CVD prevention: update

สมเกียรติ แสงวัฒนาโรจน์ พบ.

สาขาวิชาโรคหัวใจและหลอดเลือด ภาควิชาอายุรศาสตร์

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Primum non nocere
(First, do no harm)

CVD prevention in ♀- 2011 update

AHA guidelines. Mosca L. Circulation Mar 22,2011

Table 1. Class III Interventions (Not Useful/Effective and May Be Harmful) for the Prevention of CVD in Women

X **Menopausal therapy**

Hormone therapy and selective estrogen-receptor modulators (SERMs) should not be used for the primary or secondary prevention of CVD (*Class III, Level of Evidence A).*

X **Antioxidant Supplements**

Antioxidant vitamin supplements (eg, vitamin E, C, and beta carotene) should not be used for the primary or secondary prevention of CVD (*Class III, Level of Evidence A).*

X **Folic Acid***

Folic Acid, with or without B6 and B12 supplementation, should not be used for the primary or secondary prevention of CVD (*Class III, Level of Evidence A).*

X **Aspirin for MI in women <65 years of age**

Routine use of aspirin in healthy women <65 years of age is not recommended to prevent MI (*Class III, Level of Evidence B*).

CVD indicates cardiovascular disease; MI, myocardial infarction.

*Folic acid supplementation should be used in the childbearing years to prevent neural tube defects.

Antioxidant supplements 1ry & 2ry prevention

Bjelakovic G. JAMA. 2007;297:842-857

- Electronic databases & bibliographies published by Oct 2005.
- Randomized trials, adults, beta carotene, vitamin A, vitamin C (ascorbic acid), vitamin E & selenium either singly or combined vs placebo or vs no intervention.
- Randomization, blinding, and follow-up: markers of bias.
- The effect of antioxidant supplements on all-cause mortality: random-effects meta-analyses as RR with 95% CIs. Meta-regression to assess the effect of covariates across the trials.
- **68** การศึกษาข้างหน้าแบบสุ่ม**Randomized trials (** จำนวน **n = 232,606 from 385** บทความ **publications).**

เบต้าแคโรทีน ๖ การศึกษา หรือ ร่วมกับอาหารเสริมอื่น ๑๒ การศึกษา เพิ่มโอกาสตาย ๖ และ ๗% ตามลำดับเมื่อเทียบยาหลอก หลังจากปรับปัจจัยอื่น

Bjelakovic G. JAMA. 2007;297:842-857

Table 5. Intervention Effects of Different Antioxidant Supplements vs Placebo or No Intervention on Mortality

Experimental Antioxidant Supplements	References	No. of Trials	No. of Participants	Random-Effects Model Meta-analysis: Relative Risk (95% Confidence Interval)	Heterogeneity I^2, %
Beta carotene given singly	37, 44, 50, 60, 62, 83	6	40977	1.06 (1.01-1.11)	5.4
Beta carotene given in combination with other antioxidant supplements	39, 41-44, 54, 59, 62-65, 68, 71-73, 79, 81, 83, 85, 86, 91, 94	22	139572	1.01 (0.94-1.08)	55.6
Beta carotene given singly or in combination with other antioxidant supplements	37, 39, 41-44, 50, 54, 59, 60, 62-65, 68, 71-73, 79, 81, 83, 85, 86, 91, 94	25	172811	1.01 (0.96-1.08)	52.2
Beta carotene given singly or in combination with other antioxidant supplements after exclusion of high-bias risk and selenium trials	37, 44, 50, 60, 62-64, 71, 73, 83, 85, 94	12	132610	1.07 (1.02-1.11)	36.8

วิตามินเอ หรือ ร่วมกับอาหารเสริมอื่น ๕ การศึกษา

เพิ่มโอกาสตาย ๑๖% เมื่อเทียบกับยาหลอก หลังจากปรับปัจจัยอื่น

Bjelakovic G. JAMA. 2007;297:842-857

Table 5. Intervention Effects of Different Antioxidant Supplements vs Placebo or No Intervention on Mortality

Experimental Antioxidant Supplements	References	No. of Trials	No. of Participants	Random-Effects Model Meta-analysis: Relative Risk (95% Confidence Interval)	Heterogeneity I^2, %
Vitamin A given singly	40, 55	2	2406	1.18 (0.84-1.68)	0
Vitamin A given in combination with other antioxidant supplements	38, 39, 41, 42, 45, 51, 52, 57, 72, 84, 85, 91, 92, 101	14	42 431	1.03 (0.90-1.19)	33.9
Vitamin A given singly or in combination with other antioxidant supplements	38-42, 45, 51, 52, 55, 57, 72, 84, 85, 91, 92, 101	16	44 837	1.05 (0.93-1.19)	26.1
Vitamin A given singly or in combination with other antioxidant supplements after exclusion of high-bias risk and selenium trials	40, 45, 55, 85, 92	5	21 677	1.16 (1.10-1.24)	0

วิตามิน อี หรือ ร่วมกับอาหารเสริม

เพิ่มโอกาสตาย ๔% ใน ๒๖ การศึกษา เทียบกับยาหลอก หลังปรับปัจจัยอื่น

Bjelakovic G. JAMA. 2007;297:842-857

Table 5. Intervention Effects of Different Antioxidant Supplements vs Placebo or No Intervention on Mortality

Experimental Antioxidant Supplements	References	No. of Trials	No. of Participants	Random-Effects Model Meta-analysis: Relative Risk (95% Confidence Interval)	Heterogeneity I^2, %
Vitamin E given singly	35, 46, 47, 53, 56, 58, 61, 66, 69, 70, 72, 74, 77, 78, 80, 82, 83, 87, 88, 90, 93, 96, 97, 99	24	47 007	1.02 (0.98-1.05)	0
Vitamin E given in combination with other antioxidant supplements	36, 38, 39, 41-45, 52, 54, 57, 59, 61, 63-65, 67-69, 71-73, 75, 76, 79, 80, 83, 84, 86, 89, 91, 92, 94, 98, 100, 101	36	128 737	1.01 (0.95-1.06)	17.2
Vitamin E given singly or in combination with other antioxidant supplements	35, 36, 38, 39, 41-47, 52-54, 56-59, 61, 63-65, 67-69, 71-73, 75, 76, 79, 80, 83, 84, 86, 89, 91, 92, 94, 98, 100, 101	55	163 510	1.01 (0.98-1.05)	2.8
Vitamin E given singly or in combination with other antioxidant supplements after exclusion of high-bias risk and selenium trials	44, 45, 53, 61, 63, 64, 66, 71, 73-78, 80, 83, 88, 90, 92-98, 100	26	105 065	1.04 (1.01-1.07)	0

Antioxidant supplement not prevent GI cancer but ↑ death. Bjelakovic G. Cochrane Rev 2008, Issue3.

- 20 randomised trials (211,818 participants), assessing beta-carotene (12 trials), vitamin A (4 trials), vitamin C (8 trials), vitamin E (10 trials), and selenium (9 trials).
- Trials quality was generally high. Heterogeneity was low to moderate.
- ๒๐ การศึกษาในประชากร ๒ แสนกว่าคน ในเบต้าแคโรทีน ๑๒, วิตามินเอ ๔, วิตามิน ซี ๘, วิตามิน อี ๑๐, และ เซเรเนียม ๙ การศึกษา

Antioxidant supplement not prevent GI cancer but ↑ death. Bjelakovic G. Cochrane Rev 2008, Issue3.

- We could not find convincing evidence that antioxidant supplements prevent gastrointestinal cancers.
- On the contrary, antioxidant supplements seem to increase overall mortality.
- ไม่พบหลักฐานว่า วิตามินเสริมต้านอนุมูลอิสระป้องกันมะเร็งทางเดินอาหาร แต่.. กลับเพิ่มการตายโดยรวม

Antioxidant supplement not prevent GI cancer but ↑ death. Bjelakovic G. Cochrane Rev 2008, Issue3.

- Beta-carotene in combination with vitamin A (RR 1.16, 95%CI 1.09 to 1.23) and vitamin E (RR 1.06, 95%CI 1.02 to 1.11) significantly increased mortality.
- **เบต้าแคโรทีน ร่วมกับ วิตามินเอ เพิ่มโอกาสการตาย** ร้อยละ ๑๖ ถ้า**ร่วมกับ วิตามินอี เพิ่มโอกาสการตาย**ร้อยละ ๖

วิตามิน เกลือแร่กับโอกาสตายในหญิงอเมริกัน ๕๕-๖๙ ปี

Iowa Women's Health Study. Marsu J. Arch Intern Med 2011;171:1625.

- Vitamin & mineral supplements in relation to total mortality in 38,772 older women; mean age 61.6 yrs at baseline in 1986.
- Supplement use was self-reported in 1986, 1997, and 2004. Through December 31, 2008, a total of 15 594 deaths (40.2%) were identified through the State Health Registry of Iowa and the National Death Index.

แคลเซียม<ครึ่งเม็ด/วัน**ลด**โอกาสตายในหญิงอเมริกัน ๕๕-๖๙ ปี

Iowa Women's Health Study. Marsu J. Arch Intern Med 2011;171:1625.

