Medical Update for the Dental Team

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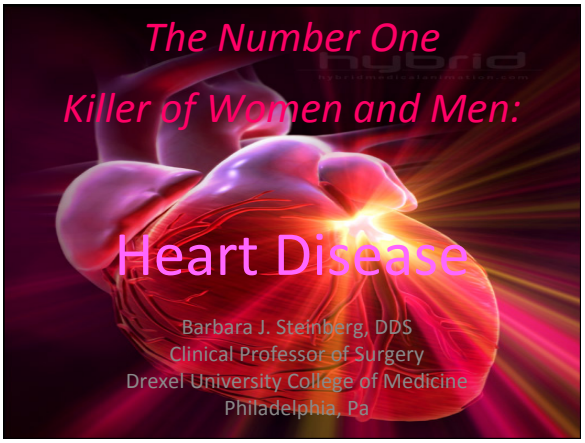


> 82 million American adults are estimated to have 1 or more types of cardiovascular disease (1 in 3 people)

2,200 Americans die of cardiovascular disease each day an average of 1 death every 39 seconds

Cardiovascular Disease
Risk Factors

- Smoking
- Hypertension
- Elevated cholesterol
- Overweight / obesity
- Physical inactivity
- Diabetes
- Family history
- Age
- Male Gender

Cardiovascular Disease
Other factors that may affect risk

- Stress
- Oral contraceptives
- Menopausal hormone therapy
- Alcohol
- Pregnancy complications
  - Preeclampsia
  - Gestational diabetes
  - Preterm birth

Cardiovascular Disease
Blood Pressure Classification
(Adults 18 and over)

Category	Systolic		Diastolic
Normal	<120	and	<80
Prehypertension	120-139	or	80-89
Stage 1 Hypertension	140-159	or	90-99
Stage 2 Hypertension	>159	or	>99

Source: National Heart, Lung, and Blood Institute 2003

Cardiovascular Disease
Classification of Cholesterol Levels

Total Cholesterol

Under 200	Desirable
200-239	Borderline High
240 and above	High

LDL Cholesterol

Less than 100	Optimal
100-129	Near-optimal
130-159	Borderline High
160-189	High
190 and above	Very High

*LDL in very-high-risk people with CHD should be < 70

Cardiovascular Disease
Classification of Cholesterol Levels

HDL Cholesterol

Under 40	Low
Over 60	High

*Optimal HDL should be > 50 for women

Triglycerides

Under 150	Optimal
150-199	Borderline high
200 and above	High

Source: NIH: May 2001

Cardiovascular Disease
Risk Factors

Overweight / obesity

- Two-thirds of Americans are overweight or obese
- Body Mass Index (BMI)
  - 18.5 – 24.9 normal
  - 25 – 29.9 overweight
  - 30 or > obese

Cardiovascular Disease
Risk Factors

Overweight / obesity

- Waist measurement ≥ 35 inches for women and ≥ 40 inches for men ↑ risk of heart disease

Cardiovascular Disease
Risk Factors

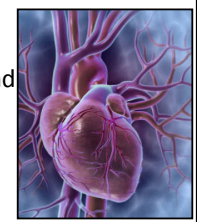
Family history

- Father or brother had cardiac event < 55 yrs
- Mother or sister had cardiac event < 65 yrs

Cardiovascular Disease
Emerging Risk Factors

C-reactive protein (CRP)

- C-reactive protein levels and risk of cardiovascular disease:
  - > 3 = high risk
  - 1 – 3 = average risk
  - < 1 = low risk



Symptoms of heart disease that may experienced

- Chest pain or discomfort
- Atypical chest, stomach or abdominal pain
- Nausea, vomiting, or dizziness
- Extreme fatigue, weakness, and sleeplessness
- Shortness of breath
- Unexplained anxiety
- Palpitations
- Cold sweat
- Paleness
- Severe indigestion
- Jaw, neck, or shoulder pain

Cardiovascular Disease Prevention and Treatment

Lifestyle Changes

Heart Healthy Eating Plan

- Low in saturated fat and cholesterol and moderate in total fat (20%-35% of calories)
  - Limit saturated fat to < 10% calories (7% if possible) and trans fats to < 1%
- Limit salt and sodium < 2300 mg ~ 1tsp
  - 1500 mg
    - ≥ 51 yrs. of age
    - African Americans
    - Hypertension
    - Diabetes Mellitus
    - Chronic Kidney disease

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

1st major randomized trial of this diet pattern for the primary prevention of cardiovascular events (MI's, stroke, and death from cardiovascular causes)

- Multicenter trial in Spain 7,447 people enrolled age 55-80 yrs. (57% were women)
- Participants were at increased risk for cardiovascular disease but did not have disease on enrollment.

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

- **Participants randomly assigned to one of three diets.**
  - Mediterranean diet supplemented with extra virgin olive oil (EVOO) (4 tbsp/ day)
  - Mediterranean diet supplemented with mixed nuts (30g/ day of walnuts, almonds, and hazelnuts)
  - Low fat diet (control group)

Summary of Dietary Recommendations to Participants in the Mediterranean-Diet Groups

Food	Goal
Mediterranean diet	
Recommended	
Olive oil	≥4 tbsp/day
Tree nuts and peanuts	≥3 servings/wk
Fresh fruits	≥3 servings/day
Vegetables	≥2 servings/day
Fish (especially fatty fish), seafood	≥3 servings/wk
Legumes	≥3 servings/wk
Sofrito	≥2 servings/wk
White meat	instead of red meat
Wine with meals (optionally, only for habitual drinkers)	≥7 glasses/wk
Discouraged	
Soda Drinks	<1 drink/day
Commercial bakery goods,sweets, and pastries	<3 servings/wk

Summary of Dietary Recommendations Participants in the Control-Diet Group

Food	Goal
Low fat diet (control)	
Recommended	
Low-fat dairy products	≥3 servings/day
Bread, potatoes, pasta, rice	≥3 servings/day
Fresh fruits	≥3 servings/day
Vegetables	≥2 servings/wk
Lean fish and seafood	≥3 servings/wk
Discouraged	
Vegetable oils (including olive oil)	≤2 tbsp/day
Commercial bakery goods, sweets, and pastries	≤1 serving/wk
Nuts and fried snacks	≤1 serving/wk
Red and processed fatty meats	≤1 serving/wk
Visible fat in meats and soups	Always remove
Fatty fish, seafood canned in oil	≤1 serving/wk

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

- Training sessions by dietitians throughout, self reported-intake and biomarker analyses when indicated (blood, urine to confirm consumption of EVOO and nuts)

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

—**Results**

- **Trial stopped early after almost 5 yrs because the results were so clear it was considered unethical to continue.**

  - Mediterranean diet with EVOO- 96 events (3.8%)
  - Mediterranean diet with nuts- 83 events (3.4%)
  - Low fat diet control group- 109 events (4.4%)

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

—**Results**

- The differences in the risk of stroke were statistically significant.

—**Conclusions**

- Among persons at high cardiovascular risk, a Mediterranean diet supplemented with EVOO or nuts reduced the incidence of major cardiovascular events.

Cardiovascular Disease

Heart-Healthy Foods

Fish

– Omega-3 fatty acids
  - Herring
  - Sardines
  - Salmon
  - Atlantic or Pacific Mackerel
  - Trout
  - Halibut
  - Anchovies
  - Pacific Oysters

– Eat at least 8oz./week

Cardiovascular Disease

Role of Supplements

- Consider omega-3 fatty acids in capsule form (fish oil)

– 1-2 grams/day
  - DHA 400-800 mg
  - EPA 600-1200 mg

Cardiovascular Disease
Prevention and Treatment

Lifestyle Changes

Be physically active - EXERCISE!

30 minutes of moderate-intensity cardio activity a day and 20 minutes of strength training 2-3 times per week

Cardiovascular Disease
Prevention and Treatment

Lifestyle Changes

Be physically active - EXERCISE!

If you need to loose weight or sustain weight loss a minimum of 60-90 minutes of moderate intensity physical activity on most and preferably all days of the week

Journal Scan Summary

Title: 2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Date Posted: November 12, 2013

Authors: Stone NJ, Robinson J, Lichtenstein AH, et al.

Citation: *J Am Coll Cardiol* 2013;Nov 12:[Epub ahead of print].

Related Resources

New ACC/AHA Prevention Guidelines Address Blood Cholesterol, Obesity, Healthy Living and Risk Assessment

Cardiosource Video News
Top 10 Points - Blood Cholesterol Guideline

Cardiosource Video News
New Guideline on Blood Cholesterol

CardioSmart
For Your Patients: A CardioSmart Summary

Perspective:

The following are 10 points to remember about this American College of Cardiology (ACC)/American Heart Association (AHA) Guideline on the Treatment of Blood Cholesterol:

1. The 2013 ACC/AHA Expert Panel included all 16 members of the National Heart, Lung, and Blood Institute Adult Treatment Panel (ATP) IV, and the document review included 23 expert reviewers and representatives of federal agencies. The expert panel recommendations arose from careful consideration of an extensive body of higher quality evidence derived from randomized controlled trials (RCTs), and systematic reviews and meta-analyses of RCTs.

2. Through a rigorous process, four groups of individuals were identified, for whom an extensive body of RCT evidence demonstrated a reduction in atherosclerotic cardiovascular disease (ASCVD) events (including coronary heart disease, cardiovascular deaths, and fatal and nonfatal strokes) with a good margin of safety from statin therapy:

Four Statin Benefit Groups:

- 1) Individuals with clinical ASCVD (acute coronary syndromes, or a history of myocardial infarction, stable or unstable angina, coronary or other arterial revascularization, stroke, TIA, or peripheral arterial disease presumed to be of atherosclerotic origin) without New York Heart Association (NYHA) class II-IV heart failure or receiving hemodialysis.

- 2) Individuals with primary elevations of low-density lipoprotein cholesterol (LDL-C) ≥190 mg/dl.

- 3) Individuals 40-75 years of age with diabetes, and LDL-C 70-189 mg/dl without clinical ASCVD.

- 4) Individuals without clinical ASCVD or diabetes, who are 40-75 years of age with LDL-C 70-189 mg/dl, and have an estimated 10-year ASCVD risk of 7.5% or higher.

3. Individuals in the fourth group can be identified by using the new Pooled Cohort Equations for ASCVD risk prediction, developed by the Risk Assessment Work Group.

4. Lifestyle modification (i.e., adhering to a heart healthy diet, regular exercise habits, avoidance of tobacco products, and maintenance of a healthy weight) remains a critical component of health promotion and ASCVD risk reduction, both prior to and in concert with the use of cholesterol-lowering drug therapies.

5. There is no evidence to support continued use of specific LDL-C and/or non–high-density lipoprotein cholesterol (non–HDL-C) treatment targets. The appropriate intensity of statin therapy should be used to reduce risk in those most likely to benefit. Nonstatin therapies, whether alone or in addition to statins, do not provide acceptable ASCVD risk reduction benefits compared to their potential for adverse effects in the routine prevention of ASCVD.

6. This guideline recommends use of the new Pooled Cohort Equations to estimate 10-year ASCVD risk in both white and black men and women. By more accurately identifying higher risk individuals for statin therapy, the guideline focuses statin therapy on those most likely to benefit. It also indicates, based on RCT data, those high-risk groups that may not benefit.

