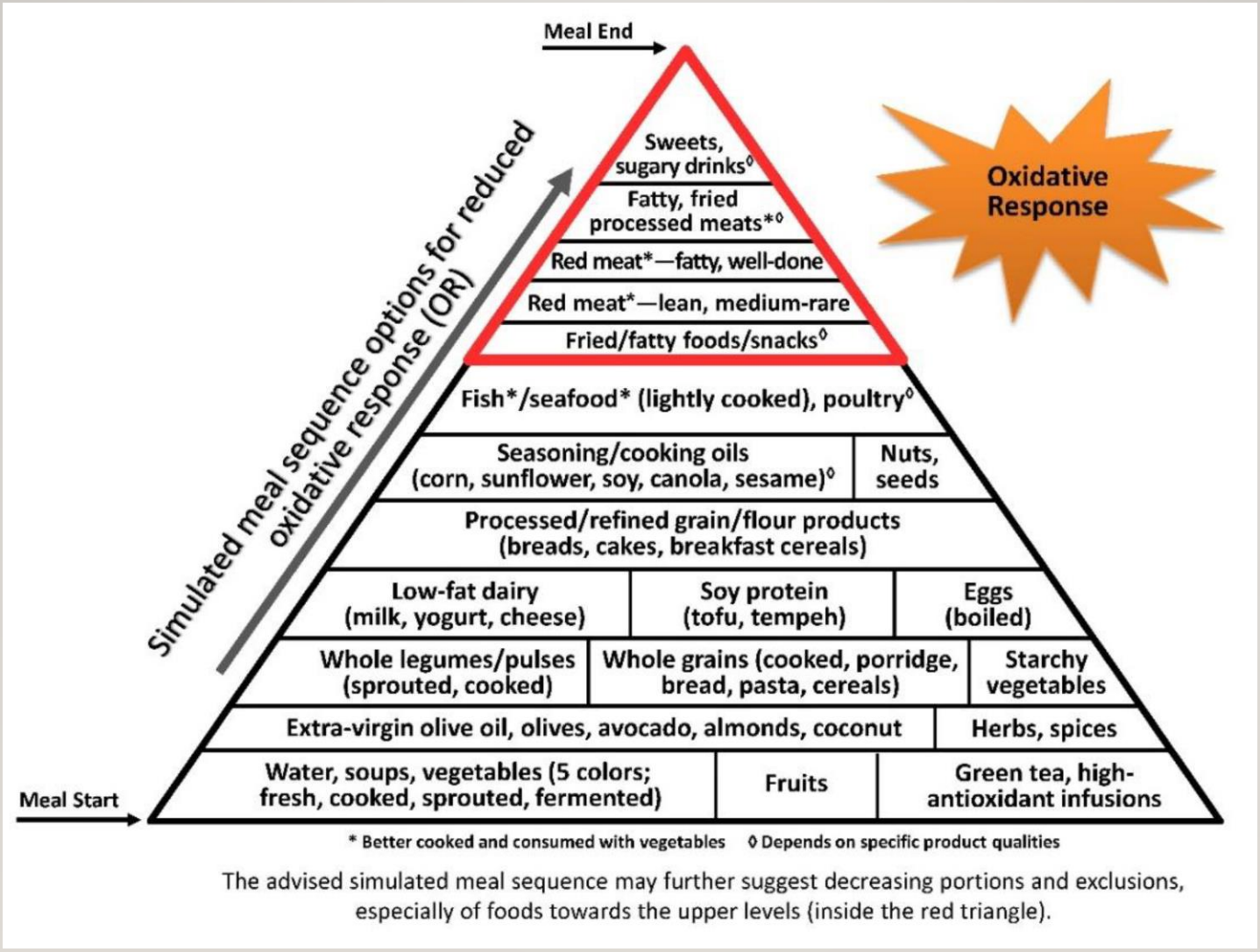

The advised simulated meal sequence may further suggest decreasing portions and exclusions, especially of foods towards the upper levels (inside the red triangle).