Table 2. Adjusted HR (95% CI) for the Use of Supplements and Risk of Total Mortality in Women Aged 55-69 y at Baseline From the Iowa Women's Health Study[a]

	Cases/Total		HR (95% CI)		
Supplement	Users	Nonusers	Age and Energy Adjusted	Multivariable Adjusted, Version 1[b]	Multivariable Adjusted, Version 2[c]
Multivitamin	5218/12 769	10 161/25 474	1.02 (0.99-1.05)	1.06 (1.02-1.09)[d]	1.06 (1.02-1.10)[d]
Vitamin A	1159/2843	13 694/34 263	0.99 (0.93-1.05)	1.05 (0.98-1.11)	1.06 (0.99-1.13)
Beta-carotene	149/378	15 445/38 394	1.00 (0.85-1.17)	1.07 (0.91-1.26)	1.10 (0.93-1.30)
Vitamin B_6	530/1269	15 064/37 503	1.04 (0.95-1.13)	1.09 (1.00-1.19)	1.10 (1.01-1.21)
Folic acid	220/509	15 374/38 263	1.09 (0.95-1.24)	1.12 (0.98-1.29)	1.15 (1.00-1.32)
Vitamin B complex	1199/3174	14 395/35 598	0.93 (0.87-0.98)	0.99 (0.93-1.05)	1.00 (0.94-1.06)
Vitamin C	4293/10 905	10 812/26 806	0.96 (0.93-0.99)	1.01 (0.97-1.05)	1.01 (0.97-1.05)
Vitamin D	1575/4082	13 327/33 105	0.92 (0.87-0.96)[d]	1.00 (0.95-1.05)	1.00 (0.95-1.06)
Vitamin E	2125/5403	12 771/31 177	0.94 (0.90-0.99)	1.00 (0.95-1.05)	1.01 (0.96-1.05)
Calcium	6454/17 428	8847/20 735	0.83 (0.80-0.85)[d]	0.92 (0.89-0.95)[d]	0.91 (0.88-0.94)[d]
Copper	108/229	15 486/38 543	1.31 (1.08-1.58)[d]	1.42 (1.17-1.72)[d]	1.45 (1.20-1.75)[d]
Iron	1117/2738	13 801/34 443	1.03 (0.97-1.09)	1.09 (1.03-1.17)	1.10 (1.03-1.17)
Magnesium	568/1410	15 026/37 362	0.97 (0.91-1.03)	1.08 (0.99-1.18)	1.08 (1.01-1.15)
Selenium	490/1251	14 328/35 788	0.97 (0.89-1.06)	1.07 (0.97-1.17)	1.09 (0.99-1.19)
Zinc	1064/2635	13 790/34 398	0.97 (0.91-1.03)	1.05 (0.99-1.12)	1.08 (1.01-1.15)

แต่กิน**วิตามินรวม บีหก โฟลิก ธาตุเหล็ก ทองแดง แมกนีเซียม และ สังกะสี เพิ่ม**โอกาสตายจากทุกสาเหตุ

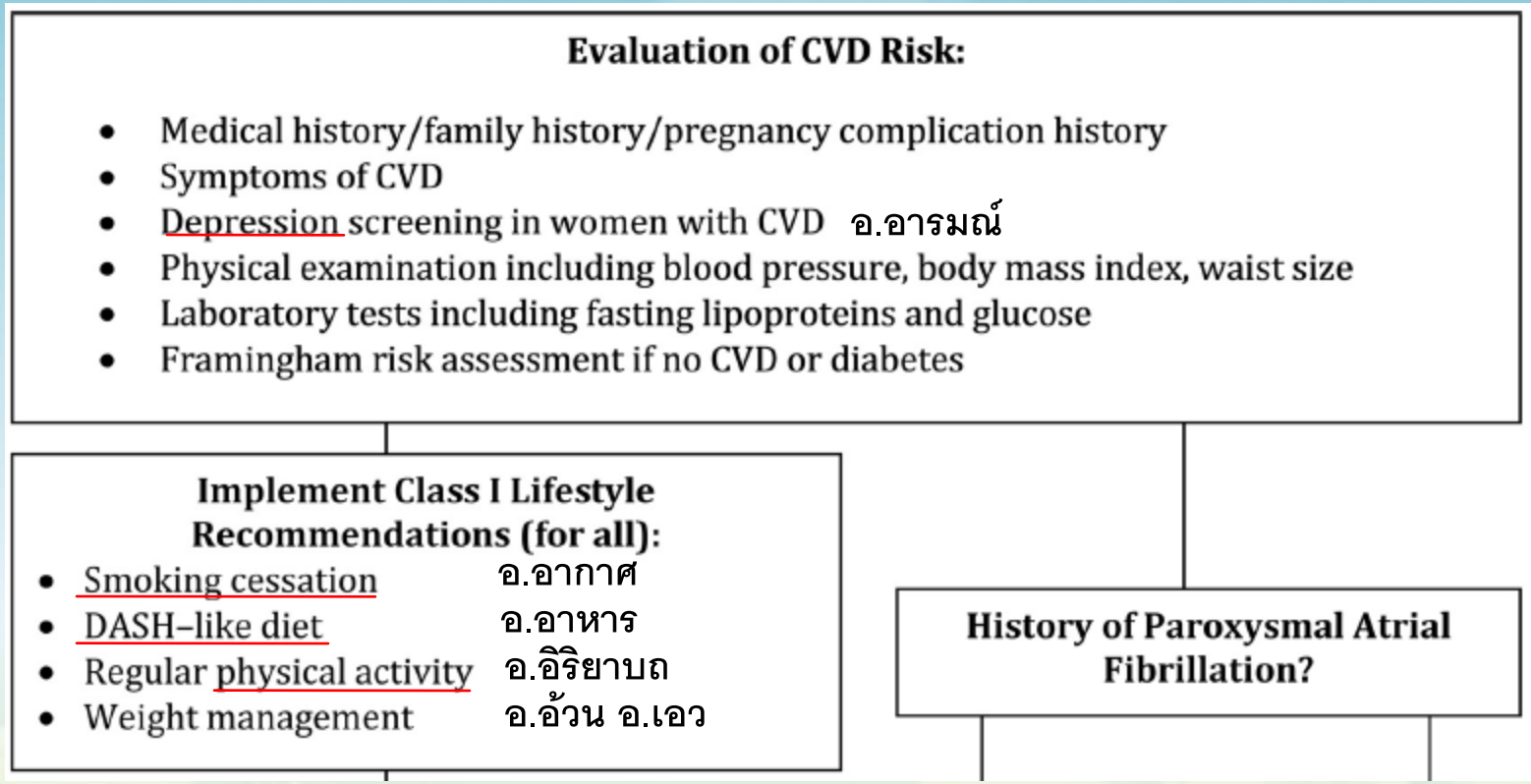
คำ(ไม่)แนะนำอาหารเสริมวิตามินและเกลือแร่

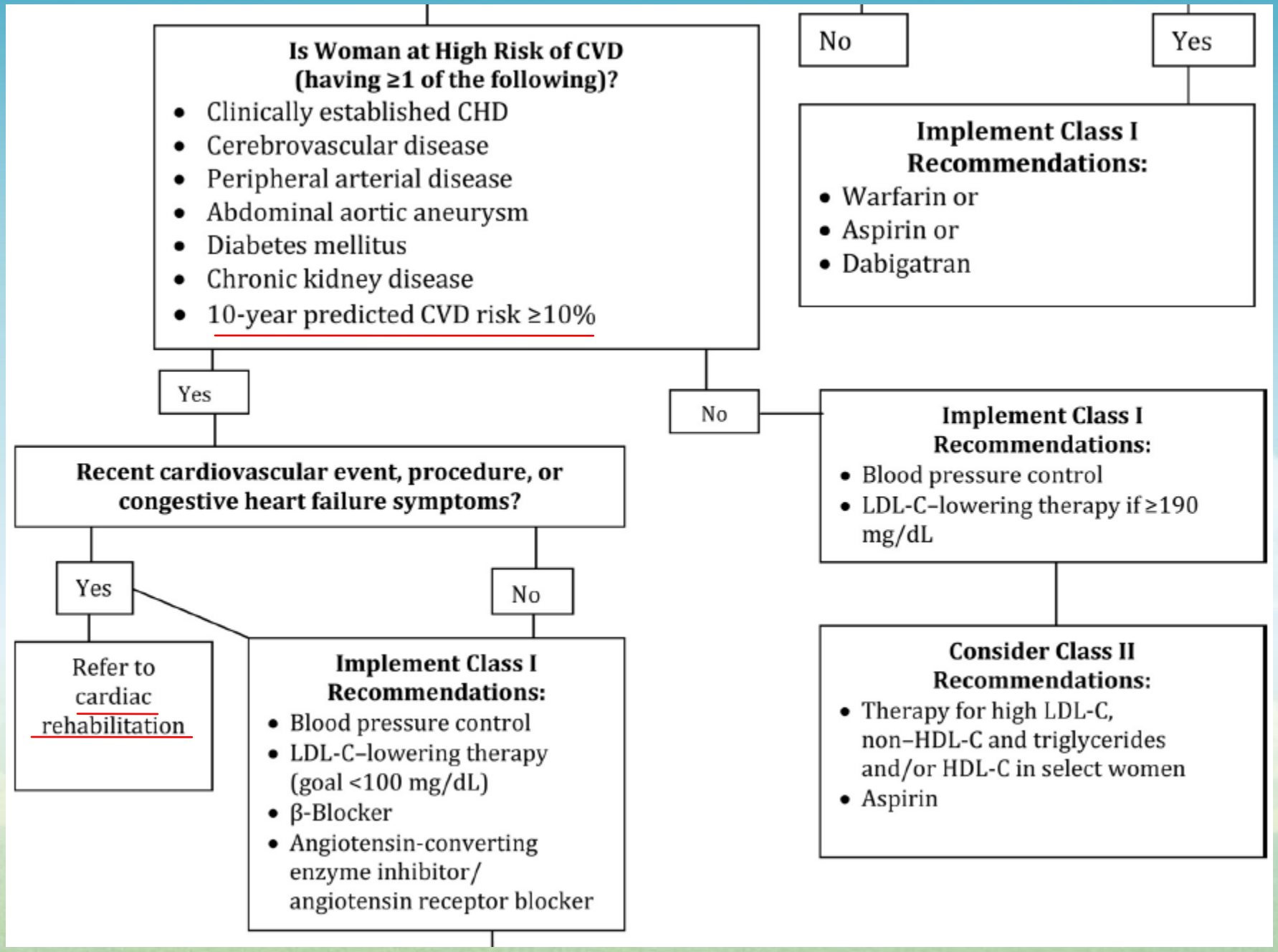
Bjelakovic G. Arch Intern Med 2011;171L1633

- We **cannot** recommend the use of vitamin and mineral supplements as a preventive measure, at least not in a well-nourished population.
- Those supplements do **not replace** or add to the benefits of eating fruits and vegetables and may cause unwanted health consequences.
- Consumption of a varied, healthful diet seems to be a prudent preventive strategy.