7. No recommendations are made to inform treatment decisions in selected individuals who are not included in the four statin benefit groups. In these individuals whose 10-year risk is <7.5% or when the decision is unclear, other factors including family history of premature ASCVD, LDL-C >160 mg/dl, high-sensitivity C-reactive protein ≥2 mg/dl, coronary calcium score ≥300 Agatston units or ≥75th percentile for age, sex, ethnicity, and ankle-brachial index <0.9, or elevated lifetime risk of ASCVD may be used to enhance the treatment decision making.

8. High-intensity statin therapy is defined as a daily dose that lowers LDL-C by ≥50% and moderate-intensity by 30% to <50%. All patients with ASCVD who are age ≤75 years, as well as patients >75 years, should receive high-intensity statin therapy; or if not a candidate for high-intensity, should receive moderate-intensity statin therapy.

9. Those with an LDL-C ≥190 mg/dl should receive high-intensity or moderate-intensity statin therapy, if not a candidate for high-intensity statin therapy. Addition of other cholesterol-lowering agents can be considered to further lower LDL-C. Diabetics with a 10-year ASCVD ≥7.5% should receive high-intensity statins and <7.5% moderate-intensity statin therapy. Persons 40-75 years with a ≥7.5% 10-year ASCVD risk should receive moderate- to high-intensity statin therapy.

10. The following are no longer considered appropriate strategies: treat to target, lower is best. The new guideline recommends: treat to level of ASCVD risk, based upon estimated 10-year or lifetime risk of ASCVD. The guidelines provided no recommendations for initiating or discontinuing statins in NYHA class II-IV ischemic systolic heart failure patients or those on maintenance hemodialysis.

Author(s):

Melvyn Rubenfire, MD, F.A.C.C. (Disclosure)

Journal Scan Summary

Title: 2013 ACC/AHA Guideline on the Assessment of Cardiovascular Risk: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Date Posted: November 12, 2013

Authors: Goff DC Jr, Lloyd-Jones DM, Coady S, et al.

Citation: *J Am Coll Cardiol* 2013;Nov 12:[Epub ahead of print].

Related Resources

New ACC/AHA Prevention Guidelines Address Blood Cholesterol, Obesity, Healthy Living and Risk Assessment

Cardiosource Video News

Top 10 Points - CV Risk Assessment Guideline

CardioSmart American College of Cardiology

For Your Patients: A CardioSmart Summary

Perspective:

The following are 10 points to remember about this American College of Cardiology (ACC)/American Heart Association (AHA) Guideline on the Assessment of Cardiovascular Risk:

1. The 2013 ACC/AHA Expert Work Group endorsed the existing and widely employed paradigm of matching the intensity of preventive efforts with the individual's absolute risk. The group also recognized that none of the risk assessment tools or novel risk markers examined or recommended has been formally evaluated in randomized controlled trials of screening strategies with clinical events as outcomes.

2. New Pooled Cohort Equations were established for estimating the 10-year risk of developing atherosclerotic cardiovascular disease (ASCVD). Ten-year risk was defined as the risk of a first ASCVD event including nonfatal myocardial infarction or coronary heart disease death, or fatal or nonfatal stroke among people free from ASCVD at the beginning of the period. Equations were developed from sex- and race-specific proportional hazards models that included the covariates of age, treated or untreated systolic blood pressure level, total cholesterol and high-density lipoprotein cholesterol (HDL-C) levels, current smoking status (Y/N), and history of diabetes (Y/N). Case example: a 55-year-old White man with total cholesterol 213 mg/dl, HDL-C 50 mg/dl, untreated systolic blood pressure 120 mm Hg, nonsmoker, and without diabetes has a 10-year risk of 5.3%, and women with similar data, a 2.1% risk.

3. Risk estimation is based on group averages that are then applied to individual patients in practice. The approach balances an understanding of an individual's absolute risk for CVD and potential treatment benefits against the potential absolute risks for harm from therapy. Using this framework, treatment can be targeted to those most likely to benefit without undue risk for harm, in the context of a "risk discussion."

4. A risk discussion could include the assessment of the patient's risk for ASCVD, and potential benefits, negative aspects, risks, and patient preferences regarding initiation of relevant preventive therapies. Only a small fraction of trial participants have events, and only a fraction of these events are prevented by therapy. Using either approach, the clinician must apply the average results obtained from groups of patients to the individual patient in practice.

5. The race- and sex-specific Pooled Cohort Equations to predict 10-year risk for a first hard ASCVD event should be used in non-Hispanic African Americans and non-Hispanic Whites, 40-79 years of age. Use of the sex-specific Pooled Cohort Equations for non-Hispanic Whites may be considered when estimating risk in patients from populations other than African Americans and non-Hispanic Whites.

6. If, after quantitative risk assessment, a risk-based treatment decision is uncertain, assessment of one or more of the following—family history, high-sensitivity C-reactive protein, coronary artery calcium score, or ankle-brachial index—may be considered to inform treatment decision making.

7. The contribution to risk assessment for a first ASCVD event using apolipoprotein B, chronic kidney disease, albuminuria, and cardiorespiratory fitness is uncertain at present.

8. Carotid intima-media thickness is not recommended for routine measurement in clinical practice for risk assessment for a first ASCVD event.

9. It is reasonable to assess traditional ASCVD risk factors every 4-6 years in adults 20-79 years of age who are free from ASCVD, and to estimate 10-year ASCVD risk every 4-6 years in adults 40-79 years of age without ASCVD.

10. Assessing 30-year or lifetime ASCVD risk based on traditional risk factors may be considered in adults 20-59 years of age without ASCVD, and who are not at high short-term risk.

Author(s):

Melvyn Rubenfire, MD, F.A.C.C. (Disclosure)

Topic(s):

Prevention/Vascular, General Cardiology, CardioMetabolic

Journal Scan Summary

Title: 2013 AHA/ACC Guideline on Lifestyle Management to Reduce Cardiovascular Risk: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Date Posted: November 12, 2013

Authors: Eckel RH, Jakicic JM, Ard JD, et al.

Citation: *J Am Coll Cardiol* 2013;Nov 12:[Epub ahead of print].

Related Resources

New ACC/AHA Prevention Guidelines Address Blood Cholesterol, Obesity, Healthy Living and Risk Assessment

Cardiosource Video News

Top 10 Points - Lifestyle Management Guideline

CardioSmart
For Your Patients: A CardioSmart Summary

Perspective:

The following are 10 points to remember about this American Heart Association (AHA)/American College of Cardiology (ACC) Guideline on Lifestyle Management to Reduce Cardiovascular Risk:

1. The 2013 ACC/AHA Expert Work Group's intent was to evaluate evidence that particular dietary patterns, nutrient intake, and levels and types of physical activity can play a major role in cardiovascular disease (CVD) prevention and treatment through effects on modifiable CVD risk factors. The evidence statements and recommendations are presented by critical questions and grouped by topic. Three primary critical questions were addressed:

• 1) Among adults, what is the effect of dietary patterns and/or macronutrient composition on CVD risk factors, when compared to no treatment or to other types of interventions?

• 2) Among adults, what is the effect of dietary intake of sodium and potassium on CVD risk factors and outcomes, when compared to no treatment or to other types of interventions?

• 3) Among adults, what is the effect of physical activity on blood pressure and lipids when compared to no treatment, or to other types of interventions?

2. Dietary recommendations to lower low-density lipoprotein cholesterol (LDL-C) include consumption of a diet high in vegetables, fruits, and whole grains. Dairy products should be low-fat. Fish, legumes, and poultry are recommended sources of protein. Vegetable oils and nuts provide healthy type oils. Limitation of sugar-sweetened beverages and red meats is recommended. There is insufficient evidence to determine whether low-glycemic diets versus high-glycemic diets affect lipids or blood pressure for adults without diabetes mellitus. The evidence for this relationship in adults with diabetes mellitus was not reviewed.

3. Additional recommendations to lower LDL-C include a dietary pattern that achieves 5-6% of calories from saturated fat. Reduction in trans-fat was also recommended.

4. This dietary pattern should be adapted for the appropriate calorie requirements, personal and cultural food preferences, and nutrition therapy for other medical conditions. This dietary pattern can be achieved by following the DASH dietary pattern, the USDA Food Pattern, or the AHA Diet.

5. Dietary recommendations to lower blood pressure are similar to those for LDL-C lowering, with added recommendations for sodium intake. Consumption of no more than 2,400 mg of sodium/day is recommended. Further reduction of sodium intake to 1,500 mg/day is associated with even greater reduction in blood pressure, and is recommended if achievable by the patients.

6. For blood pressure lowering, if recommended goals for sodium are not attainable, reducing sodium intake by at least 1,000 mg/day lowers blood pressure. A reduction in sodium intake of approximately 1,000 mg/day reduces CVD events by approximately 30%.

7. Combining the DASH dietary pattern with lower sodium intake is recommended for lowering blood pressure.

8. Recommendations to improve lipids with physical activity were also provided. These include regular aerobic physical activity, 3-4 sessions a week, lasting on average 40 minutes per session, and involving moderate- to vigorous-intensity physical activity. This level of physical activity can reduce both LDL-C and non–high-density lipoprotein cholesterol.

9. Recommendations to improve blood pressure include the same level and duration of physical activity. Again, this includes aerobic activity, 3-4 sessions a week, lasting on average 40 minutes per session, and involving moderate- to vigorous-intensity physical activity.

10. The DASH dietary pattern is beneficial for a wide range of subgroups, including women and men; African American and non–African American adults; older and younger adults; and hypertensive and nonhypertensive in lowering blood pressure. A similar pattern is observed for LDL-C lowering for African American and non–African American adults, and hypertensive and nonhypertensive adults.

Author(s):

Elizabeth A. Jackson, MD, F.A.C.C. (Disclosure)

Topic(s):

Prevention/Vascular, General Cardiology, CardioMetabolic

Journal Scan Summary

Title: 2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines, and The Obesity Society

Date Posted: November 12, 2013

Authors: Jensen MD, Ryan DH, Apovian CM, et al.

Citation: *J Am Coll Cardiol* 2013;Nov 12:[Epub ahead of print].

Related Resources

New ACC/AHA Prevention Guidelines Address Blood Cholesterol, Obesity, Healthy Living and Risk Assessment

Cardiosource Video News

Top 10 Points - Obesity Guideline

CardioSmart

For Your Patients: A CardioSmart Summary

Perspective:

The following are 10 points to remember about this American College of Cardiology (ACC)/American Heart Association (AHA)/The Obesity Society (TOS) Guideline on Management of Overweight and Obesity in Adults:

1. Approximately 78 million adults in the United States are obese, which places them at risk for morbidity from a variety of conditions including diabetes, coronary heart disease, and stroke. An expert panel was assembled to first develop a list of critical questions to be addressed. Five targeted questions were selected based on relevance to health care providers who frequently work with obese patients, and to provide an update on the benefits and risks of weight loss achieved with various approaches. Not included were questions related to genetics of obesity, binge eating disorders, pharmacotherapy, and cost-effectiveness of interventions to manage obesity. Five critical questions were addressed, which centered around evidence for:

- 1) Weight loss and reduction of cardiovascular disease (CVD) risk factors, events, and mortality;
- 2) Current cut points for body mass index (BMI) and waist circumference in relation to CVD risk;
- 3) Different diets in relation to weight loss and weight maintenance;
- 4) Comprehensive lifestyle intervention programs for weight loss and maintenance of weight loss; and
- 5) Bariatric surgery for weight loss, and maintenance of weight loss, and impact on CVD risk factors and mortality over the short- and long-term.