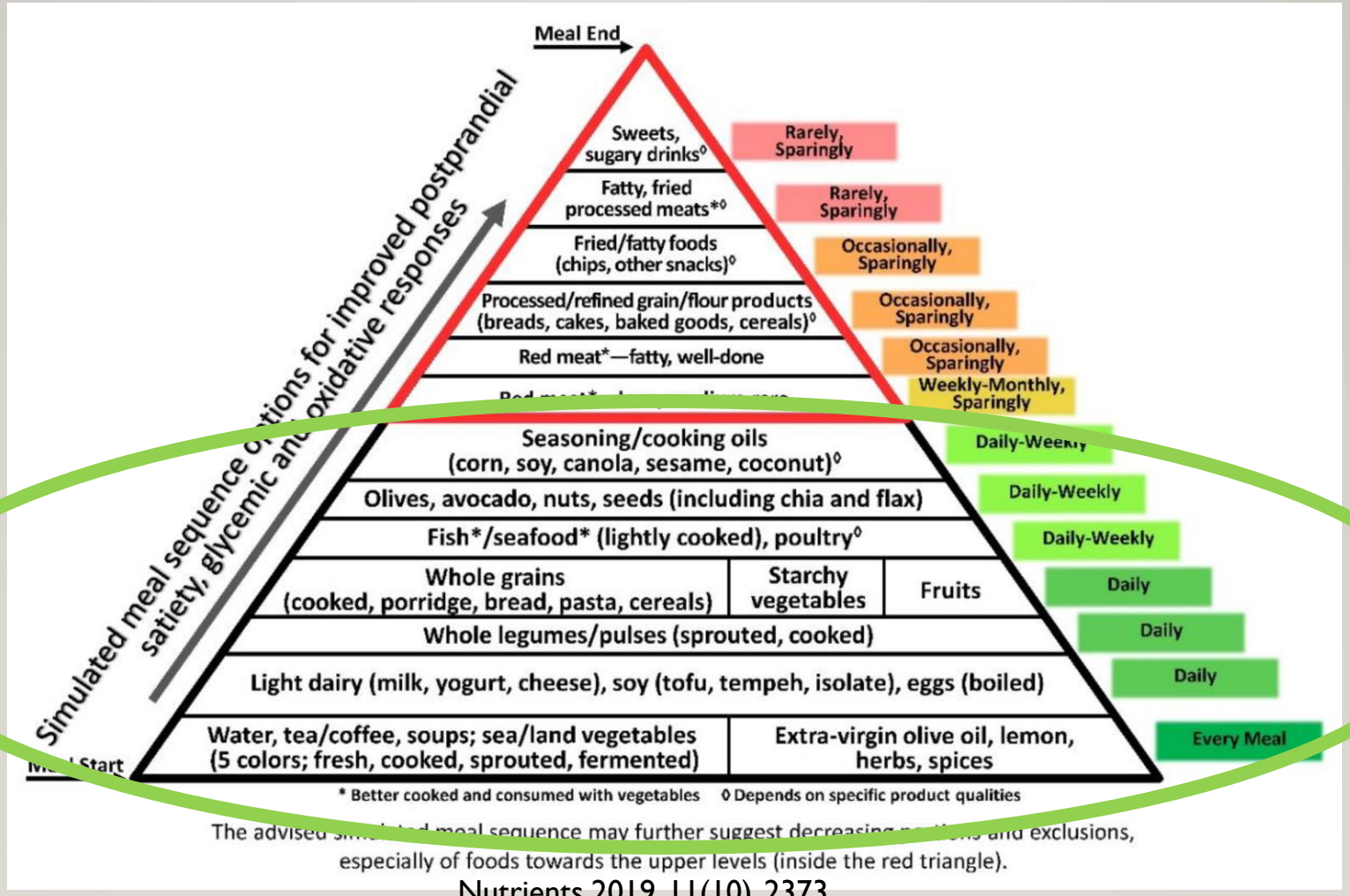

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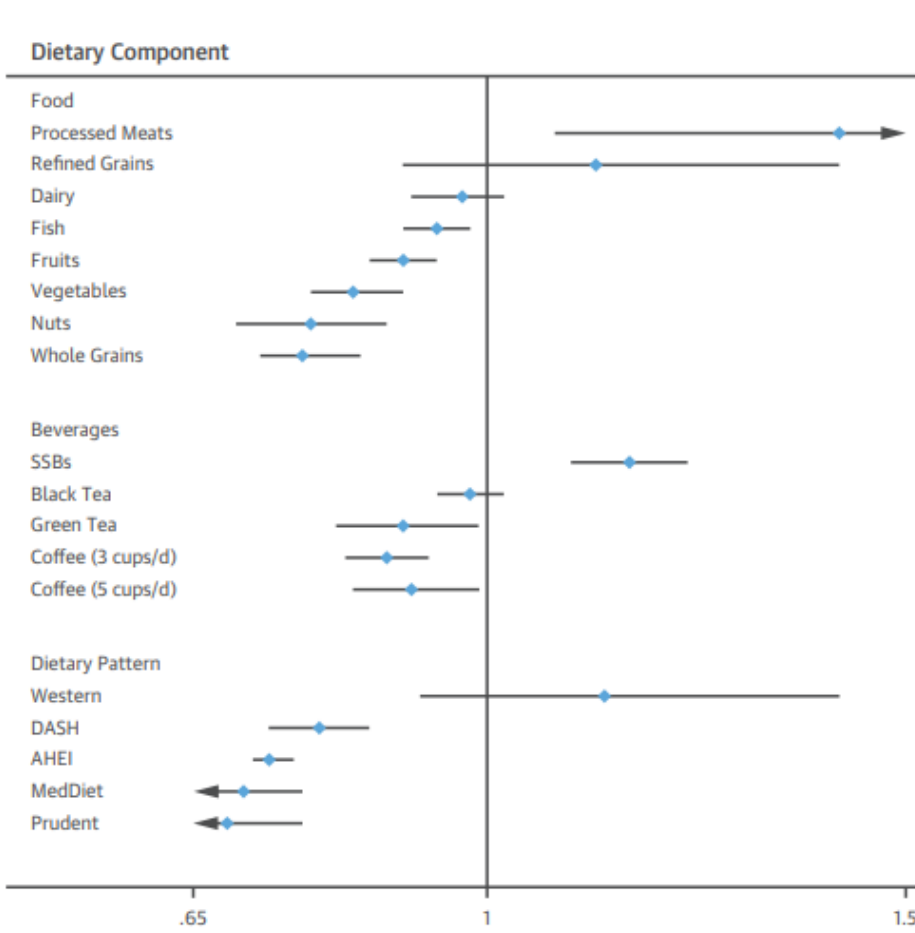
FIGURE 1 **Summary of Various Meta-Analyses for the Associations of Key Foods and Food Groups, and Dietary Patterns With Incident CVD**



Dietary Component	RR (95% CI)	Reference	No. of Studies	Analysis Unit	Outcome
Food					
Processed Meats	1.42 (1.08, 1.89)	Micha 2012	7	Per 50 g/d	CHD Incidence
Refined Grains	1.13 (0.90, 1.42)	Aune 2016	4	Per 90 g/d	CHD Incidence
Dairy	0.97 (0.91, 1.02)	Guo 2017	8	Per 200 g/d	CVD Incidence
Fish	0.94 (0.90, 0.98)	Zheng 2012	17	Per 15 g/d	CHD Mortality
Fruits	0.90 (0.86, 0.94)	Aune 2017	24	Per 200 g/d	CVD Incidence
Vegetables	0.84 (0.79, 0.90)	Aune 2017	20	Per 200 g/d	CVD Incidence
Nuts	0.79 (0.70, 0.88)	Aune 2016	12	Per 28 g/d	CVD Incidence
Whole Grains	0.78 (0.73, 0.85)	Aune 2016	10	Per 90 g/d	CVD Incidence
Beverages					
SSBs	1.17 (1.10, 1.24)	Xi 2015	4	Per serv/d	CHD Incidence
Black Tea	0.98 (0.94, 1.02)	Wang 2011	13	Per 1 cup/d	CHD Incidence
Green Tea	0.90 (0.82, 0.99)	Wang 2011	5	Per 1 cup/d	CHD Incidence
Coffee (3 cups/d)	0.88 (0.83, 0.93)	Ding 2014	36	vs. nondrinkers	CVD Incidence