CVD prevention in ♀- 2011 update

AHA guidelines. Mosca L. Circulation Mar 22,2011




Is Woman at High Risk of CVD (having ≥1 of the following)?
Clinically established CHD
Cerebrovascular disease
Peripheral arterial disease
Abdominal aortic aneurysm
Diabetes mellitus
Chronic kidney disease
10-year predicted CVD risk ≥10%
No
Yes
Implement Class I Recommendations:
Warfarin or
Aspirin or
Dabigatran
Yes
No
Recent cardiovascular event, procedure, or congestive heart failure symptoms?
Implement Class I Recommendations:
Blood pressure control
LDL-C–lowering therapy if ≥190 mg/dL
Yes
No
Refer to cardiac rehabilitation
Implement Class I Recommendations:
Blood pressure control
LDL-C–lowering therapy (goal <100 mg/dL)
β-Blocker
Angiotensin-converting enzyme inhibitor/ angiotensin receptor blocker
Consider Class II Recommendations:
Therapy for high LDL-C, non–HDL-C and triglycerides and/or HDL-C in select women
Aspirin

CVD prevention in ♀- 2011 update

Appendix. Specific Dietary Intake Recommendations

Nutrient	Serving
Fruits and vegetables	≥4.5 cups/d
Fish	2/wk
Fiber	30 g/d (1.1 g/10 g carbohydrate)
Whole grains	3/d
Sugar	≤5/wk (≤450 kcal/wk from sugar-sweetened beverages)
Nuts, legumes, and seeds	≥4/wk
Saturated fat	<7%/total energy intake
Cholesterol	<150 mg/d
Alcohol	≤1/d
Sodium	<1500 mg/d
Trans-fatty acids	0

AHA/ACCF Guideline

AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary and Other Atherosclerotic Vascular Disease: 2011 Update

A Guideline From the American Heart Association and American College of Cardiology Foundation

Endorsed by the World Heart Federation and the Preventive Cardiovascular Nurses Association

Smith SC. Circulation Nov 29,2011.
DOI: 10.1161/CIR.0b013e318235eb4d

AHA/ACCF 2^{ry} Prevention & Risk Reduction Therapy for Coronary & Other Atherosclerotic Vascular Disease Pts, 2011: Smoking

Area for Intervention	Recommendations
Smoking **5A.** Goal: Complete cessation. No exposure to environmental tobacco smoke	**Class I** 1. Patients should be asked about tobacco use status at every office visit.[2,3,4,5,7] ***(Level of Evidence: B)*** 2. Every tobacco user should be advised at every visit to quit.[4,5,7,9] ***(Level of Evidence: A)*** 3. The tobacco user's willingness to quit should be assessed at every visit. ***(Level of Evidence: C)*** 4. Patients should be assisted by counseling and by development of a plan for quitting that may include pharmacotherapy and/or referral to a smoking cessation program.[4–9] ***(Level of Evidence: A)*** 5. Arrangement for follow up is recommended. ***(Level of Evidence: C)*** 6. All patients should be advised at every office visit to avoid exposure to environmental tobacco smoke at work, home, and public places.[10,11] ***(Level of Evidence: B)***

AHA/ACCF 2ry Prevention & Risk Reduction Therapy for Coronary & Other Atherosclerotic Vascular Disease Pts, 2011: BP

Area for Intervention	Recommendations
Blood pressure control Goal: <140/90 mm Hg	**Note: The writing committee did not think that the 2006 recommendations for blood pressure control (below) should be modified at this time. The writing committee anticipates that the recommendations will be reviewed when the updated JNC guidelines are released.** Class I 1. All patients should be counseled regarding the need for lifestyle modification: weight control; increased physical activity; alcohol moderation; sodium reduction; and emphasis on increased consumption of fresh fruits, vegetables, and low-fat dairy products.[12–16] ***(Level of Evidence: B)*** 2. Patients with blood pressure ≥140/90 mm Hg should be treated, as tolerated, with blood pressure medication, treating initially with β-blockers and/or ACE inhibitors, with addition of other drugs as needed to achieve goal blood pressure.[12,17,18] ***(Level of Evidence: A)***

AHA/ACCF 2ry Prevention & Risk Reduction Therapy for Coronary & Other Atherosclerotic Vascular Disease Pts, 2011: Lipid

Area for Intervention	Recommendations
Lipid management Goal: Treatment with statin therapy; use statin therapy to achieve an LDL-C of <100 mg/dL; for very high risk* patients an LDL-C <70 mg/dL is reasonable; if triglycerides are ≥200 mg/dL, non–HDL-C† should be <130 mg/dL, whereas non–HDL-C <100 mg/dL for very high risk patients is reasonable	**Note: The writing committee anticipates that the recommendations will be reviewed when the updated ATP guidelines are released.** **Class I** 1. A lipid profile in all patients should be established, and for hospitalized patients, lipid-lowering therapy as recommended below should be initiated before discharge.[20] ***(Level of Evidence: B)*** 2. Lifestyle modifications including daily physical activity and weight management are strongly recommended for all patients.[19,29] ***(Level of Evidence: B)*** 3. Dietary therapy for all patients should include reduced intake of saturated fats (to <7% of total calories), *trans* fatty acids (to <1% of total calories), and cholesterol (to <200 mg/d).[21–24,29] ***(Level of Evidence: B)*** 4. In addition to therapeutic lifestyle changes, statin therapy should be prescribed in the absence of contraindications or documented adverse effects.[25–29] ***(Level of Evidence: A)*** 5. An adequate dose of statin should be used that reduces LDL-C to <100 mg/dL AND achieves at least a 30% lowering of LDL-C.[25–29] ***(Level of Evidence: C)*** 6. Patients who have triglycerides ≥200 mg/dL should be treated with statins to lower non–HDL-C to <130 mg/dL.[25–27,30] ***(Level of Evidence: B)*** 7. Patients who have triglycerides >500 mg/dL should be started on fibrate therapy in addition to statin therapy to prevent acute pancreatitis. ***(Level of Evidence: C)***

AHA/ACCF 2ry Prevention & Risk Reduction Therapy for Coronary & Other Atherosclerotic Vascular Disease Pts, 2011: Physical Activity

Area for Intervention	Recommendations
Physical activity Goal: At least 30 minutes, 7 days per week (minimum 5 days per week)	**Class I** 1. For all patients, the clinician should encourage 30 to 60 minutes of moderate-intensity aerobic activity, such as brisk walking, at least 5 days and preferably 7 days per week, supplemented by an increase in daily lifestyle activities (eg, walking breaks at work, gardening, household work) to improve cardiorespiratory fitness and move patients out of the least fit, least active high-risk cohort (bottom 20%).[54,55,58] ***(Level of Evidence: B)*** 2. For all patients, risk assessment with a physical activity history and/or an exercise test is recommended to guide prognosis and prescription.[47–52,58] ***(Level of Evidence: B)*** 3. The clinician should counsel patients to report and be evaluated for symptoms related to exercise. ***(Level of Evidence: C)*** **Class IIa** 1. It is reasonable for the clinician to recommend complementary resistance training at least 2 days per week.[59] ***(Level of Evidence: C)***

AHA/ACCF 2ry Prevention & Risk Reduction Therapy for Coronary & Other Atherosclerotic Vascular Disease Pts, 2011: Wt. Management

Area for Intervention	Recommendations
Weight management Goals: Body mass index: 18.5 to 24.9 kg/m^2 Waist circumference: women <35 inches (<89 cm), men <40 inches (<102 cm)	**Class I** 1. Body mass index and/or waist circumference should be assessed at every visit, and the clinician should consistently encourage weight maintenance/reduction through an appropriate balance of lifestyle physical activity, structured exercise, caloric intake, and formal behavioral programs when indicated to maintain/achieve a body mass index between 18.5 and 24.9 kg/m^2.[60–62,65–70] ***(Level of Evidence: B)*** 2. If waist circumference (measured horizontally at the iliac crest) is ≥35 inches (≥89 cm) in women and ≥40 inches (≥102 cm) in men, therapeutic lifestyle interventions should be intensified and focused on weight management.[66–70] ***(Level of Evidence: B)*** 3. The initial goal of weight loss therapy should be to reduce body weight by approximately 5% to 10% from baseline. With success, further weight loss can be attempted if indicated. ***(Level of Evidence: C)***

AHA/ACCF 2ry Prevention & Risk Reduction Therapy for Coronary & Other Atherosclerotic Vascular Disease Pts, 2011: T2DM