2. Providers are recommended to measure height and weight and calculate BMI at annual visits or more frequently to identify patients who need to lose weight. Use of current cut points for overweight (BMI >25.0-29.9 kg/m^2) and obesity (BMI ≥30 kg/m^2) should be continued to identify adults who may be at increased risk for CVD. A cut point for obesity (BMI ≥30 kg/m^2) should be used to identify adults at increased risk for all-cause mortality. Patients who are overweight or obese should be counseled that their BMI level places them at increased risk for CVD, type 2 diabetes, and all-cause mortality.

3. Waist circumference should be measured at annual visits or more frequently in overweight and obese adults. Cut points for increased waist circumference defined by the National Institutes of Health or World Health Organization (>35 inches or 88 cm for women and >40 inches or 102 cm for men) can be used.

Patients who have an increased waist circumference should be counseled that their BMI level places them at increased risk for CVD, type 2 diabetes, and all-cause mortality.

4. Overweight and obese adults with CVD risk factors (including elevated blood pressure, hyperlipidemia, and hyperglycemia) should be counseled that even modest weight loss (3-5% of body weight) can result in clinically meaningful benefits for triglycerides, blood glucose, glycated hemoglobin, and development of diabetes (type 2). Greater weight loss (>5%) can further reduce blood pressure, improve lipids (both low-density lipoprotein and high-density lipoprotein cholesterol), and reduce need of medications to control blood pressure, blood glucose, and lipids.

5. A diet prescribed for weight loss is recommended to be part of a comprehensive lifestyle intervention, a component of which includes a plan to achieve reduced caloric intake. Any one of the following methods can be used to reduce food and calorie intake:

- 1) Prescribe 1,200-1,500 kcal/day for women and 1,500-1,800 kcal/day for men (kcal levels are usually adjusted for the individual's body weight);

- 2) Prescribe a 500 kcal/day or 750 kcal/day energy deficit; or

- 3) Prescribe one of the evidence-based diets that restricts certain food types (such as high-carbohydrate foods, low-fiber foods, or high-fat foods) in order to create an energy deficit by reduced food intake.

6. Prescribing a calorie-restricted diet should be based on the patient's preferences, health status, and preferably with a referral to a nutrition professional for counseling.

7. Overweight and obese adults who would benefit from weight loss are recommended to participate in at least 6 months of a comprehensive lifestyle program, which assists participants to adhere to a lower calorie diet and to increase physical activity. Such programs are recommended to include high-intensity (i.e., ≥14 sessions in 6 months), comprehensive weight loss interventions provided in individual or group sessions by a trained interventionist. Electronically delivered weight loss programs (including by telephone) that include personalized feedback from a trained interventionist can be prescribed for weight loss, but may result in smaller weight loss than face-to-face interventions. Some commercial-based programs that provide a comprehensive lifestyle intervention can be prescribed as an option for weight loss, provided there is peer-reviewed published evidence of their safety and efficacy.

8. It is recommended that very low-calorie diets (defined as <800 kcal/day) be used only when medical monitoring and trained providers are available, and only as part of a high-intensity lifestyle intervention.

9. Weight loss maintenance is recommended to be a component of patients' overall weight loss plan. Participation in a long-term (≥1 year) comprehensive weight loss maintenance program is strongly recommended. Programs should include regular contact with trained personnel, face-to-face or telephone-delivered, to encourage high levels of physical activity (200-300 minutes/week), monitor body weight (at least weekly), and adhere to a reduced-calorie diet (needed to maintain lower body weight).

10. Among adults with a BMI ≥40 or BMI ≥35 with obesity-related comorbid conditions, who have not responded to behavioral treatments with or without pharmacotherapy, bariatric surgery may be an appropriate option. For individuals with a BMI <35, there is insufficient evidence to recommend for or against undergoing bariatric surgical procedures.

Author(s):

Elizabeth A. Jackson, MD, F.A.C.C. (Disclosure)

An 2014 Evidence-Based Guideline for the Management High Blood Pressure in Adults: A Report from the Panel Members Appointed to the Eighth Joint National Committee (JNC 8)

James PA, Oparil S, Carter BL, et al.
Published Online December 18, 2013
Journal of the American Medical Association

http://jama.jamanetwork.com/article.aspx?articleid=1791497

Boning Up On Osteoporosis: Medical and Dental Considerations

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Osteoporosis

Risk Factors for Osteoporotic Fractures

Non-modifiable

- Personal history of fracture as an adult
- History of fracture in first-degree relative
- Caucasian or Asian race
- Small skeletal frame
- Advanced age
- Female sex
- Dementia
- Poor health / frailty

Osteoporosis

Risk Factors for Osteoporotic Fractures

Potentially modifiable

- **Current cigarette smoking**
- **Body Mass Index <21 kg/m²)**
- **Estrogen deficiency**
  - Early menopause (<age 45) or bilateral ovariectomy
  - Prolonged premenopausal amenorrhea (>1 yr)

Osteoporosis

Risk Factors for Osteoporotic Fractures

Potentially modifiable (cont.)

- **Low calcium intake (lifelong)**
- **Excessive alcohol consumption**
- **Excessive caffeine consumption**
- **Impaired eyesight despite adequate correction**
- **Recurrent falls**
- **Inadequate physical activity**
- **Poor health / frailty**
- **Cola drinks regularly may ↑ risk**

Osteoporosis

Screening for Osteoporosis: U.S. Preventive Services Task Force *(USPSTF)* Recommendation Statement

- Routine screening in all women aged ≥65y and in any younger women whose fracture risk is equal to or greater than of that of a 65y old white woman who has no additional risk factors (equivalent to a 9.3% or greater risk of fracture within 10 years)
- Current evidence is insufficient to assess the balance of benefits and harms of screening for osteoporosis in men

Ann Intern Med. 2011; 154: 356-364

Osteoporosis

Osteoporosis Screening Recommendations of Other Organizations

Organization	Recommendations Women	Men
National Osteoporosis Foundation	BMD testing for all women ≥ 65y and postmenopausal women <65y, based on risk factor profile	BMD testing for all men ≥70y and men aged 50-69y, based on risk factor profile
World Health Organization	Indirect evidence supports screening women ≥65y, but no direct evidence supports widespread screening programs using BMD testing	
American College of Physicians		Clinicians should assess older men for osteoporosis risk factors and use DXA to screen men at increased risk who are candidates for drug therapy for osteoporosis
American College of Obstetricians and Gynecologists	BMD testing for all women ≥65y and postmenopausal women <65y who have ≥1 risk factor	

Ann Intern Med. 2011; 154: 356-364

Osteoporosis

Defining Osteoporosis by BMD

(World Health Organization Classification)

Normal	BMD is within 1 SD of a "young normal" adul (T-score above -1)
Low Bone Mass (Osteopenia)	BMD is between 1 and 2.5 SD below that of a "young normal" adult (T-score between -1 and -2.5)
Osteoporosis	BMD is 2.5 SD or more below that of a "young normal" adult (T-score at or below -2.5)

Osteoporosis

2008 WHO and NOF Quantitative Risk Assessment Algorithm for Osteoporosis Fractures (cont.)

WHO Fracture Risk Assessment Tool is accessible at many internet sites including:

www.shef.ac.uk/FRAX/

Bisphosphonate Drugs Available in the United States

Pamidronate (Aredia)	Parenteral
Zoledronic acid (Zometa and Reclast)	Parenteral
Clodronate (Bonefos)	Parenteral
Etidronate (Didronel)	Oral
Alendronate (Fosamax and Fosamax plus D)	Oral
Risedronate (Actonel and Atelvia)	Oral
Ibandronate (Boniva)	Oral and Parenteral
Tiludronate (Skelid)	Oral

If you suspect a patient to have ARONJ contact FDA's MedWatch program at www.fda.gov/MedWatch/report.htm or 800-FDA-1088

OSTEOPOROSIS RESOURCES

- National Osteoporosis Foundation – www.nof.org
- International Osteoporosis Foundation – www.osteofound.org
- National Institutes of Health Bone Disease Center – www.osteo.org
- Doctor's guide: Osteoporosis – www.pslgroup.com/osteoporosis.htm

Indications for Antibiotic Prophylaxis

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Indications for Antibiotic Prophylaxis Resources

Infective Endocarditis

American Heart Association,

Circulation 2007, 116: 1736-1754
http://www.circ.ahajournals.org/content/116/15/1736.full.pdf+html?sid=d2846955-2778-42ab-af86-167cb6cbc6dc

American Dental Association

JADA, January 2008, Vol. 139: 35-245
http://www.jada-plus.com/content/139/suppl_1/3S.full.pdf+html

Indications for Antibiotic Prophylaxis Resources

Total Joint Replacements

American Academy Orthopaedic Surgeons

http://www.aaos.org/Research/guidelines/PUDP/dental_guideline.asp

American Dental Association

http://www.ada.org/2583.aspx?currentTab=2#replace

Editorials represent the opinions of the authors and not necessarily those of the American Dental Association.

GUEST EDITORIAL

Providing clarity on evidence-based prophylactic guidelines for prosthetic joint infections

Daniel M. Meyer, DDS

The notion of biological plausibility—that is, the likelihood of whether an outcome could occur as a result of a causal association—is frequently a premise for clinical research as well as a basis for clinical decision making. However, what do we as clinicians do when the scientific evidence indicates that a risk factor for a condition, preventive regimen, or treatment is not probable or likely, despite being conceivable? Do we follow precedence, inference, or conflicting professional standards of care, or do we rely on clinical guidelines supported by relevant, scientific evidence from systematic reviews in the peer-reviewed literature? Should we as health care providers discontinue providing conventional care when new scientific evidence from clinical studies indicates a particular therapy or a traditional antibiotic regimen is not necessary, especially if the risk of potential harms outweigh the benefits? Such appears to be the case in regard to the results of systematic reviews in the scientific literature on the use of prophylactic antibiotics to prevent prosthetic joint infections (PJI).

The concept of providing prophylactic antibiotics to prevent PJI has been based on a logical premise and biological plausibility. Dental procedures that involve soft-tissue manipulation or bleeding have the potential to introduce oral bacteria into the blood stream, leading to bacteremia. It has generally been accepted that bacteremia resulting from dental invasive procedures could lead to infection of prosthetic joint implant areas. The common practice, thus far, has been to have patients premedicate with oral antibiotics before dental treatment to prevent bacteremia and postsurgical infections of prosthetic joint implant areas. More recent scientific information published in the peer-reviewed literature is contributing to a greater understanding of the risks versus benefits resulting from the widespread use of antibiotics. Consequently, attitudes regarding the indications and contraindications for antibiotic usage are changing. The overprescribing and overuse of oral antibiotics are now considered to be a significant public health threat. Providers, their patients, and the public need to be aware of widespread antibiotic resistance, adverse drug reactions such as hypersensitivity reactions, anaphylaxis, opportunistic infections, and *Clostridium difficile* infection.

