



## Complete Summary

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### GUIDELINE TITLE

First aid: 2005 International Consensus Conference on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations.

### BIBLIOGRAPHIC SOURCE(S)

First aid. In: 2005 International Consensus Conference on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. Circulation 2005 Nov 29;112(22 Suppl):III115-25. [153 references]

### GUIDELINE STATUS

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT

SCOPE  
METHODOLOGY - including Rating Scheme and Cost Analysis  
RECOMMENDATIONS  
EVIDENCE SUPPORTING THE RECOMMENDATIONS  
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS  
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INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES  
IDENTIFYING INFORMATION AND AVAILABILITY  
DISCLAIMER

## SCOPE

### DISEASE/CONDITION(S)

Any medical condition or injury that requires first aid, including:

- Medical emergencies (asthma, anaphylaxis)
- Cervical spine injuries
- Severe bleeding
- Wounds and abrasions
- Thermal burns
- Musculoskeletal injuries (fractures, sprains, contusions)
- Dental injuries (tooth avulsion)
- Snake bites

- Cold injuries (hypothermia, frostbite)
- Poisoning (toxic exposure, chemical burns, ingested poisons)

## **GUIDELINE CATEGORY**

Management  
Treatment

## **CLINICAL SPECIALTY**

Allergy and Immunology  
Dentistry  
Emergency Medicine  
Family Practice  
Internal Medicine  
Neurology  
Pediatrics  
Pulmonary Medicine

## **INTENDED USERS**

Advanced Practice Nurses  
Allied Health Personnel  
Emergency Medical Technicians/Paramedics  
Health Care Providers  
Nurses  
Physicians  
Public Health Departments

## **GUIDELINE OBJECTIVE(S)**

To reduce morbidity and mortality due to emergency events and to analyze the scientific evidence that answers the following questions:

- What are the most common emergency conditions that lead to significant morbidity and mortality?
- In which of these emergency conditions can morbidity or mortality be reduced by the intervention of a first aid provider?
- How strong is the scientific evidence that interventions performed by a first aid provider are safe, effective, and feasible?

## **TARGET POPULATION**

Individuals with a medical condition or injury requiring first aid

## **INTERVENTIONS AND PRACTICES CONSIDERED**

### **Management/Treatment**

1. Management of medical emergencies (e.g., severe asthma, anaphylaxis)
  - Oxygen administration (considered but not recommended)

- Assistance with use of inhalers
  - Use of epinephrine autoinjector
2. Recovery position
  3. Cervical spine immobilization for cervical spine injuries
  4. Application of pressure to control severe bleeding (Note: use of tourniquets is considered but not recommended routinely)
  5. Management of wounds and abrasions
    - Irrigation with clean tap water
    - Application of antibiotic ointment
  6. Cooling of thermal burns with tap water
  7. Management of musculoskeletal injuries
    - Stabilization
    - Compression with circumferential bandage (considered but evidence is inadequate to make recommendation)
    - Application of cold (ice)
  8. Management of dental injuries (tooth avulsion)
    - Storage and transport of avulsed teeth in milk
  9. Management of elapid snakebites through pressure immobilization
  10. Management of hypothermia by passive and active warming
  11. Management of frostbite by rewarming
  12. Management of toxic exposure and chemical burns by irrigation with water
  13. Management of ingested poisons (note: administration of water or milk, syrup of ipecac, and activated charcoal are considered but not recommended)

## **MAJOR OUTCOMES CONSIDERED**

- Morbidity and mortality
- Hemorrhage control
- Wound infection rates

## **METHODOLOGY**

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

Hand-searches of Published Literature (Primary Sources)  
 Hand-searches of Published Literature (Secondary Sources)  
 Searches of Electronic Databases

### **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

All reviewers were instructed to search their allocated questions broadly. Reviewers documented their search strategies to ensure reproducibility of the search. The minimum electronic databases searched included the Cochrane database for systematic reviews and the Central Register of Controlled Trials (<http://www.cochrane.org/>), MEDLINE (<http://www.ncbi.nlm.nih.gov/PubMed/>), EMBASE ([www.embase.com](http://www.embase.com)), and the master reference library collated by the American Heart Association (AHA). To identify the largest possible number of relevant articles, reviewers were also encouraged to perform hand searches of journals, review articles, and books as appropriate.

The reviewers documented the mechanism by which studies relevant to the hypothesis were selected. Specific study inclusion and exclusion criteria and study limitations were documented. Inclusion of all relevant evidence (from animal and manikin/model studies as well as human studies) was encouraged.