Area for Intervention	Recommendations
Type 2 diabetes mellitus management	**Note: Recommendations below are for prevention of cardiovascular complications.** **Class I** 1. Care for diabetes should be coordinated with the patient's primary care physician and/or endocrinologist. ***(Level of Evidence: C)*** 2. Lifestyle modifications including daily physical activity, weight management, blood pressure control, and lipid management are recommended for all patients with diabetes.[19,22-24,29,56,58,59,62,66,74,162] ***(Level of Evidence: B)*** **Class IIa** 1. Metformin is an effective first-line pharmacotherapy and can be useful if not contraindicated.[74–76] ***(Level of Evidence: A)*** 2. It is reasonable to individualize the intensity of blood sugar–lowering interventions based on the individual patient's risk of hypoglycemia during treatment. ***(Level of Evidence: C)*** **Class IIb** 1. Initiation of pharmacotherapy interventions to achieve target HbA1c may be reasonable.[71,72,74-80] ***(Level of Evidence: A)*** 2. A target HbA1c of ≤7% may be considered. ***(Level of Evidence: C)*** 3. Less stringent HbA1c goals may be considered for patients with a history of severe hypoglycemia, limited life expectancy, advanced microvascular or macrovascular complications, or extensive comorbidities, or those in whom the goal is difficult to attain despite intensive therapeutic interventions. ***(Level of Evidence: C)***

Diet & Exercise CHD 2ry prevention

Systematic reiew. Cole JA.Cardiol Res Pract 2011doi:10.4061/2011/232351

- Aimed to determine effectiveness & included randomized controlled trials of lifestyle interventions, in 1ry care or community settings, minimum FU 3 months, published since 1990.
- 21 trials with 10,799 patients were included
- Interventions: multifactorial (10), educational (4), psychological (3), dietary (1), organisational (eg, case managment) (2) & exercise (1).

Diet & Exercise: ↓all cause mortality

Systematic reiew. Cole JA.Cardiol Res Pract 2011doi:10.4061/2011/232351

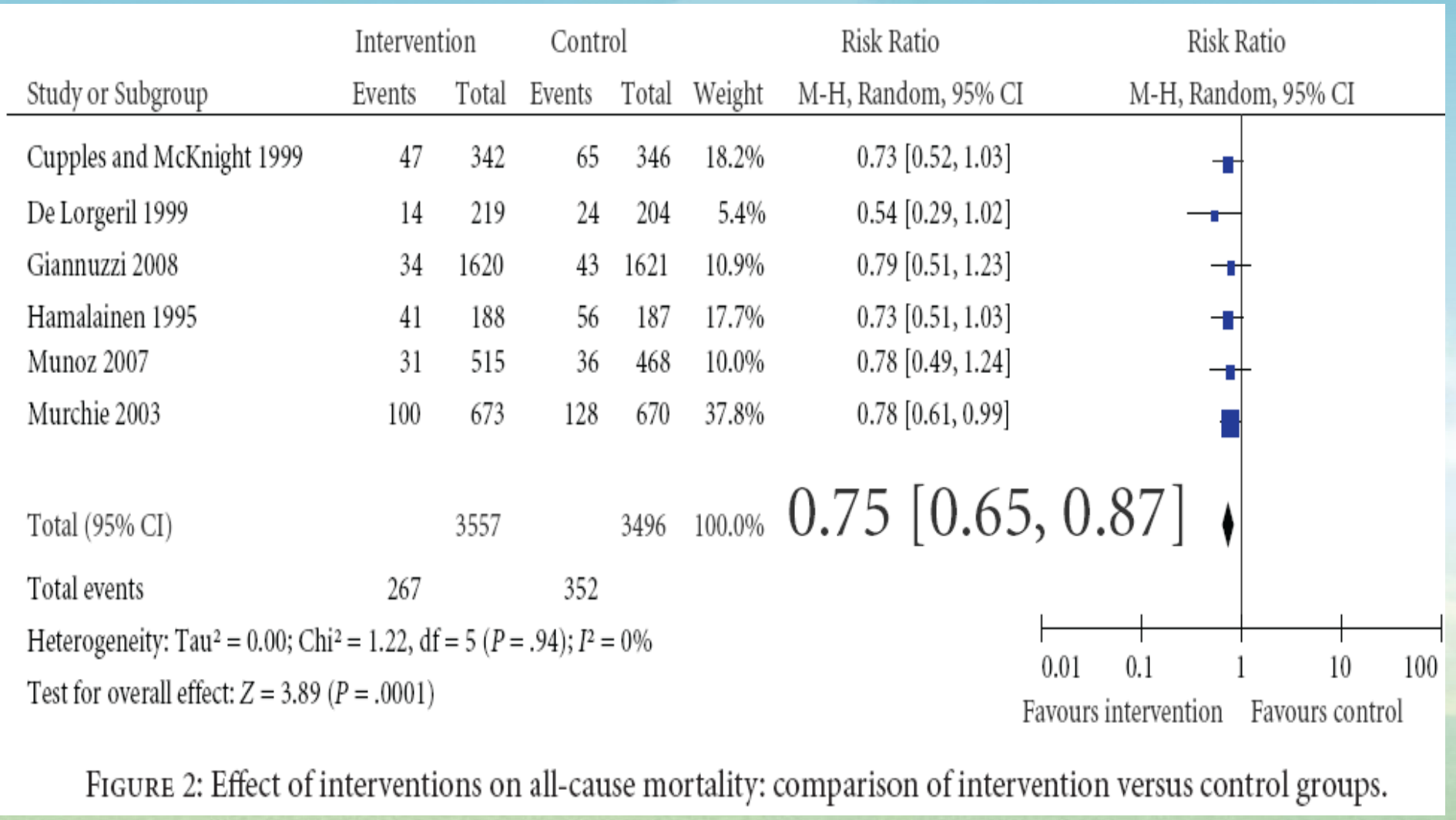
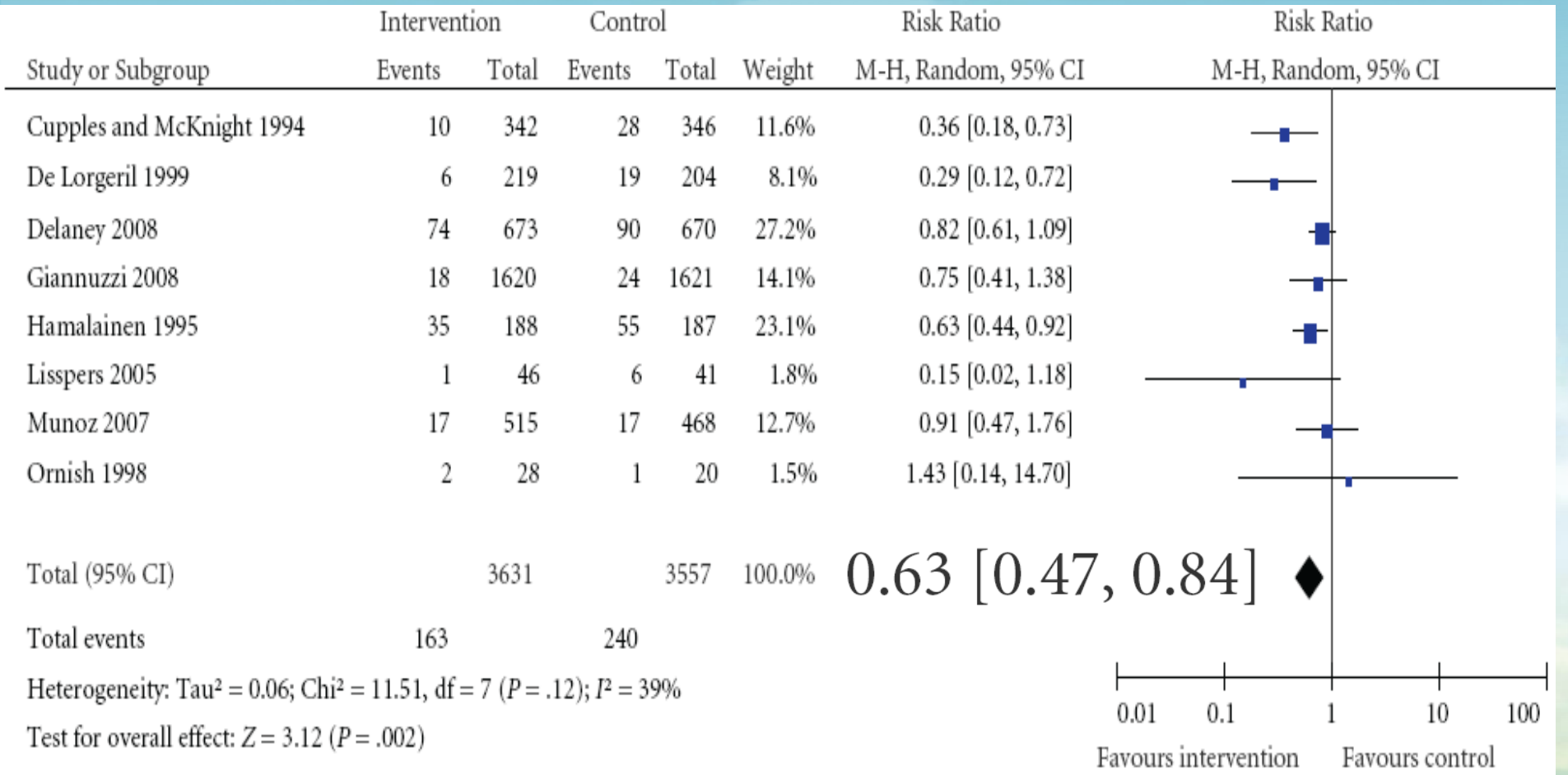


FIGURE 2: Effect of interventions on all-cause mortality: comparison of intervention versus control groups.