In 2013, the American Association of Orthopedic Surgeons (AAOS), in collaboration with the American Dental Association (ADA), published the

results of a comprehensive evidence-based, systematic review and clinical practice guideline entitled, "Prevention of Orthopaedic Implant Infection in Patients Undergoing Dental Procedures: Evidence-Based Guideline and Evidence Report."[1-3] After conducting an extensive review of the published scientific literature, a multidisciplinary expert panel concluded, "There is no evidence to demonstrate a direct link between dental-procedure-associated bacteremia and infection of prosthetic joints or other orthopaedic implants," noting, "There is no evidence that [dental-related] bacteremias are related to prosthetic joint infections." The published clinical evidence suggests that there is no association between invasive or noninvasive dental procedures and postsurgical PJIs. Even though the routine practice of prescribing antibiotics may be considered by some providers to be relatively safe, current scientific evidence does not support doing so before performing dental procedures to prevent bacteremia and postsurgical PJIs.

Although the AAOS/ADA systematic review was conducted thoroughly and was supported by robust scientific evidence, the clinical guidance stemming from the review process resulted in considerable confusion among providers and their patients. In addition, the 2013 clinical recommendations were questioned and criticized for their apparent ambiguity. In order to provide more clarity for clinicians, the ADA Council on Scientific Affairs (CSA) convened its own evidence-based expert panel to reevaluate the systematic review and reassess the clinical guidelines. The CSA expert panel reviewed the literature previously conducted by AAOS, ADA, and other professional organizations, as well as additional scientific evidence not included in the 2013 review and publication.

The ADA expert panel identified 3 additional studies and reviewed and evaluated each for its clinical relevance.[4-6] The 3 studies provided additional clinical data that were consistent with the original evidence identified by AAOS and ADA in the 2013 clinical recommendations. The additional studies provided further evidence that invasive dental procedures are not associated with PJIs. The evidence also indicated that prophylactic antibiotics taken before dental treatment do not help prevent PJIs.

The ADA expert panel concluded that the benefits of providing antibiotic prophylaxis to prevent PJIs do not outweigh the potential harm for most patients. In an attempt to provide more accurate clinical guidance and clarity, the expert panel drafted new clinical recommendations that include a chair-side guide, which is published in this issue.[7] The chair-side guide was developed to help dentists and orthopedic surgeons communicate with their patients about the potential risks associated with the use of prophylactic antibiotics to help prevent postorthopedic surgery PJIs.

The new CSA guideline clearly states that for most patients, prophylactic antibiotics are not indicated before dental procedures to prevent PJIs. The new guideline also takes into consideration that patients who have previous medical conditions or complications associated with their joint replacement surgery may have specific needs calling for premedication. In medically compromised patients who are undergoing dental procedures that include gingival manipulation or mucosal inclusion, prophylactic antibiotics should be considered only after consultation with the patient and orthopedic surgeon. For patients with serious health conditions, such as immunocompromising diseases, it may be appropriate for the orthopedic surgeon to recommend an antibiotic regimen when medically indicated, as footnoted in the new chair-side guide.

Instituting these new evidence-based changes into clinical practice likely will lead to professional challenges across disciplines for providers and their patients. The new chair-side guide puts at the forefront of multidisciplined, collaborative care the need for dentists and orthopedic surgeons to work more closely together to assess each patient's medical history, health status, and oral conditions. The chair-side guide is designed to be a useful tool for dentists, orthopedic surgeons, and patients to use in the decision-making process. It is intended to promote supportable, clinically relevant care that is consistent with a systematic assessment of the benefits, risks, needs, and preferences of each patient.

Successful implementation of these clinical guidelines empowers medical and dental providers to use their clinical judgment along with the support from the best available scientific evidence on the potential risks, benefits, and harms. The guidelines enable dentists and orthopedic surgeons to engage in a shared dialogue and decision-making process with each patient to minimize risks while optimizing health outcomes. It is the process of jointly making a systematic, clinical decision, rather than the decision itself, that lends itself to an applicable use of these evidence-based guidelines.

It is time to rely on scientifically sound, interprofessional, and cross-discipline communications to support beneficial evidence-based clinical recommendations. Clinical guidelines that are based on clinically relevant systematic reviews enable medical and dental professionals to provide safe and effective care—comprehensive, multidisciplined care that is based on clinically relevant scientific evidence instead of customary,

time-honored principles that are not backed by current research. ■

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ADA CE Program ARTICLE 1

COVER STORY

The use of prophylactic antibiotics prior to dental procedures in patients with prosthetic joints

Evidence-based clinical practice guideline for dental practitioners—a report of the American Dental Association Council on Scientific Affairs

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ABSTRACT

Background. A panel of experts (the 2014 Panel) convened by the American Dental Association Council on Scientific Affairs developed an evidence-based clinical practice guideline (CPG) on the use of prophylactic antibiotics in patients with prosthetic joints who are undergoing dental procedures. This CPG is intended to clarify the "Prevention of Orthopaedic Implant Infection in Patients Undergoing Dental Procedures: Evidence-based Guideline and Evidence Report," which was developed and published by the American Academy of Orthopaedic Surgeons and the American Dental Association (the 2012 Panel).

Types of Studies Reviewed. The 2014 Panel based the current CPG on literature search results and direct evidence contained in the comprehensive systematic review published by the 2012 Panel, as well as the results from an updated literature search. The 2014 Panel identified 4 case-control studies.

Results. The 2014 Panel judged that the current best evidence failed to demonstrate an association between dental procedures and prosthetic joint infection (PJI). The 2014 Panel also presented information about antibiotic resistance, adverse drug reactions, and costs associated with prescribing antibiotics for PJI prophylaxis.

Practical Implications and Conclusions. The 2014 Panel made the following clinical recommendation: In general, for patients with prosthetic joint implants, prophylactic antibiotics are not recommended prior to dental procedures to prevent prosthetic joint infection. The practitioner and patient should consider possible clinical circumstances that may suggest the presence of a significant medical risk in providing dental care without antibiotic prophylaxis, as well as the known risks of frequent or widespread antibiotic use. As part of the evidence-based approach to care, this clinical recommendation should be integrated with the practitioner's professional judgment and the patient's needs and preferences.

Key Words. Antibiotic prophylaxis; evidence-based dentistry; practice guidelines; prostheses; joint replacement.

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In 2012, a panel of experts representing the American Academy of Orthopaedic Surgeons (AAOS) and the American Dental Association (ADA) (the 2012 Panel) published a systematic review and accompanying clinical practice guideline (CPG) entitled "Prevention of Orthopaedic

This article has an accompanying online continuing education activity available at: http://jada.ada.org/ce/home.

Implant Infection in Patients Undergoing Dental Procedures: Evidence-based Guideline and Evidence Report."[1-3] The 2012 Panel initially considered 222 questions concerning the relationship between dental procedures, bacteremia (as an intermediate outcome), and the risk of developing a prosthetic joint infection (PJI) as a clinical end point. The 2012 Panel published a comprehensive evidence-based guideline. The release of this guideline was followed by calls to the ADA Member Service Center hotline requesting additional clarification, which indicated that this guideline was 1 of the top 2 issues of concern to dental practitioners. Therefore, the ADA's Council on Scientific Affairs convened a panel of experts (the 2014 Panel) to provide dental professionals with a more specific and practical set of guidelines, the results of which are included in this article.

Supplemental material is available online.

The 2014 Panel considered the direct evidence linking a PJI with a dental procedure but did not reevaluate intermediate outcomes, including bacteremia[4] from manipulation of oral mucosa. The full report of the 2012 Panel, which includes intermediate outcomes, is available online.[1] The 2014 Panel addressed the following clinical question: For patients with prosthetic joints, is there an association between dental procedures and PJI, and, therefore, should systemic antibiotics be prescribed before patients with prosthetic joint implants undergo dental procedures? In this article, we present the evidence to answer this question and provide clinical recommendations.

EVIDENCE REVIEW

Because the 2012 Panel[1] conducted a comprehensive search of the biomedical literature and screened the results of the search according to defined inclusion and exclusion criteria, the 2014 Panel chose to use the literature selected by the 2012 Panel as the foundation of this CPG. In addition, the 2014 Panel updated the literature search and screening process to identify additional evidence. The methods are presented in Appendix 1 (available online at the end of this article). The 2014 Panel assessed each identified study according to the Critical Appraisal Skills Programme case-control critical appraisal tool[5] and then summarized the body of evidence to determine the level of certainty in the effect estimate and corresponding strength of the recommendation. Details about the process for generating clinical recommendations are in Appendix 2 (available online at the end of this article). The 2014 Panel did not conduct a meta-analysis because a meta-analysis of observational studies can produce precise, but possibly spurious, estimates of risk owing to the effects of confounding.[6]

In their systematic review,[1] the 2012 Panel identified 1 study that provided direct evidence about dental procedures as risk factors for developing prosthetic hip and knee implant infections. The study by Berbari and colleagues[7] was a case-control study of 339 patients with infected hip or knee prostheses (cases), and the authors matched them with 339 patients who did not have infected hip or knee prostheses (controls) and who were hospitalized in an orthopedic service at the Mayo Clinic Care Network (Rochester, MN) from December 2001 through May 2006. The authors reviewed and abstracted information from dental records to determine the association between the dental procedures (exposure) and hip and knee infections. Exposure was measured within the previous 6 months and 2 years before hospital admission and classified as low-risk dental procedures (fluoride treatment, restorative dentistry, and endodontic treatment) and high-risk dental procedures (periodontal treatment, extractions, treatment of a dental abscess, oral surgery, and dental hygiene), as defined by Berbari and colleagues.[7]

The authors controlled for confounding variables by matching control patients to case patients on the basis of joint arthroplasty location, resulting in exactly the same number of prosthetic hip (n = 164) and knee (n = 175) replacements among cases and controls. The authors also controlled for confounding by providing each patient with a yes versus no propensity score regarding whether the patient had had a dental visit during the period of data abstraction. The score took into account several covariates—including sociodemographic and behavioral information, comorbidities, and the American Society of Anesthesiologists score—that influenced a patient's propensity to visit a dentist. The authors also controlled for covariates such as antibiotic prophylaxis, sex, and joint effect. The regression models included all of these covariates and confounding variables.

The regression modeling used odds ratios (ORs), and the results showed no statistical association between having undergone high-risk dental procedures without antibiotics and PJIs at either 6-months (OR = 0.8; 95% confidence interval [CI], 0.4-1.7) or 2-years (OR = 0.8; 95% CI, 0.4-1.6) after the procedure. High-risk dental procedures with antibiotics were statistically significant at 6 months (OR = 0.5; 95% CI, 0.3-0.9), but not at 2 years (OR = 0.7; 95% CI, 0.5-1.1). All 4 of these ORs are below the null value of 1, indicating that case patients

ABBREVIATION KEY. **AAOS:** American Academy of Orthopaedic Surgeons. **ADA:** American Dental Association. **CPG:** Clinical practice guideline. **PJI:** Prosthetic joint infection.

had lower odds of having undergone dental procedures than did control patients.

The 2014 Panel identified 3 additional case-control studies via its updated literature search process.[8-10] The first study was by Skaar and colleagues.[9] They extracted data (*International Classification of Diseases, Ninth Revision, Clinical Modification* for procedures associated with hospital use in the United States: codes 81.5, 81.51, 81.52, 81.54, 81.56, 81.57, 81.80, 81.81, 81.84, 81.9, and 996.99) for the years 1997 through 2006 from the Medicare Current Beneficiary Survey. The nested case-control study included 168 participants who had undergone total arthroplasty—42 case participants who had PJIs matched according to age group, sex, and number of comorbid conditions with 126 control participants who did not. Dental data were based on patients' self-reports, which are susceptible to recall bias. The authors reported that control participants were more likely to have undergone invasive dental procedures than were case participants, although this result was not significant (main results were expressed as time to event with hazard ratios [HRs] and association with ORs: HR = 0.78 [95% CI, 0.18-3.39]; OR = 0.56 [95% CI, 0.18-1.74]; $P = .45$; neither the HR nor the OR was significant). Invasive dental procedures, as defined by Skaar and colleagues,[9] included teeth cleaning (including periodontal procedures), extractions, and endodontic procedures. The authors noted that the statistical power for their study was low. Despite the risk of bias, the study results appeared to be valid, generalizable, and consistent with those of other related studies in which investigators failed to demonstrate an association between dental procedures and PJI.