Coffee (5 cups/d)	0.91 (0.84, 0.99)	Ding 2014	36	vs. nondrinkers	CVD Incidence
Dietary Pattern					
Western	1.14 (0.92, 1.42)	Rodriguez-Monforte 2015	5	Extreme categories	CVD Incidence
DASH	0.80 (0.74, 0.86)	Salehi-Abargouei 2013	6	Extreme categories	CVD Incidence
AHEI	0.74 (0.72, 0.77)	Schwingshackl 2015	6	Extreme categories	CVD Incidence
MedDiet	0.71 (0.65, 0.78)	Grosso 2015	13	Extreme categories	CVD Incidence
Prudent	0.69 (0.60, 0.78)	Rodriquez-Monforte 2015	5	Extreme categories	CVD Incidence

High amounts of processed meat, SSBs, and refined grain consumption are associated with greater CVD incidence; moderate coffee and alcohol intake, and high fruit/vegetable, dairy (low-fat), whole grain, fish, and nut intake are associated with lower incidence. High adherence to Mediterranean, DASH, AHEI, and Prudent dietary patterns are significantly predictive of lower CVD incidence. AHEI = Alternative Healthy Eating Index; CHD = coronary heart disease; CI = confidence interval; CVD = cardiovascular disease; DASH = Dietary Approaches to Stop Hypertension; MedDiet = Mediterranean diet; RR = risk ratio; SSB = sugar-sweetened beverage.