Diet & Exercise: ↓CV mortality

Systematic reiew. Cole JA.Cardiol Res Pract 2011doi:10.4061/2011/232351



Study or Subgroup	Intervention Events	Intervention Total	Control Events	Control Total	Weight	Risk Ratio M-H, Random, 95% CI
Cupples and McKnight 1994	10	342	28	346	11.6%	0.36 [0.18, 0.73]
De Lorgeril 1999	6	219	19	204	8.1%	0.29 [0.12, 0.72]
Delaney 2008	74	673	90	670	27.2%	0.82 [0.61, 1.09]
Giannuzzi 2008	18	1620	24	1621	14.1%	0.75 [0.41, 1.38]
Hamalainen 1995	35	188	55	187	23.1%	0.63 [0.44, 0.92]
Lisspers 2005	1	46	6	41	1.8%	0.15 [0.02, 1.18]
Munoz 2007	17	515	17	468	12.7%	0.91 [0.47, 1.76]
Ornish 1998	2	28	1	20	1.5%	1.43 [0.14, 14.70]
Total (95% CI)		3631		3557	100.0%	0.63 [0.47, 0.84]
Total events	163		240			

Heterogeneity: $Tau^2 = 0.06$; $Chi^2 = 11.51$, $df = 7$ ($P = .12$); $I^2 = 39\%$

Test for overall effect: $Z = 3.12$ ($P = .002$)

FIGURE 3: Effect of interventions on cardiovascular mortality: comparison of intervention versus control groups.

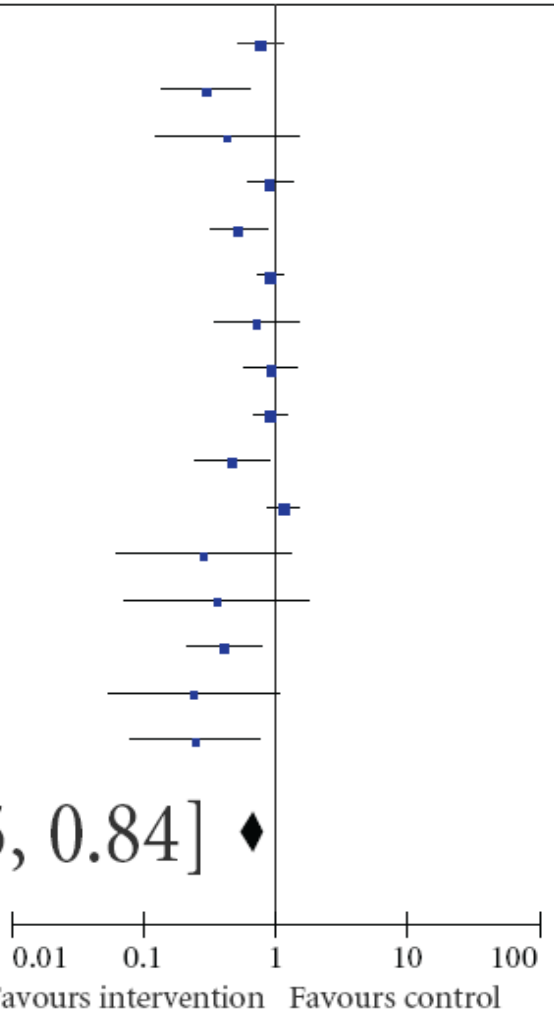
Diet & Exercise: ↓non-fatal H. event

Systematic reiew. Cole JA.Cardiol Res Pract 2011doi:10.4061/2011/232351

Study or Subgroup	Intervention Events	Intervention Total	Control Events	Control Total	Weight	Risk Ratio M-H, Random, 95% CI
DeLorgeril1999 MIRevasc	37	219	45	204	9.3%	0.77 [0.52, 1.13]
DeLorgeril1999 nonfatalMI	8	219	25	204	4.7%	0.30 [0.14, 0.65]
Giallauria 2009	3	26	7	26	2.3%	0.43 [0.12, 1.48]
Giannuzzi2008 CABG	45	1620	50	1621	9.2%	0.90 [0.61, 1.34]
Giannuzzi2008 nonfatal MI	23	1620	44	1621	7.7%	0.52 [0.32, 0.86]
Giannuzzi2008 PCI	144	1620	159	1621	12.2%	0.91 [0.73, 1.12]
Heller1993 C/angioplasty	11	213	17	237	5.0%	0.72 [0.35, 1.50]
Heller1993 CABG	29	213	35	237	8.3%	0.92 [0.58, 1.45]
Heller1993 cardcatheter	60	213	73	237	11.0%	0.91 [0.69, 1.22]
Lisspers 2005	10	46	19	41	6.0%	0.47 [0.25, 0.89]
Munoz 2007	92	515	73	468	11.1%	1.15 [0.87, 1.52]
Ornish1998 CABG	2	28	5	20	1.6%	0.29 [0.06, 1.33]
Ornish1998 nonfatal MI	2	28	4	20	1.5%	0.36 [0.07, 1.76]
Ornish1998 PTCA	8	28	14	20	5.8%	0.41 [0.21, 0.78]
Southard 2003	2	53	8	51	1.7%	0.24 [0.05, 1.08]
Wallner 1999	3	28	14	32	2.6%	0.24 [0.08, 0.77]
Total (95% CI)		6689		6660	100.0%	0.68 [0.55, 0.84]
Total events	479		592			

Heterogeneity: Tau² = 0.08; Chi² = 35.36, df = 15 (P = .002); I^2 = 58%

Test for overall effect: Z = 3.66 (P = .0003)



Diet, Exercise & smoking interventions

Systematic reiew. Cole JA.Cardiol Res Pract 2011doi:10.4061/2011/232351

Table 5: Summary of lifestyle risk findings.

Outcome	Number of studies with this outcome	Number of outcomes	Number significantly improved	Number of outcomes with no significant difference
Exercise	21	37	20	17
Diet	15	51	39	12
Smoking	13	20	7	13

Note: we counted Campbell and Murchie as separate studies as the patients in each were not necessarily the same. Other follow-up studies, Cupples, Ornish, Vestfold, and Redfern we counted as one study but counted the outcomes from each time point as different outcomes (hence the 20 outcomes for the 13 studies reporting smoking outcomes).

AHA/ACCF 2ry Prevention & Risk Reduction Therapy for Coronary & Other Atherosclerotic Vascular Disease Pts, 2011: AntiPlt./AntiCoag.

Area for Intervention	Recommendations
Antiplatelet agents/anticoagulants	**Class I** 1. Aspirin 75–162 mg daily is recommended in all patients with coronary artery disease unless contraindicated.[64,81,82,116] ***(Level of Evidence: A)*** • Clopidogrel 75 mg daily is recommended as an alternative for patients who are intolerant of or allergic to aspirin.[117] ***(Level of Evidence: B)*** 2. A P2Y12 receptor antagonist in combination with aspirin is indicated in patients after ACS or PCI with stent placement.[83–85] ***(Level of Evidence: A)*** • For patients receiving a bare-metal stent or drug-eluting stent during PCI for ACS, clopidogrel 75 mg daily, prasugrel 10 mg daily, or ticagrelor 90 mg twice daily should be given for at least 12 months.[84,86,113,114] ***(Level of Evidence: A)***

AHA/ACCF 2ry Prevention & Risk Reduction Therapy for Coronary & Other Atherosclerotic Vascular Disease Pts, 2011: AntiPlt./AntiCoag.

Area for Intervention	Recommendations

3. For patients undergoing coronary artery bypass grafting, aspirin should be started within 6 hours after surgery to reduce saphenous vein graft closure. Dosing regimens ranging from 100 to 325 mg daily for 1 year appear to be efficacious.[87–90] ***(Level of Evidence: A)***
4. In patients with extracranial carotid or vertebral atherosclerosis who have had ischemic stroke or TIA, treatment with aspirin alone (75–325 mg daily), clopidogrel alone (75 mg daily), or the combination of aspirin plus extended-release dipyridamole (25 mg and 200 mg twice daily, respectively) should be started and continued.[91,104,116] ***(Level of Evidence: B)***
5. For patients with symptomatic atherosclerotic peripheral artery disease of the lower extremity, antiplatelet therapy with aspirin (75–325 mg daily) or clopidogrel (75 mg daily) should be started and continued.[92,107,116,117] ***(Level of Evidence: A)***
6. Antiplatelet therapy is recommended in preference to anticoagulant therapy with warfarin or other vitamin K antagonists to treat patients with atherosclerosis.[93,94,105,110] ***(Level of Evidence: A)***
   - If there is a compelling indication for anticoagulant therapy, such as atrial fibrillation, prosthetic heart valve, left ventricular thrombus, or concomitant venous thromboembolic disease, warfarin should be administered in addition to the low-dose aspirin (75–81 mg daily).[95,99–102] ***(Level of Evidence: A)***
   - For patients requiring warfarin, therapy should be administered to achieve the recommended INR for the specific condition.[81,96] ***(Level of Evidence: B)***
   - Use of warfarin in conjunction with aspirin and/or clopidogrel is associated with increased risk of bleeding and should be monitored closely.[97,98,110] ***(Level of Evidence: A)***

AHA/ACCF 2ry Prevention & Risk Reduction Therapy for Coronary & Other Atherosclerotic Vascular Disease Pts, 2011: RAAS inhibitors