The second study also was a nested case-control study in which Swan and colleagues[10] addressed events associated with PJI. They identified 17 patients (of 1,641 who underwent arthroplasty between 1998 and 2006 in a tertiary referral center) in whom PJI developed more than 3 months postoperatively. The authors identified 51 control patients from a central institutional audit database, but it was unclear whether case and control participants were demographically similar. In addition, there was high susceptibility for recall bias because the exposure data were collected via telephone. The 2 factors most associated with PJI were having cellulitis or having more than 4 comorbidities. The authors used data for dental procedures as published in the article to create a 2×2 table and calculate the OR as 1.53 (95% CI, 0.13-18.03). We did not calculate a *P* value, but the CI was wide enough and includes the null value of 1; therefore, it failed to demonstrate an association between dental procedures and PJI.

The third study was a nested case-control study in which Jacobson and colleagues[8] recruited case participants from approximately 2,700 patients with prosthetic knee or hip joints that had been placed in 1 of 2 hospitals from 1970 through 1983. The authors identified 30 case participants with late (> 6 months after implant placement) PJI and 100 control patients, although it was unclear whether or how the control patients were matched with the case patients. The authors reviewed dental charts, but they did not mention masking of data abstractors or the types of dental procedures that were performed. The authors did not account for any confounding factors such as age, sex, smoking status, or medical conditions. The authors performed a Fisher exact test, and from the published data we calculated an OR of 0.07 (95% CI, 0.01-0.56). This result provided evidence that there is an association between dental procedures and PJI; however, the OR and Fisher exact test results implied that those undergoing dental procedures were at lower risk of developing PJI. The methodological limitations of this study affect the validity and generalizability of its results; furthermore, the results are inconsistent with other studies in which investigators failed to show an association between dental procedures and PJI.

CLINICAL RECOMMENDATION AND RATIONALE

Using eTable 1 (available online at the end of this article) as a guide, the 2014 Panel judged with moderate certainty that there is no association between dental procedures and the occurrence of PJIs. The 2014 Panel made this judgment on the basis of the following 2 considerations. The first was consistency between results, in that the results of 3 of 4 studies failed to show an association between dental procedures and PJI, and the results of the fourth study showed a protective effect of dental procedures on PJI. The second was that although the number of studies was limited, it is unlikely that the results of the additional studies would have changed the conclusion. The 2014 Panel made the assumption that the evidence regarding hip and knee joint infections can be extrapolated to all joints on the basis of the morphologic and physiological characteristics of the tissues involved. This extrapolation is necessary for clinical relevance because, to our knowledge, no studies have been published addressing the relationship between dental treatment and infections of other types of prosthetic joints. Using the ADA's methods for generating clinical recommendation statements as described in eTable 2 (available online at the end of this article), when there is moderate certainty of no association, the strength of the recommendation is *against*. The term *against* means that evidence suggests not implementing this intervention or discontinuing ineffective procedures (eTable 3, available online at the end of this article).

On the basis of this rationale, the 2014 Panel makes the following clinical recommendation as depicted in the Sidebar at the end of the article: In general, for patients with prosthetic joint implants, prophylactic antibiotics are not recommended prior to dental procedures to prevent prosthetic joint infection. The practitioner and

patient should consider possible clinical circumstances that may suggest the presence of a significant medical risk in providing dental care without antibiotic prophylaxis, as well as the known risks of frequent or widespread antibiotic use.

This report is intended to assist practitioners with making decisions about the prophylactic use of antibiotics to prevent PJIs. The recommendations in this document are not intended to define a standard of care and rather should be integrated with the practitioner's professional judgment and the patient's needs and preferences.

RISK FACTORS FOR DEVELOPING PROSTHETIC JOINT INFECTION INDEPENDENT OF DENTAL PROCEDURES

One case-control study[7] identified a number of nondental risk factors for developing PJI. In this study, Berbari and colleagues[7] evaluated both preoperative and postoperative factors associated with PJI. The most clinically relevant of these factors were postoperative, especially wound drainage after arthroplasty (OR = 18.7; 95% CI, 7.4-47.2). Other postoperative factors associated with PJI were wound hematoma after arthroplasty (OR = 2.5; 95% CI, 1.3-9.5) and postoperative urinary tract infection (OR = 2.7; 95% CI, 1.04-7.1). The OR for surgical site infection could not be calculated because there were no PJIs among the control subjects. Thus, the patients at the highest risk of developing PJI had drainage, an infection, or both after undergoing arthroplasty. There were no data regarding whether use of prophylactic antibiotics decreased the risk of developing PJIs in patients with these specific postoperative conditions.

Other conditions, as defined by Berbari and colleagues,[7] with significant ORs (ranging from 1.8 to 2.2) for PJI independent of dental procedures, were preoperative factors including prior operation/arthroplasty on the index joint, diabetes mellitus, and/or being immunocompromised (defined[7] as rheumatoid arthritis or current use of systemic steroids/immunosuppressive drugs or diabetes mellitus or presence of a malignancy or a history of chronic kidney disease). However, the magnitude of these ORs may not be clinically relevant. Observational studies such as those with a case-control design do not involve the use of randomization and are more prone to the effects of bias and confounding. Therefore, some epidemiologists maintain that in case-control studies significant ORs of less than 4 may not be large enough to be clinically relevant.[11] The upper limit of the 95% CIs for the preoperative factors did not include values of 4 or greater in the results of the case-control study by Berbari and colleagues.[7] Thus, although these factors were significant, the effects of these medical conditions on the risk of developing PJI may not be clinically relevant. Independent of having undergone a dental procedure, it appears that postoperative factors such as drainage or infection after undergoing arthroplasty were associated more strongly with PJI than are having undergone previous surgery or arthroplasty of the index joint, being immunocompromised, or having a medical condition such as diabetes mellitus.

FURTHER CONSIDERATIONS

The following considerations contribute to the argument against antibiotic prophylaxis.

Antibiotic resistance. There is a long-standing and increasing concern that repeated exposure to antibiotics is a risk factor for the development of resistant bacterial species (for example, penicillin-resistant streptococci).[12-14]

Adverse drug reactions. Although there are no data regarding the risk of developing a drug reaction from 1 dose of amoxicillin prescribed to prevent a distant site infection such as PJI, older data involving prophylaxis regimens that included intramuscular injections and multiple oral doses suggest that more people who are given antibiotic prophylaxis would experience drug reactions from penicillin-type drugs—some of which may be fatal—than would be prevented from developing PJI.[15] Of all allergens, penicillin is the most frequent medication-related cause of anaphylaxis in humans, and its use is the cause of approximately 75% of fatal anaphylaxis cases in the United States each year.[16] Other potential antibiotic-associated adverse reactions include nausea, vomiting, and diarrhea. There also is an increased risk of experiencing adverse reactions with increasing patient age (that is, in patients 70 years or older),[17] which is compounded by the increased frequency of arthroplasty in older patient cohorts.[18]

Prolonged treatment with antibiotics is associated with infections secondary to changes in the gastrointestinal microbial flora, which includes that involved in the development of oral thrush. For example, *Clostridium difficile* infection potentially can cause pseudomembranous colitis after patients are prescribed antibiotics to treat other infections.[19] Recognizing that a single dose of antibiotics for prophylaxis of PJI is unlikely to cause a *C difficile* infection, comprehensive dental care often involves multiple appointments over a short period. In addition, patients may have taken antibiotics for other medical conditions in the past, increasing their risk of experiencing changes in the gastrointestinal flora. The Centers for Disease Control and Prevention has estimated that annually there are approximately 250,000 people with *C difficile* infections that require hospitalization or already affect hospitalized patients, resulting in 14,000 deaths per year.[20] Investigators have identified clindamycin, cephalosporins, and fluoroquinolones as the inducing agents.[19]

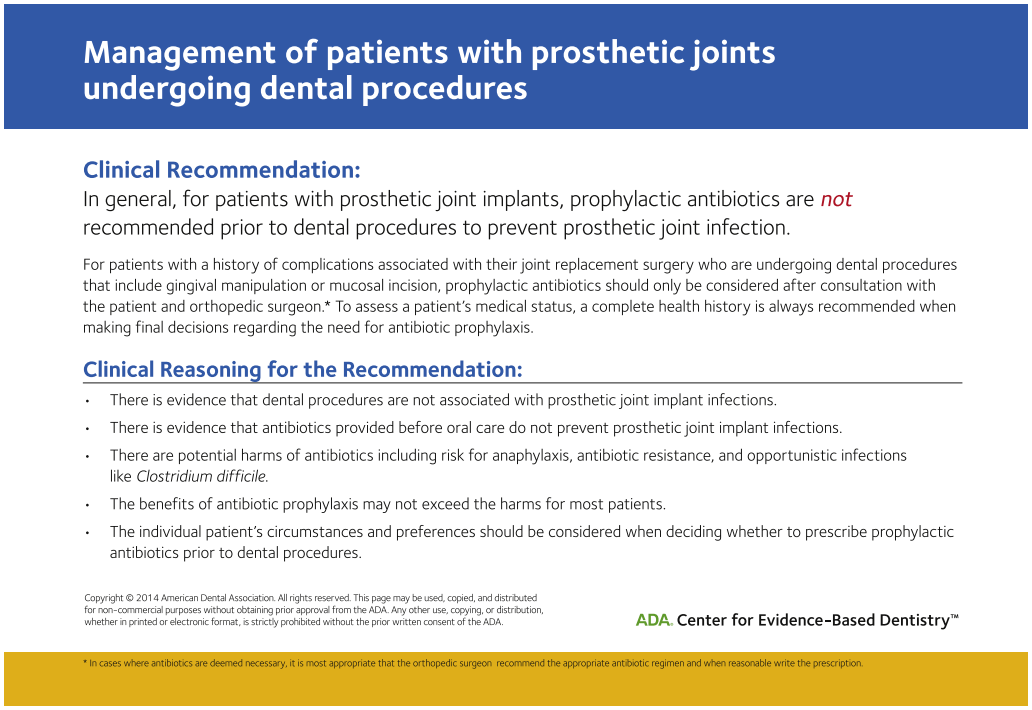
Cost. The results of a 2013 report indicate that the annual cost of amoxicillin administered to patients with hip and knee prostheses before dental procedures in the United States may exceed $50 million.[21]

CONCLUSIONS

Evidence fails to demonstrate an association between dental procedures and PJI or any effectiveness for antibiotic prophylaxis. Given this information in conjunction with the potential harm from antibiotic use, using antibiotics before dental procedures is not recommended to prevent PJI. Additional case-control studies are needed to increase the level of certainty in the evidence to a level higher than moderate. ■

SUPPLEMENTAL DATA

Supplemental data related to this article can be found at http://dx.doi.org/10.1016/j.adaj.2014.11.012.