## **NUMBER OF SOURCE DOCUMENTS**

Not stated

## **METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Weighting According to a Rating Scheme (Scheme Given)

## **RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

### **Levels of Evidence**

**Level 1:** Randomized clinical trials or meta-analyses of multiple clinical trials with substantial treatment effects

**Level 2:** Randomized clinical trials with smaller or less significant treatment effects

**Level 3:** Prospective, controlled, nonrandomized cohort studies

**Level 4:** Historic, nonrandomized cohort or case-control studies

**Level 5:** Case series; patients compiled in serial fashion, control group lacking

**Level 6:** Animal studies or mechanical model studies

**Level 7:** Extrapolations from existing data collected for other purposes, theoretical analyses

**Level 8:** Rational conjecture (common sense); common practices accepted before evidence-based guidelines

## **METHODS USED TO ANALYZE THE EVIDENCE**

Review of Published Meta-Analyses  
Systematic Review

## **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

A worksheet template was provided with step-by-step directions to help the experts document their literature review, evaluate studies, and determine levels of evidence. When possible, 2 expert reviewers were recruited to undertake independent evaluations for each topic.

## **Assessing the Quality of Evidence**

In this step reviewers were asked to determine the level of evidence of relevant studies (Step 2A), assess the quality of study research design and methods (Step 2B), determine the direction of results (Step 2C), and cross-tabulate assessed studies (Step 2D).

The levels of evidence used for the 2005 consensus process were modified from those used in 2000. In many situations summary conclusions were based on lower levels of evidence because human clinical trial data was not available. The reviewers assessed the quality of research design and methods and allocated each study to 1 of 5 categories: excellent, good, fair, poor, or unsatisfactory. Studies graded as poor or unsatisfactory were excluded from further analysis.

Reviewers evaluated the direction of the study results as supportive, neutral, or opposed and then depicted the data in 1 of 2 grids. The grids were 2-dimensional, showing quality and levels of evidence. The reviewers completed a Supporting Evidence grid and a Neutral or Opposing Level of Evidence grid.

## **Controversies Encountered**

### *Studies on Related Topics (Level of Evidence [LOE] 7)*

Many reviewers identified studies that answered related questions but did not specifically address the reviewer's initial hypothesis. Examples include the extrapolation of adult data for pediatric worksheets and extrapolation of the results of glucose control in critically ill patients to the postresuscitation setting. Worksheet reviewers were instructed to clearly designate evidence that represented extrapolations. Reviewers could designate such studies as LOE 7, or they could assign a level of evidence based on the study design but include terms such as "extrapolated from" with specific relevant details in the draft consensus on science statements to indicate clearly that these were extrapolations from data collected for other purposes.

### *Animal Studies and Mechanical Models*

Animal studies can be performed under highly controlled experimental conditions using extremely sophisticated methodology. Irrespective of methodology, all animal studies and all studies involving mechanical models (e.g., manikin studies) were classified as LOE 6. Specific details about these studies (including methodology) are included in the summary of science where appropriate.

### *Studies Evaluating Diagnosis or Prognosis*

The default levels of evidence used for the 2005 consensus process were not designed for the review of studies that evaluate diagnosis or prognosis. For these studies other methods of assigning levels of evidence were considered (such as those proposed by the Oxford Centre for Evidence-Based Medicine [<http://www.cebm.net/>]). Worksheet reviewers planning to include alternative levels of evidence were asked to define such levels clearly and to retain the default levels of evidence.

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus  
Expert Consensus (Consensus Development Conference)

## **DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Worksheet reviewers created a summary of the science. In the summary format reviewers were encouraged to provide a detailed discussion of the evidence, including the outcomes evaluated and the strengths and limitations of the data.

The final step in the science summary process was the creation of draft consensus on science statements and treatment recommendations. Statement templates were provided to standardize the comprehensive summary of information. Elements of the consensus on science statement template included the specific intervention or assessment tool, number of studies, levels of evidence, clinical outcome, population studied, and the study setting. Elements of the treatment recommendation template included specific intervention or assessment tool, population and setting, and strength of recommendation.

The statements drafted by the reviewers in the worksheets reflect the recommendations of the reviewers and may or may not be consistent with the conclusions of the 2005 Consensus Conference.

All 380 participants at the 2005 Consensus Conference received a copy of the worksheets on CD-ROM. Expert reviewers presented topics in plenary, concurrent, and poster conference sessions. Presenters and participants then debated the evidence, conclusions, and draft summary statements. Each day the most controversial topics from the previous day, as identified by the task force chairs, were presented and debated in one or more additional sessions. The International Liaison Committee on Resuscitation (ILCOR) task forces met daily during the conference to discuss and debate the experts' recommendations and develop interim consensus science statements. Each science statement summarized the experts' interpretation of all the relevant data on a specific topic. Draft treatment recommendations were added if a consensus was reached.

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

Not applicable

## **COST ANALYSIS**

A formal cost analysis was not performed and published cost analyses were not reviewed.

## **METHOD OF GUIDELINE VALIDATION**

External Peer Review  
Internal Peer Review

## DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Completed worksheets were posted on the Internet for further review. The initial process involved posting the worksheet to a password-protected area of the American Heart Association Intranet (accessible to worksheet reviewers). In December 2004 the completed worksheets were posted on an Internet site that could be accessed by the public for further review and feedback before the 2005 Consensus Conference in Dallas ([www.C2005.org](http://www.C2005.org)).