Area for Intervention	Recommendations
Renin-angiotensin-aldosterone system blockers	
ACE inhibitors	**Class I** 1. ACE inhibitors should be started and continued indefinitely in all patients with left ventricular ejection fraction ≤40% and in those with hypertension, diabetes, or chronic kidney disease, unless contraindicated.[124,125] ***(Level of Evidence: A)*** **Class IIa** 1. It is reasonable to use ACE inhibitors in all other patients.[126] ***(Level of Evidence: B)***
ARBs	**Class I** 1. The use of ARBs is recommended in patients who have heart failure or who have had a myocardial infarction with left ventricular ejection fraction ≤40% and who are ACE-inhibitor intolerant.[130–132] ***(Level of Evidence: A)*** **Class IIa** 1. It is reasonable to use ARBs in other patients who are ACE-inhibitor intolerant.[133] ***(Level of Evidence: B)*** **Class IIb** 1. The use of ARBs in combination with an ACE inhibitor is not well established in those with systolic heart failure.[132,134] ***(Level of Evidence: A)***
Aldosterone blockade	**Class I** 1. Use of aldosterone blockade in post–myocardial infarction patients without significant renal dysfunction# or hyperkalemia** is recommended in patients who are already receiving therapeutic doses of an ACE inhibitor and β-blocker, who have a left ventricular ejection fraction ≤40%, and who have either diabetes or heart failure.[136,137] ***(Level of Evidence: A)***

AHA/ACCF 2ry Prevention & Risk Reduction Therapy for Coronary & Other Atherosclerotic Vascular Disease Pts, 2011: Beta-blockers

Area for Intervention	Recommendations
β-Blockers	**Class I** 1. β-Blocker therapy should be used in all patients with left ventricular systolic dysfunction (ejection fraction ≤40%) with heart failure or prior myocardial infarction, unless contraindicated. (Use should be limited to carvedilol, metoprolol succinate, or bisoprolol, which have been shown to reduce mortality.)[138,140,141] ***(Level of Evidence: A)*** 2. β-Blocker therapy should be started and continued for 3 years in all patients with normal left ventricular function who have had myocardial infarction or ACS.[139,142,143] ***(Level of Evidence: B)*** **Class IIa** 1. It is reasonable to continue β-blockers beyond 3 years as chronic therapy in all patients with normal left ventricular function who have had myocardial infarction or ACS.[139,142,143] ***(Level of Evidence: B)*** 2. It is reasonable to give β-blocker therapy in patients with left ventricular systolic dysfunction (ejection fraction ≤40%) without heart failure or prior myocardial infarction. ***(Level of Evidence: C)*** **Class IIb** 1. β-Blockers may be considered as chronic therapy for all other patients with coronary or other vascular disease. ***(Level of Evidence: C)***

AHA/ACCF 2ry Prevention & Risk Reduction Therapy for Coronary & Other Atherosclerotic Vascular Disease Pts, 2011: Vaccine, Depression

Area for Intervention	Recommendations
Influenza vaccination	Class I 1. Patients with cardiovascular disease should have an annual influenza vaccination.[144–147] *(Level of Evidence: B)*
Depression	Class IIa 1. For patients with recent coronary artery bypass graft surgery or myocardial infarction, it is reasonable to screen for depression if patients have access to case management, in collaboration with their primary care physician and a mental health specialist.[148–152] *(Level of Evidence: B)* Class IIb 1. Treatment of depression has not been shown to improve cardiovascular disease outcomes but may be reasonable for its other clinical benefits. *(Level of Evidence: C)*

Psycho-neuro-endocrino-immuno-cardiology ?

Behavior & acute coronary syndrome. Gidron Y. Cardiovascular Research 2002; 56: 15-21

Psychological, neuroendocrine, immunological and hemodynamic factors in the acute coronary syndrome

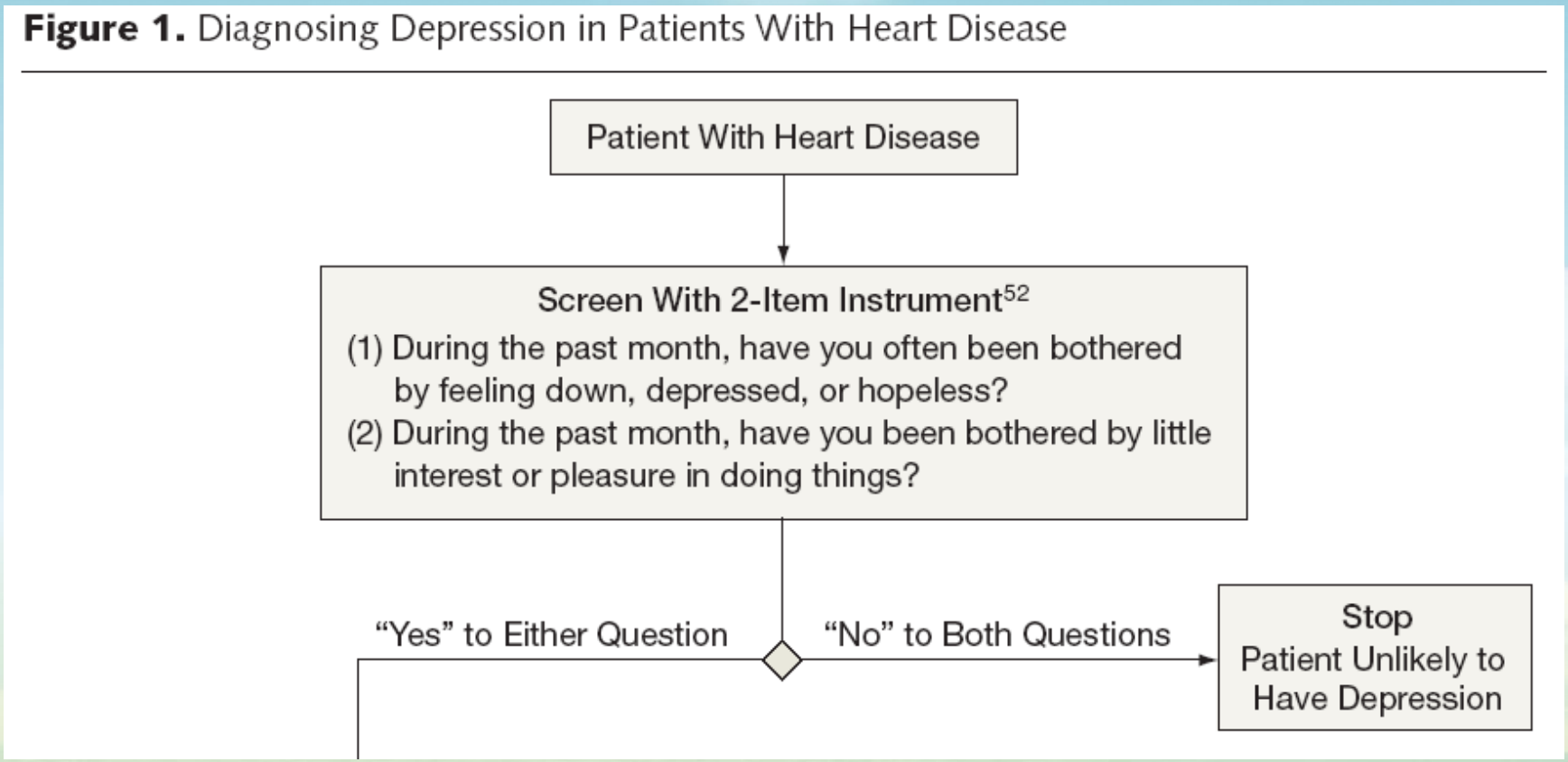
Psychological factors	Neuroendocrine factors	Immune and cell factors	Hemodynamic factors	Acute coronary syndrome stage
Hostility, depression, acute stress and vital exhaustion	Norepinephrine, CRH, ACTH, Cortisol	IL-1β, IL-6, TNF-α, IFN-γ, monocytes, MMPs		Plaque instability
Hostility and acute stress	Norepinephrine Epinephrine	IL-1β, IL-6, TNF-α	Vasoconstriction, elevated BP, shear stress	Plaque rupture
Hostility, depression	Epinephrine	IL-1β, IL-6, TNF-α,	Pro-coagulant and anti-coagulant factors (C-protein)	Thrombosis⇒ acute coronary syndrome

CRH, corticotrophic releasing hormone; ACTH, adrenocorticotrophic hormone; IL, interleukin; TNF, tumor necrosis factor; IFN, interferon; BP, blood pressure; MMPs, metalloproteinases.