Management of patients with prosthetic joints undergoing dental procedures

Clinical Recommendation:

In general, for patients with prosthetic joint implants, prophylactic antibiotics are *not* recommended prior to dental procedures to prevent prosthetic joint infection.

For patients with a history of complications associated with their joint replacement surgery who are undergoing dental procedures that include gingival manipulation or mucosal incision, prophylactic antibiotics should only be considered after consultation with the patient and orthopedic surgeon.* To assess a patient's medical status, a complete health history is always recommended when making final decisions regarding the need for antibiotic prophylaxis.

Clinical Reasoning for the Recommendation:

- There is evidence that dental procedures are not associated with prosthetic joint implant infections.
- There is evidence that antibiotics provided before oral care do not prevent prosthetic joint implant infections.
- There are potential harms of antibiotics including risk for anaphylaxis, antibiotic resistance, and opportunistic infections like *Clostridium difficile.*
- The benefits of antibiotic prophylaxis may not exceed the harms for most patients.
- The individual patient's circumstances and preferences should be considered when deciding whether to prescribe prophylactic antibiotics prior to dental procedures.

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* In cases where antibiotics are deemed necessary, it is most appropriate that the orthopedic surgeon recommend the appropriate antibiotic regimen and when reasonable write the prescription.

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Appendix 1
UPDATED LITERATURE SEARCH

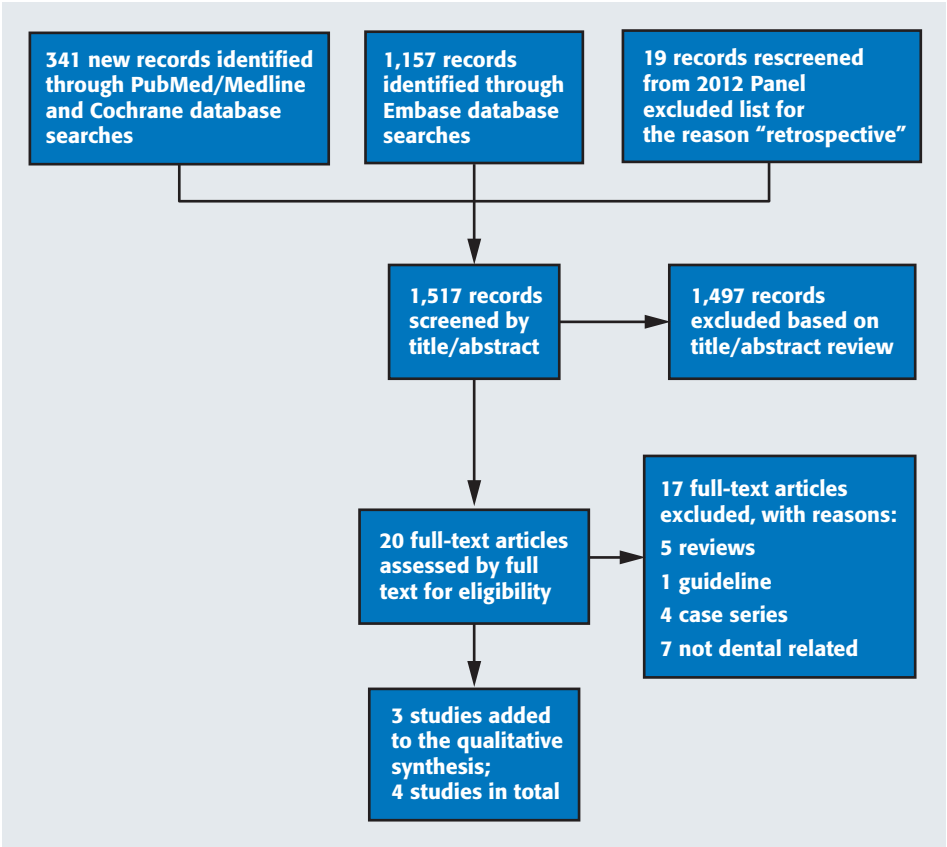
We conducted an updated literature search in February 2014 by using the identical search strategy as that described in Appendix IV of the 2012 Panel's article[1] to identify any articles published since the previous search was conducted in 2011. The updated literature search and full-text review process compelled the 2014 Panel to review the list of articles excluded at the full-text stage in the 2012 Panel's manuscript (Table 58 in Appendix III of the 2012 Panel's article[1]) for the reason that they were retrospective. According to the study selection criteria,[1] only retrospective case series were eligible for exclusion; therefore, the 2014 Panel judged that 2 additional case-control studies[2,3] that had been rejected should be included in the evidence. We screened all records independently and in duplicate. The eFigure shows the results of these searching and screening procedures. The articles that we excluded at the full-text stage are shown in eTable 4[4-20] with reasons for the exclusions. eTable 5[21-24] shows the critical appraisal results for each of the four included studies.

Appendix 2
PROCESS FOR DEVELOPING CLINICAL RECOMMENDATIONS

The level of certainty in the effect estimate is judged as high, moderate, or low, according to a grading system (eTable 1) amended from the *ADA Clinical Practice Guidelines Handbook: 2013 Update*.[25] The level of certainty refers to the probability that the 2014 Panel's assessment of the effect estimate is correct. The criteria for assessment include several components of the evidence, including the number of studies, number of participants, methodological quality, believability of results, applicability of the results to populations of interest, and consistency of findings across studies.

The level of certainty is combined with the net benefit rating as shown in eTable 2 to arrive at clinical recommendation strengths (that is, *strong*, *in favor*, *weak*, *expert opinion for*, *expert opinion against*, or *against*). eTable 3 shows the definitions of these strengths of recommendations.

The 2014 Panel approved clinical recommendations by means of a unanimous vote. The 2014 Panel sought comments on this report from other subject matter experts, methodologists, epidemiologists, and end users before finalizing the recommendations. The ADA Council on Scientific Affairs approved the final report for publication.



eFigure. Results of literature search and screening procedures.

eTABLE 1

Level of certainty categories.

LEVEL OF CERTAINTY IN EFFECT ESTIMATE	DESCRIPTION
High	The body of evidence usually includes consistent results from well-designed, well-conducted studies in representative populations. This conclusion is unlikely to be affected strongly by the results of future studies. This statement is established strongly by use of the best available evidence.
Moderate	As more information becomes available, the magnitude or direction of the observed effect could change, and this change could be large enough to alter the conclusion. This statement is based on preliminary determination from the current best available evidence, but confidence in the estimate is constrained by 1 or more factors, such as ▬ the number or size of studies; ▬ risk of bias of individual studies leading to uncertainty in the validity of the reported results; ▬ inconsistency of findings across individual studies; and ▬ limited generalizability to the populations of interest.
Low	More information could allow a reliable estimation of effects on health outcomes. The available evidence is insufficient to support the statement, or the statement is based on extrapolation from the best available evidence. Evidence is insufficient, or the reliability of estimated effects is limited by factors such as ▬ the limited number or size of studies; ▬ important flaws in study design or methods leading to lack of validity; ▬ substantial inconsistency of findings across individual studies; and ▬ findings not generalizable to the populations of interest.

eTABLE 2

Balancing level of certainty and net benefit rating to arrive at clinical recommendation strength.

LEVEL OF CERTAINTY	NET BENEFIT RATING		
	Benefits Outweigh Potential Harms	**Benefits Balanced With Potential Harms**	**No Benefit, Potential Harms Outweigh Benefits, or No Association**
High	Strong	In Favor	Against
Moderate	In Favor	Weak	Against
Low	Expert opinion for or expert opinion against		

eTABLE 3

Definitions for the strength of the recommendation.

RECOMMENDATION STRENGTH	DEFINITION
Strong	Evidence strongly supports providing this intervention.
In Favor	Evidence favors providing this intervention.
Weak	Evidence suggests implementing this intervention after alternatives have been considered.
Expert Opinion For	Evidence is lacking; the level of certainty is low. Expert opinion guides this recommendation.
Expert Opinion Against	Evidence is lacking; the level of certainty is low. Expert opinion suggests not implementing this intervention.
Against	Evidence suggests not implementing this intervention or discontinuing ineffective procedures.

eTABLE 4

Articles excluded at full-text stage.

ARTICLE	REASON FOR EXCLUSION
Bell and Colleagues,[4] 1990	Narrative review
Chen and Colleagues,[5] 2014	Not a study; work group question and answer
Dubee and Colleaues,[6] 2013	No dental exposure
Gomez and Colleagues,[7] 2011	Question and answer
Jacobsen and Murray,[8] 1980	Retrospective case series
Jacobson and Matthews,[9] 1987	Retrospective case series from same population as 1986 article that is included
LaPorte and Colleagues,[10] 1999	Case series
Legout and Colleagues,[11] 2012	Review
Marculescu and Colleagues,[12] 2006	No measure of dental outcomes
McGowan and Hendrey,[13] 1985	Narrative review
Mercuri,[14] 2012	Narrative review
Sendi and Colleagues,[15] 2011	Retrospective cohort with no dental exposure
Sendi and Colleagues,[16] 2011	Retrospective cohort with no dental exposure
Seymour and Colleagues,[17] 2003	Narrative review
Tornero and Colleagues,[18] 2012	Retrospective case series
Waldman and Colleagues,[19] 1997	Retrospective case series
Zywiel and Colleagues,[20] 2011	No measure of dental exposures

eTABLE 5

Critical appraisals of the included studies.

QUESTIONS	SKAAR AND COLLEAGUES,[21] 2011	SWAN AND COLLEAGUES,[3] 2011	BERBARI AND COLLEAGUES,[22] 2010	JACOBSON AND COLLEAGUES,[2] 1986
Did the Study Address a Clearly Focused Issue?	Yes: 1,000 participants from Medicare Current Beneficiary Survey. This was the cohort from which the 168 participants of the case-control study were selected.	Yes: It addressed sentinel events associated with prosthetic joint infection.	Yes: The population was selected on the basis of outcomes, which were patients with and without prosthetic joint infection. The risk factors (exposure) were high- and low-risk dental procedures with and without antibiotics.	Yes: The study examined the association between dental procedures and late prosthetic joint infection.
Did the Authors Use an Appropriate Method to Answer Their Question?	Yes: A nested case-control study is appropriate to answer the clinical question.	Yes: A nested case-control study is appropriate to answer the clinical question.	Yes: A case-control study starts with the outcome and typically looks retrospectively for differences in exposure. Case-control studies are excellent for rare diseases or outcomes, and this study addressed the study question.	Yes: A nested case-control study is appropriate for answering the clinical question.
Were the Case Participants Recruited in an Acceptable Way?	Yes: Case participants were recruited from the Medicare Current Beneficiary Survey database from 1997 through 2006. Case participants were defined clearly as having experienced a prosthetic joint infection.	Yes: Case participants were patients with prosthetic joint infection developing more than 3 months postoperatively, in 1,641 patients undergoing arthroplasty between 1998 and 2006 at a tertiary referral center. Seventeen case patients were identified.	Yes: Case participants were patients with a prosthetic hip or knee infection who were hospitalized at the Mayo Clinic (Rochester, MN) from December 2001 through May 2006. Case patients appeared to represent a geographically diverse population as well (Table 2 in the article). At 80% power, we would need a total sample of approximately 240 patients, or 120 per group. The study had 339 patients per group. The power calculation is as follows: $(0.30 - 0.15) \div \sqrt{0.225(1 - 0.225)} = 0.36$, which is the standardized difference. Using Altman's nomogram[23] gives the total sample at 240 patients.	Yes: The case participants were recruited from approximately 2,700 hospital and dental charts from 2 hospitals in Michigan from 1970 through 1983. The authors identified 30 patients with late prosthetic joint infection.
Were the Control Participants Selected in an Acceptable Way?	Yes: Selection of control patients in a case-control study is complex. The nested case-control study format was advantageous in that the control patients were selected from the same Medicare Current Beneficiary Survey database during the same period as the case patients.	Unable to determine: Control patients were identified from a central institutional audit database. It is unclear whether they were similar to case patients treated at the tertiary referral center. Appropriate selection of control patients is 1 of the major problems with case-control studies, and it is curious why control patients were not selected from the same referral center or geographic area. Control patients were matched in a 3:1 ratio, resulting in 51 control patients.	Yes: Selection of control patients in a case-control study is rather complex. This study's authors selected for control patients those with a prosthetic hip or knee, hospitalized on an orthopedic service, who did not have a prosthetic joint infection. Paired matching was not performed (that is, individual matching to attributes such as age, sex, or smoking status). However, frequency matching was performed on the joint arthroplasty location, resulting in exactly the same number of prosthetic hip ($n = 164$) and knee ($n = 175$) replacements in the case and control groups.	Unable to determine: The authors identified 100 patients without prosthetic joint infection as control patients. It is unclear whether they were from the same institutions or were matched to case patients in any way.

eTABLE 5 (CONTINUED)

QUESTIONS	SKAAR AND COLLEAGUES,[21] 2011	SWAN AND COLLEAGUES,[3] 2011	BERBARI AND COLLEAGUES,[22] 2010	JACOBSON AND COLLEAGUES,[2] 1986
Was the Exposure Accurately Measured to Minimize Bias?	Unable to determine: The authors obtained the dental records from the Medicare Current Beneficiary Survey, but those records were based on patient self-reporting. Thus, the exposure is susceptible to recall bias. In addition, there did not appear to be any masking of those assessing the dental records, raising the possibility of detection bias.	No: The exposure data were collected by means of phone calls to both case and control patients. This method is highly susceptible to recall or memory bias.	Yes: Although measurement bias cannot be ruled out owing to uncertainty about what exactly was being measured, the authors obtained and analyzed dental records. This method minimized recall bias, which commonly is assessed by using a patient's memory for details on exposure. Furthermore, investigators were masked during dental record analysis, minimizing detection bias.	Unable to determine: Although the authors used dental charts in this study, there is no mention of assessor masking or a detailed explanation of what type of dental procedures were performed.
A. What Confounding Factors Have the Authors Accounted For? **B. Have the Authors Taken Account of the Potential Confounding Factors in the Design, Their Analysis, or Both?**	A. They were matched for age, sex, and Charlson comorbidity index, which measures many different medical conditions. The authors selected control cases in a 3:1 ratio. B. Yes: For design owing to matching. Unable to determine for analysis because there was no mention of logistic regression analysis.	A. Age, sex, and date of surgery were the criteria the authors used for matching. This method has its limitations, and cases should have been matched based on medical, socioeconomic, and geographic factors. B. Partially: The authors used stepwise logistic regression analysis to examine which predictor variables (sentinel events, including dental procedures) were associated significantly with prosthetic joint infection.	A. The authors used geographic location, education level, history of kidney disease, history of malignancy, diabetes mellitus, use of systemic corticosteroids, rheumatoid arthritis, use of immunosuppressive medications, smoking history, body mass index, American Society of Anesthesiologists status, and sex. B. Yes: The authors controlled for many important confounding factors by using many covariates in a propensity score, which was calculated using logistic regression analysis. The authors used the propensity score to control for the propensity to visit a dentist (exposure).	A. The authors have not accounted for any confounding factors. They should have accounted for many, including age, sex, smoking status, multiple medical conditions, American Society of Anesthesiologists status, and geographic location. B. No: The authors performed no regression analysis to account for the effects of confounding variables.
What Are the Results of This Study?	The authors expressed main results as both time to event with hazard ratios (HRs) and association with odds ratios (ORs): HR = 0.78 (95% confidence interval [CI], 0.18-3.39); OR = 0.56 (95% CI, 0.18-1.74); $P = .45$. Neither the HR nor the OR was significant, although they indicated a trend for a reduction in the odds of having dental procedures for the PJI group. HRs were stable and did not move closer to the null value after adjustment for confounding factors. (This is a good thing and shows that results are not likely to be spurious owing to confounding).	The 2 factors most associated with PJI were having more than 4 comorbidities (risk ratio [RR] = 3.4; 95% CI, 1.5-7.7) and having cellulitis (RR = 2.7; 95% CI, 1.15-6.3). RR is not the appropriate summary statistic to use because risk cannot be calculated with case-control studies. OR should have been used because it also is the output of logistic regression analysis. In addition, the P values of 1.000 reported in Table 4 of the article are incorrect, further complicating the statistical analysis presented in the article. The crude OR we calculated for dental infection was 1.53, which by itself is not clinically relevant for association with prosthetic joint infection.	The authors reported the main results as an OR of 0.8 (95% CI, 0.4-1.6; $P = .56$) for high-risk dental procedures without antibiotics.	The authors performed a hypothesis test (Fisher exact test) and reported that $P = .0005$, although in the text it was stated as .005. A Fisher exact test is a form of χ^2 test and is appropriate for obtaining a P value for binary data when cells contain values less than 5. We performed a crude calculation for an OR of 0.07, confirming strong evidence against the null hypothesis of no association between dental procedures and prosthetic joint infection. There was no adjusting for confounding, and the results imply that dental procedures are associated with protection from PJI.

eTABLE 5 (CONTINUED)

QUESTIONS	SKAAR AND COLLEAGUES,[21] 2011	SWAN AND COLLEAGUES,[3] 2011	BERBARI AND COLLEAGUES,[22] 2010	JACOBSON AND COLLEAGUES,[2] 1986
How Precise Are the Results? How Precise Is the Estimate of Risk?	*P* values showed extremely weak evidence against the null hypothesis. CIs were rather wide, meaning there is a lack of precision around the summary estimates (HR and OR). However, the CIs were similar to those in the Berbari and colleagues[22] study, which had a much bigger sample, which shows the statistical efficiency of a nested case-control study—that is, by 3:1 matching, one maintains a great degree of statistical power.	The CIs were wide, indicating imprecision with the summary estimate.	The CIs were wide, owing to the low number of events in each group.	We have no measure of precision because the authors did not report CIs.
Do You Believe the Results?	Yes: Owing to good methodology and because we were not rejecting the null value, the results appeared valid—that is, observational studies with positive results are likely to have false–positive findings.[24]	No: ORs are always further away from the null value than are RRs, and it seems as if more than 4 comorbidities and cellulitis would have ORs around 4.5 or 5. The magnitude of these ORs would appear to be clinically relevant to developing PJI. However, the many methodological and statistical shortcomings with this article render the results unreliable.	Yes: This study's authors did a good job on several fronts from a power calculation, selection of control patients, propensity score, masking outcomes assessors, and seeking dental records rather than relying on patients' memories of dental visits.	No: Given the lack of information about control patients, and no matching or adjusting for confounding factors, it is unclear how accurate the results presented actually are.
Can the Results Be Applied to the Local Population?	Yes: The Medicare Current Beneficiary Survey would appear to be a representative sample of patients receiving prosthetic joints.	Yes: The patient population in this study appears to be similar in nature to the local population.	Yes: The participants appear to be similar to many populations undergoing this type of orthopedic surgery.	Unable to determine: Although the patient population was probably representative of patients with prosthetic joint infection, given the methodological and statistical shortcomings of the article, its external validity can be questioned.
Do the Results of This Study Fit With Other Available Evidence?	Yes: This study's results are in alignment with those of other case-control studies showing no association between dental procedures and prosthetic joint infection.	Yes: Certainly the association between prosthetic joint infection and cellulitis and, to a certain, extent comorbidities fits with what has been reported in other studies on this topic.	Yes: The results are consistent with those of other observational studies.	No: The authors of the 3 other case-control studies all failed to reject the null value. This study's authors presented strong evidence against the null value.

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Additional Recommendations for Antibiotic Prophylaxis for Dentistry Made by National Organizations

National Organization	Conditions	Antibiotic (dosage)	Comments
AHA (2003)	Pacemakers, defibrillators, ventriculoatrial shunts, closure devices, patches, stents, vascular grafts, Dacron grafts and patches, Vena caval filters, vascular closure devices, total artificial hearts, L ventricular assist devices	Select appropriate regimen and dosage listed in AHA (2007) if prophylaxis is indicated	Prophylaxis is not indicated except for I&D for abscess, extractions or other surgical procedures in areas of acute infections
AHA (2003)	Renal dialysis shunts		No indication for prophylaxis
CDC (2002)	Intravascular catheters ■ Intravenous ■ Intra-arterial		No indication for prophylaxis

Conditions Where Antibiotic Prophylaxis Has Been Used But With No National Organization Guidelines or Recommendations

Conditions	Antibiotic (dosage)	Comments
Organ transplants (heart, kidney, liver, heart-lung, bone marrow, others)	Many transplant surgeons recommend AHA regimens (2007) or Amoxicillin 2.0 g and Metronidazole 500 mg one hour prior	Most transplant surgeons recommend antibiotic prophylaxis for dental procedures; no controlled studies demonstrate benefit; prophylaxis may be appropriate during rejection phases, over-immunosupression, and if organ is functioning poorly. Prophylaxis usually is not indicated during the stable phase of transplant.
HIV/AIDS	Select appropriate regimen and dosage listed in AHA (2007) if prophylaxis is indicated	Prophylaxis not recommended unless neutrophil count is < 1,000 mm3 and/or if the CD4 count is < 200 mm3
Immunosupression ■ Drugs (steroids) ■ Diseases (agranulocytosis, AIDS, cancer, systemic lupus erythematosus) ■ Leukopenia	Select appropriate regimen and dosage listed in AHA (2007) if prophylaxis is indicated	Long-term corticosteroid therapy may be an indication for antibiotic prophylaxis. Patients with neutrophil count < 1,000 mm3 and/or CD4 count < 200 are candidates for antibiotic prophylaxis
Specific medical conditions: ■ Poorly controlled Type-I diabetes ■ Sickle cell anemia	No specific regimen recommended	Antibiotic prophylaxis may be indicated for surgery in poorly controlled diabetics and in patients with sickle cell anemia especially if infection is present
Splenectomy	No specific regimen recommended	Some authors suggest antibiotic prophylaxis for surgical procedures during the first 6 months following the splenectomy, others do not.
Implants ■ Breast ■ Penile	No specific regimen recommended	No indication for antibiotic prophylaxis for any dental procedures

Oral Health and Dental Treatment for the Pregnant Patient

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Oral Health Care During Pregnancy Expert Workgroup. *2012. Oral Health Care During Pregnancy: A National Consensus Statement-Summary of an Expert Workgroup Meeting.* Washington, D.C.: National Maternal and Child Oral Health Resource Center

In collaboration with
American College of Obstetricians and Gynecologists
American Dental Association

www.mchoralhealth.org

Guidance for Oral Health Professionals

Advise Pregnant Women About Oral Health Care

- Reassure women that oral health care, including use of radiographs, pain medication, and local anesthesia, is safe throughout pregnancy

Guidance for Oral Health Professionals

Advise Pregnant Women About Oral Health Care (cont.)