Depression & CVD

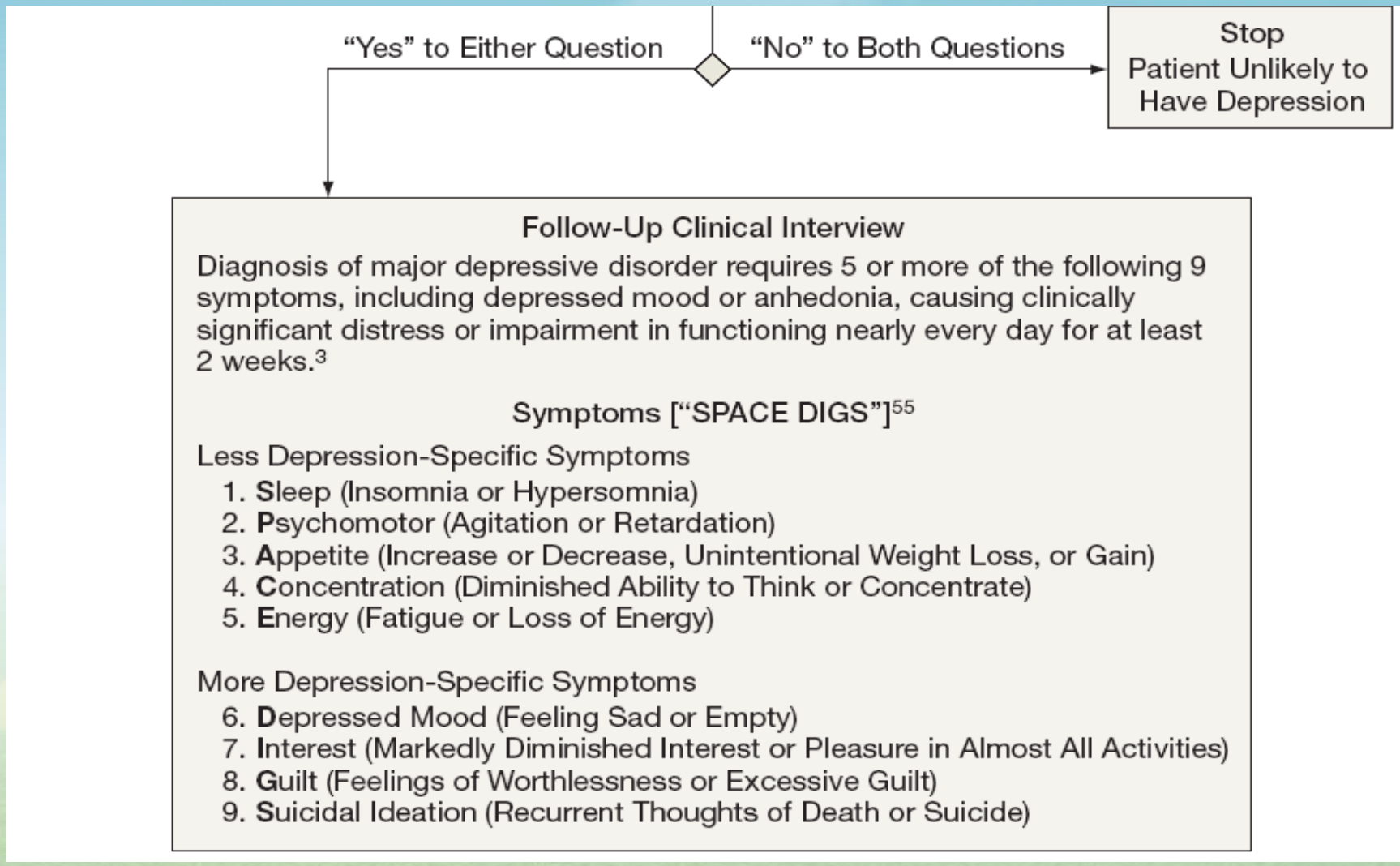
Whooley MA. JAMA 2006;295:2874-81

Figure 1. Diagnosing Depression in Patients With Heart Disease



Depression & CHD

Whooley MA. JAMA 2006;295:2874-81



AHA Science Advisory

Depression and Coronary Heart Disease

Recommendations for Screening, Referral, and Treatment

A Science Advisory From the American Heart Association Prevention Committee of the Council on Cardiovascular Nursing, Council on Clinical Cardiology, Council on Epidemiology and Prevention, and Interdisciplinary Council on Quality of Care and Outcomes Research

Endorsed by the American Psychiatric Association

Judith H. Lichtman, PhD, MPH, Co-Chair; J. Thomas Bigger, Jr, MD;
James A. Blumenthal, PhD, ABPP; Nancy Frasure-Smith, PhD; Peter G. Kaufmann, PhD;
François Lespérance, MD; Daniel B. Mark, MD, MPH; David S. Sheps, MD, MSPH;
C. Barr Taylor, MD; Erika Sivarajan Froelicher, RN, MA, MPH, PhD, Co-Chair

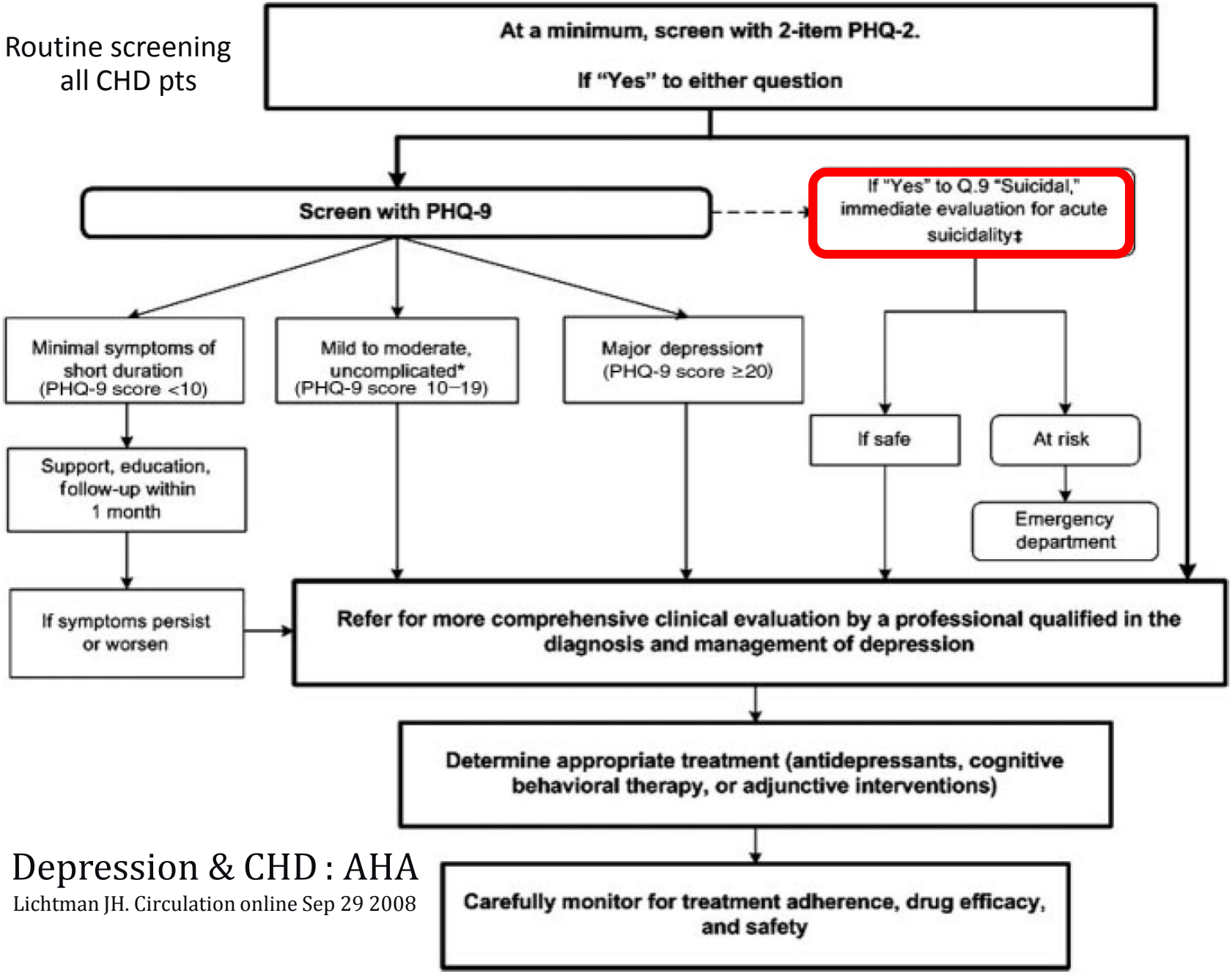
Abstract—Depression is commonly present in patients with coronary heart disease (CHD) and is independently associated with increased cardiovascular morbidity and mortality. Screening tests for depressive symptoms should be applied to identify patients who may require further assessment and treatment. This multispecialty consensus document reviews the evidence linking depression with CHD and provides recommendations for healthcare providers for the assessment, referral, and treatment of depression. **(*Circulation.* 2008;118:0-0.)**

Circulation 2008 Oct 21;118:1768-75

Patient Health Questionnaire-9

ท่านมีอาการต่อไปนี้มากเพียงใด ใน ๒ สัปดาห์	ไม่เลย	ไม่เกินครึ่ง	เกินครึ่ง	ทุกวัน
๑.นอนหลับยาก หลับน้อยหรือมากเกินไป(S)	0	1	2	3
๒. รู้สึกเหนื่อย เพลีย หรือ ไม่มีเรี่ยวแรง (P)	0	1	2	3
๓.ไม่อยากอาหาร/อยากอาหารมากเกินไป(A)	0	1	2	3
๔.ไม่มีสมาธิ อ่านหนังสือ ดูทีวีไม่รู้เรื่อง(C)	0	1	2	3
๕.มีคนทักว่าทำอะไรช้า /เร็วเกินกว่าปกติ(E)	0	1	2	3
๖. รู้สึกตกต่ำ ซึมเศร้า หรือ หมดหวัง(D)	0	1	2	3
๗.ทำอะไรด้วยความไม่สบายใจ/ไม่สนใจ(I)	0	1	2	3
๘.รู้สึกตัวเองไร้ค่า แย่ ทำให้ครอบครัวตกต่ำ(G)	0	1	2	3
๙.คิดจะทำร้ายตัวเอง หรือ ตายเสียดีกว่า(S)	0	1	2	3

Routine screening all CHD pts



Depression & CHD : AHA

Lichtman JH. Circulation online Sep 29 2008

Depression & CHD : AHA

Lichtman JH. Circulation 21 Oct 2008

- Treatment
  - Antidepressant: maybe effective post MI depression
    - SSRI: Sertraline , Citalopram
    - C/I: Tricyclic antidepressant & MAOinh.
  - Physical activity/Exercise
    - Family / social (emotional) support
  - Cognitive behavioral therarpy (CBT)

Mindfulness Based Stress Reduction (MBSR)

AHA/ACCF 2^{ry} Prevention & Risk Reduction Therapy for Coronary & Other Atherosclerotic Vascular Disease Pts, 2011: Cardiac Rehab.