- Encourage women to continue to seek oral health care, practice good oral hygiene, eat healthy foods and attend prenatal classes during pregnancy.

Guidance for Oral Health Professionals

Advise Pregnant Women About Oral Health Care (cont.)

- Good oral hygiene tips:
  - Brush your teeth with fluoridated toothpaste twice a day. Replace your toothbrush every 3 or 4 months, or more often if the bristles are frayed. Do not share your toothbrush. Clean between teeth daily with floss or an interdental cleaner.

Guidance for Oral Health Professionals

Advise Pregnant Women About Oral Health Care (cont.)

- Good oral hygiene tips:
  - Rinse every night with an over-the-counter fluoridated, alcohol-free mouthrinse.
  - After eating, chew xylitol-containing gum or use other xylitol containing products such as mints, which can help reduce bacteria that can cause tooth decay.

Guidance for Oral Health Professionals

Advise Pregnant Women About Oral Health Care (cont.)

•Good oral hygiene tips:

– If you vomit, rinse your mouth with a teaspoon of baking soda in a cup of water to stop acid from attacking teeth.

Guidance for Oral Health Professionals

Work in Collaboration with Prenatal Care Health Professionals

•Consult with prenatal care health professionals, *as necessary*-for example, when considering the following:

– Co-morbid conditions that may affect management of oral problems (e.g., diabetes, hypertension, pulmonary or cardiac disease, bleeding disorders).

Guidance for Oral Health Professionals

Work in Collaboration with Prenatal Care Health Professionals

- Consult with prenatal care health professionals, *as necessary*-for example, when considering the following (cont.):
  - The use of intravenous sedation or general anesthesia.
  - The use of nitrous oxide as an adunctive analgesic to local anesthetics.

Guidance for Oral Health Professionals

Provide Oral Disease Management and Treatment to Pregnant Women

•Provide emergency or acute care at any time during the pregnancy, as indicated by the oral condition

•Develop, discuss with women, and provide a comprehensive care plan that includes prevention, treatment, and maintenance throughout pregnancy. Discuss benefits and risks of treatment and alternatives to treatments.

Guidance for Oral Health Professionals

Provide Oral Disease Management and Treatment to Pregnant Women (cont.)

- Use standard practice when placing restorative materials such as amalgam and composites.
- Use a rubber dam during endodontic procedures and restorative procedures.

Guidance for Oral Health Professionals

Provide Oral Disease Management and Treatment to Pregnant Women (cont.)

•Position pregnant women appropriately during care:

– Keep the woman's head at a higher level than her feet.

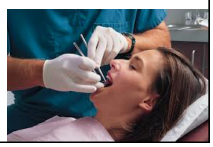
– Place women in a semi-reclining position, as tolerated, and allow frequent position changes.

– Place a small pillow under the right hip, or have the women turn slightly to the left as needed to avoid dizziness or nausea resulting from hypotension.

Guidance for Oral Health Professionals

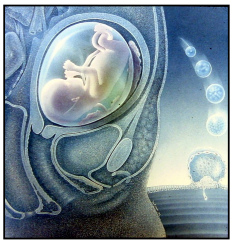
Provide Oral Disease Management and Treatment to Pregnant Women (cont.)

- Follow up with pregnant women to determine whether preventive and restorative treatment has been effective.



Drug Administration

"The potential benefit to the patient must outweigh the potential harm to the fetus"



FDA Categorization of Prescription Drugs for Use in Pregnancy

A = Controlled studies in humans fail to demonstrate a risk to the fetus, and the possibility of fetal harm appears remote.

B = Animal studies do not indicate fetal risk and there are no human studies, or animal studies show a risk but controlled human studies do not.

C = Animal studies have shown a risk but there are no controlled human studies or no studies are available in humans or animals.

FDA Categorization of Prescription Drugs for Use in Pregnancy

D = Positive evidence of human fetal risk exists, but in certain situations the drug may be used despite its risk

X = Positive evidence of human fetal risk exits, and the risk outweighs any possible benefit of use

Pharmacological Considerations for Pregnant Women

The pharmacological agents listed below are to be used only for indicated medical conditions and with appropriate supervision.

Pharmaceutical Agent	Indications, Contraindications, and Special Considerations
Analgesics	
Acetaminophen	May be used during pregnancy.
Acetaminophen with Codeine, Hydrocodone, or Oxycodone	
Codeine	
Meperidine	
Morphine	
Aspirin	May be used in short duration during pregnancy; 48 to 72 hours. Avoid in 1st and 3rd trimesters.
Ibuprofen	
Naproxen	

Pharmacological Considerations for Pregnant Women

The pharmacological agents listed below are to be used only for indicated medical conditions and with appropriate supervision.

Antibiotics	
Amoxicillin	May be used during pregnancy.
Cephalosporins	
Clindamycin	
Metronidazole	
Penicillin	
Ciprofloxacin	Avoid during pregnancy.
Clarithromycin	
Levofloxacin	
Moxifloxacin	
Tetracycline	Never use during pregnancy.

Pharmacological Considerations for Pregnant Women

The pharmacological agents listed below are to be used only for indicated medical conditions and with appropriate supervision.

Anesthetics	Consult with a prenatal care health professional prior to using intravenous sedation or general anesthesia.
Local anesthetics with epinephrine (e.g., Bupivacaine, Lidocaine, Mepivacaine)	May be used during pregnancy.
Nitrous oxide (30%)	May be used during pregnancy when topical or local anesthetics are inadequate. Pregnant women require lower levels of nitrous oxide to achieve sedation; consult with prenatal care health professional.
Over-the-Counter Antimicrobials	Use alcohol-free products during pregnancy.
Cetylpyridinium chloride mouth rinse	May be used during pregnancy.
Chlorhexidine mouth rinse	
Xylitol	

Oral Health Care During Pregnancy Expert Workgroup. 2012. "Oral Health Care During Pregnancy: A National Consensus Statement- Summary of an Expert Workgroup Meeting." Washington, DC: National Maternal and Child Oral Health Resource Center.

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

Hari Cheryl Sachs, MD., FAAP and COMMITTEE ON DRUGS

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The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

- The benefits of breastfeeding outweigh the risk of exposure to most therapeutic agents via human milk
  - Greater vulnerability of some infants such as preemies or neonates due to immature organ function or underlying medical conditions

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

- **Most drugs and vaccines are safe for women to take while breastfeeding**
  - Caution needed for a small proportion of drugs:
    - Those concentrated in human milk
    - Those that have a long half-life
    - Those with known toxicity to mother or child
    - Those that expose the infant to relatively high doses or detectible serum concentrations

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

- Most up-to-date data and comprehensive information related to drugs and breastfeeding is compiled in a National Institute's of Health database called **LactMed**, available on the Internet and as an app for mobile devices

http://toxnet.nlm.nih.gov

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

LactMed database includes the following information:

- Levels of individual drugs found in human milk and infant serum
- Possible adverse effects on the infant and/or lactation
- Alternate drug recommendations

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

Narcotic Analgesics

When narcotic agents are needed to treat pain in breastfeeding women agents other codeine are preferred

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

Narcotic Analgesics

- ***Codeine*** *and* ***Hydrocodone*** can reach high levels in breast milk
  - Adverse events reported:
    - Unexplained apnea
    - Bradycardia
    - Cyanosis
    - Sedation

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

Narcotic Analgesics

- The following are ***not*** recommended in the lactating mother
  - ***Oxycodone-*** a relatively high amount excreted into human milk and therapeutic concentrations have been detected in the plasma of a nursing infant
    - Central nervous system depression noted in 20% of infants exposed during breastfeeding

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

Narcotic Analgesics

- The following are ***not*** recommended in the lactating mother
  - ***Pentazocine (Talwin)***
  - ***Meperidine (Demerol)***

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Narcotic Analgesics

- The following ***are*** recommended in the
  - ***Butorphanol***
  - ***Morphene***
  - ***Hydrpmorphone (Dilaudid)***

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Narcotic Analgesics

•Regardless of choice of therapy, to minimize adverse events for both the mother and her nursing infant, the lowest dose and shortest duration of therapy should be prescribed.

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

Non-Narcotic Analgesics

•Drugs acceptable for use in breastfeeding
- Ibuprofen
- Acetaminophen
- Celecoxib (Celebrex)
- Flurbiprofen (Ansaid)
- Naproxen (short term)
- Low doses of aspirin (75-162 mg/d)(high doses not advised)

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

Non-Narcotic Analgesics

•Limited published data on other NSAIDs and use is ***discouraged*** in breastfeeding

- **Etodolac**
- **Fenoprofen**
- **Meloxicam**
- **Oxaprozin**
- **Piroxicam**
- **Sulindac**
- **Tolmetin**

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

Antidepressants, Anxiolytics, and Antipsychotics

- Some of these agents appear in breast milk at clinically significant levels

- **Bupropion (Wellbutrin)**
- **Diazepam (Valium)**
- **Fluoxetine (Prozac)**
- **Citalopram (Celexa)**
- **Lithium (Eskalith)**
- **Lamotrigine (Lamictal)**
- **Venlafaxine (Effexor)**

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

Antidepressants, Anxiolytics, and Antipsychotics

- Some of these agents appear in breast milk at clinically significant levels
  - The report recommended counseling women who want to breastfeed while taking these medications on the risk-benefit balance and the unknown long-term impact for the child

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

Herbs

•Reliable information on safety of many herbal products is lacking

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

Herbs

- The following herbs commonly used during breastfeeding are ***not*** recommended for use by nursing women

- **Chamomile**
- **Black Cohosh**
- **Blue Cohosh**
- **Chastetree**
- **Echinacea**

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

Herbs

- The following herbs commonly used during breastfeeding are ***not*** recommended for use by nursing women (continued)

- **Ginseng**
- **Gingko**
- ***Hypericum* (St. John's wort)**
- **Valarian**
- **Fenugreek**

Eating Disorder Referral Resources for the Dental Practice

The Renfrew Center
1-877-367-3383
www.Renfrew.org

National Institute of Mental Health
1-301-443-4513
www.nimh.nih.gov

National Eating Disorders Association Helpline
1-800-931-2277
www.nationaleatingdisorders.org

Eating Disorder Referral and Information Center
1-858-792-7463
www.edreferral.com

National Association of Anorexia Nervosa and Associated Disorders (ANAD)
1-847-831-3438
www.anad.org

American Anorexia and Bulimia Association, Inc. (AABA)
418 East 76th Street, New York, NY 10021
1-212-734-1114

Foundation for Education About Eating Disorders (FEED)
P.O. Box 799 Middletown, MD 21769

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SCOFF QUESTIONNAIRE

The SCOFF Questions*

Do you make yourself ***S****ick* because you feel uncomfortably full?

Do you worry you have lost ***C****ontrol* over how much you eat?

Have you recently lost ***Over*** 14 pounds in a 3-month period?

Do you believe yourself to be ***F****at* when others say you are too thin?

Would you say that ***F****ood* dominates your life?

*One point for every "yes"; a score of 2 or more indicates a likely case of anorexia nervosa or bulimia nervosa.

Reproduced from Obstetrics and Gynecology, Vol. 114, No. 6, December 2009; 1353-1367. Anderson AE, Ryan GL, Eating Disorders in the Obstetric and Gynecologic Patient Population.

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