Area for Intervention	Recommendations
Cardiac rehabilitation	**Class I** 1. All eligible patients with ACS or whose status is immediately post coronary artery bypass surgery or post-PCI should be referred to a comprehensive outpatient cardiovascular rehabilitation program either prior to hospital discharge or during the first follow-up office visit.[55,154,161,163] ***(Level of Evidence: A)*** 2. All eligible outpatients with the diagnosis of ACS, coronary artery bypass surgery or PCI ***(Level of Evidence: A)***,[55,154,155,161] chronic angina ***(Level of Evidence: B)***,[161,163] and/or peripheral artery disease ***(Level of Evidence: A)***[158,164] within the past year should be referred to a comprehensive outpatient cardiovascular rehabilitation program. 3. A home-based cardiac rehabilitation program can be substituted for a supervised, center-based program for low-risk patients.[153,159,160] ***(Level of Evidence: A)*** **Class IIa** 1. A comprehensive exercise-based outpatient cardiac rehabilitation program can be safe and beneficial for clinically stable outpatients with a history of heart failure.[159,159a–159c] ***(Level of Evidence: B)***

Cardiac rehabilitation following a cardiac event

- ***Phase I*** or inpatient phase: introduced in 1960s & consists of early graded mobilization of stable cardiac pt to the activity to perform simple household tasks.
- ***Phase II*** consists of outpatient monitored exercise and risk factor reduction. This multidimensional approach gained popularity in 1970s & well structured in 1980s.
- ***Phase III*** or maintenance phase consists of home- or gymnasium-based exercise ĉ goal of continuing risk factor modification & phase II exercise program.

Exercise-based CR. for CHD.

Heran BS. Cochrane Data System Rev 2011, Issue 7. Art. No.: CD001800.

Comparison 1. Exercise-based rehabilitation versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Total mortality	33		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 Follow-up of 6 to 12 months	19	6000	Risk Ratio (M-H, Fixed, 95% CI)	0.82 [0.67, 1.01]
1.2 Follow-up longer than 12 months	16	5790	Risk Ratio (M-H, Fixed, 95% CI)	0.87 [0.75, 0.99]
	Total events: 324 (Exercise), 354 (Usual Care)		Heterogeneity: Chi^2 = 14.42, df = 15 (P = 0.49); I^2 =0.0%	
2 Cardiovascular mortality	19		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
2.1 Follow-up of 6 to 12 months	9	4130	Risk Ratio (M-H, Fixed, 95% CI)	0.93 [0.71, 1.21]
2.2 Follow-up longer than 12 months	12	4757	Risk Ratio (M-H, Fixed, 95% CI)	0.74 [0.63, 0.87]
	Total events: 235 (Exercise), 301 (Usual Care)		Heterogeneity: Chi^2 = 8.23, df = 10 (P = 0.61); I^2 =0.0%	

Exercise-based CR. for CHD.

Heran BS. Cochrane Data System Rev 2011, Issue 7. Art. No.: CD001800.

Comparison 1. Exercise-based rehabilitation versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
4 CABG	21		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
4.1 Follow-up of 6 to 12 months	14	2312	Risk Ratio (M-H, Fixed, 95% CI)	0.91 [0.67, 1.24]
4.2 Follow-up longer than 12 months	9	2189	Risk Ratio (M-H, Fixed, 95% CI)	0.93 [0.68, 1.27]
5 PTCA	11		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
5.1 Follow-up of 6 to 12 months	7	1328	Risk Ratio (M-H, Fixed, 95% CI)	1.02 [0.69, 1.50]
5.2 Follow-up longer than 12 months	6	1322	Risk Ratio (M-H, Fixed, 95% CI)	0.89 [0.66, 1.19]
6 Hospital Admissions	10		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
6.1 Follow-up of 6 to 12 months	4	463	Risk Ratio (M-H, Fixed, 95% CI)	0.69 [0.51, 0.93]
	Total events: 54 (Exercise), 73 (Usual Care)		Heterogeneity: $Chi^2 = 3.39$, $df = 3$ ($P = 0.33$); $I^2 = 12\%$	
6.2 Follow-up longer than 12 months	7	2009	Risk Ratio (M-H, Fixed, 95% CI)	0.98 [0.87, 1.11]

Psychological intervention for CHD

Whalley B. Cochrane Data System Rev 2011, Issue 8. Art. No.: CD002902.

Comparison 1. Psychological intervention +/- other rehabilitation vs control (usual care/other rehabilitation)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Total Mortality	17	6852	Risk Ratio (M-H, Random, 95% CI)	0.89 [0.75, 1.05]
2 Cardiac Mortality	5 I^2 =0.0%	3893	Risk Ratio (M-H, Random, 95% CI)	0.80 [0.64, 1.00]
	Total events: 389 (Treatment), 403 (Control)			
3 Revascularisation (CABG and PTCA combined)	12	6670	Risk Ratio (M-H, Random, 95% CI)	0.95 [0.80, 1.13]
4 Non-fatal MI	12	7534	Risk Ratio (M-H, Random, 95% CI)	0.87 [0.67, 1.13]
5 Depression	12 I^2 =70%	5041	Std. Mean Difference (IV, Random, 95% CI)	-0.21 [-0.35, -0.08]
6 Anxiety	8 I^2 =72%	2771	Std. Mean Difference (IV, Random, 95% CI)	-0.25 [-0.48, -0.03]

Pt. education in CHD management:not enough

Brown JPR. Cochrane Data System Rev 2011, Issue 12. Art. No.: CD008895.

Comparison 1. Total Mortality

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Total mortality at the end of the follow up period	6	2330	Risk Ratio (M-H, Random, 95% CI)	0.79 [0.55, 1.13]

Comparison 2. Cardiovascular Events

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Myocardial Infarction at the end of the follow up period	2	209	Risk Ratio (M-H, Random, 95% CI)	0.63 [0.26, 1.48]

Comparison 4. Hospitalisations

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Cardiac Hospitalisations at end of follow up period	4	12905	Risk Ratio (M-H, Random, 95% CI)	0.83 [0.65, 1.07]

Exercise based rehabilitation for HF

Davies EJ. Cochrane Database of Systematic Reviews 2010, Issue 4

- Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library 2007, Issue 4).* MEDLINE, EMBASE, CINAHL, and PsycINFO were searched (2001-Jan 2008). ISI Proceedings and bibliographies of identified reviews were checked.
- RCTs of exercise-based interventions ≥ 6 months follow up compared to usual medical care or placebo in adults of all ages (> 18 yrs) with evidence of chronic systolic heart failure.

Rehabilitation for systolic HF

Davies EJ. Cochrane Database of Systematic Reviews 2010, Issue 4

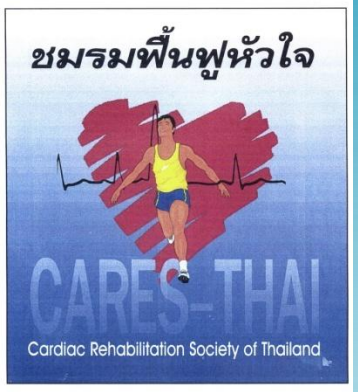
Comparison 1. All exercise interventions versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 All cause mortality up to12 month follow up	13	962	Risk Ratio (M-H, Fixed, 95% CI)	1.02 [0.70, 1.51]
2 All cause mortality more than 12 months follow up	4	2658	Odds Ratio (M-H, Fixed, 95% CI)	0.88 [0.73, 1.07]
3 Hospital admission up to 12 month follow up	8	659	Risk Ratio (M-H, Fixed, 95% CI)	0.79 [0.58, 1.07]
4 Hospital admission more than 12 months follow up	4	2658	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.90, 1.02]
5 Hospital admission heart failure only	7	569	Risk Ratio (M-H, Fixed, 95% CI)	0.72 [0.52, 0.99]
6 Health related quality of life - MLWHF	6	700	Mean Difference (IV, Random, 95% CI)	-10.33 [-15.89, -4.77]
7 Health related quality of life - all scales	10	3109	Std. Mean Difference (IV, Random, 95% CI)	-0.56 [-0.82, -0.30]

CHD 2^{ry} prevention: CR vs. Drugs

Interventions	Trials (pts)	All cause mortality reduction/1000/yr
Beta-blockers [1]	31(24,974)	12 (6-17)
ACE-inhibitors [2]	22(102,476)	4 (1-6)
Statins [3]	3(17,617)	4 (2-6)
Anti-platelets[4]	11(18,773)	7 (1-13)
Exercise-based CR[5]	44 (8,700)	9 (5-**16**[5])

1 Freemantle N. BMJ 1999;318:1730-7 2 Domanski MJ. J Am Coll Cardiol 1999;33:598-604
3 LaRosa JC. JAMA 1999;282:2340-6 4 Collins R. BMJ 1994;309:1215-7
5 Taylor RS. Am J Med 2004;116:682-692
From Perk J. Cardiovascular prevention and rehabilitation. Springer-Verlag London 2007: 16



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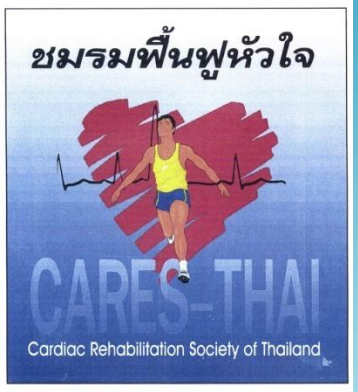

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- Prevention is better & never too late.
- กันไว้ ดีกว่า แก้, แย่แล้ว แก้ไม่ทัน
- Protect your heart, Do It Yourself.
- โรคเรื้อรังกินยาดีกว่าไม่กิน แต่"ทำเอง" ดีกว่า กินยา

“สุขภาพ” ดีไม่มีขาย ใครอยากได้ต้อง “ทำเอง”