Wording of science statements and treatment recommendations was refined after further review by International Liaison Committee on Resuscitation (ILCOR) member organizations and the international editorial board. This format ensured that this final document represents a truly international consensus process.

The manuscript was ultimately approved by all ILCOR member organizations and by an international editorial board. The American Heart Association (AHA) Science Advisory and Coordinating Committee and the editor of *Circulation* obtained peer reviews of this document before it was accepted for publication. The document is being published simultaneously in *Circulation* and *Resuscitation*, although the version in *Resuscitation* does not include the sections on stroke and first aid.

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

Levels of Evidence (LOE) (1-8) are defined at the end of the "Major Recommendations" field.

#### Medical Emergencies

##### Oxygen Administration

There is insufficient evidence to recommend for or against the use of oxygen by the first aid provider.

##### Assistance With Use of Inhalers

Because the frequency and mortality from severe asthma is increasing (Mannino et al., 1998) and bronchodilator therapy is safe and can be effective during episodes of severe asthma, the first aid rescuer should assist with administration of bronchodilator therapy.

##### Epinephrine Autoinjector

Given the widespread use of epinephrine autoinjectors and their documented efficacy in the rapid delivery of epinephrine (Simons et al., 1998), first aid providers may be trained to assist in the use of an epinephrine autoinjector for a victim of anaphylaxis when the victim has a prescribed autoinjector and the victim is unable to use it.

## **Recovery Position**

The use of the recovery position with the victim lying on his or her side with the dependent hand placed in front of the body is recommended for the unconscious victim with an intact airway, spontaneous respiration, and signs of circulation. This position is easy to teach, but conscious volunteers who were placed in the position developed some vessel and nerve compression (LOE 3) (Rathgeber et al., 1996; Fulstow & Smith, 1993). Nerve and vessel injury can develop, particularly if the victim remains in the position for a long period of time.

The preferred position for the victim with known or suspected spinal injury is to stabilize the spine in the supine position and minimize movement of the victim. Use of the recovery position may be necessary if it is difficult to maintain a patent airway in the supine position, if the victim has secretions or emesis, or if the rescuer must leave the victim and there is no provider trained in spinal stabilization. If use of the recovery position is absolutely necessary, use the HAINES (High Arm In Endangered Spine) recovery position: extend the victim's arm above the head and roll the victim to the side so that the victim's head rests on that arm. Bend both legs to stabilize the victim.

## **Injury Emergencies**

### **Cervical Spine Injuries**

#### *Cervical Spine Stabilization*

Considering the serious consequences of spinal cord injury, most experts agree that spinal motion restriction should be the goal of early treatment of all patients at risk for spinal injury. The first aid provider should restrict spinal motion by manual spinal stabilization if there is any possibility of spinal injury.

In the absence of any evidence supporting the first aid use of immobilization devices and with some evidence suggesting potential harm even when these devices are used by healthcare providers, the first aid provider should refrain from use of spinal immobilization devices.

### **Severe Bleeding**

#### *Application of Pressure and Tourniquets*

The first aid provider should try to control external bleeding by applying direct pressure.

There is insufficient evidence to recommend for or against the first aid use of pressure points or extremity elevation to control bleeding.

Tourniquets may be useful under some unique conditions (e.g., battlefield conditions when rapid evacuation is required and ischemic time is carefully monitored). Additional studies are needed to identify those conditions and the indications and procedures for use. The method of application and best design of tourniquets is still under investigation (Calkins et al., 2000). There is insufficient

evidence about the effectiveness, feasibility, and safety of tourniquets to recommend for or against their use by first aid providers to control bleeding.

## **Wounds and Abrasions**

### *Wound Irrigation*

Superficial wounds and abrasions should be irrigated with clean tap water.

### *Use of Antibiotic Ointment*

Lay rescuers should apply antibiotic ointment or cream to cutaneous abrasions and wounds to promote faster healing with less risk of infection. The use of triple antibiotic ointment may be preferable to double- or single-agent antibiotic ointment or cream.

## **Thermal Burns**

### *Cooling With Water*

Cooling of burns with cold water as soon as possible is safe, feasible, and effective as a first aid treatment. First aid providers should avoid cooling burns with ice or ice water for >10 minutes, especially if burns are large (>20% total body surface area).

### *First Aid for Burn Blisters*

Because the need for blister debridement is controversial and requires equipment and skills that are not consistent with first aid training, first aid providers should leave burn blisters intact and cover them loosely.

## **Musculoskeletal Injuries (Fractures, Sprains, and Contusions)**

### *Stabilization*

The first aid provider should assume that any injury to an extremity can include a potential bone fracture. The first aid provider may manually stabilize the injured extremity but should not attempt to straighten it.

### *Compression*

There is inadequate evidence to recommend for or against the use of a circumferential bandage to compress a closed soft-tissue injury and reduce formation of edema (Class Indeterminate).

### *Application of Cold*

Cooling is generally safe, effective, and feasible in first aid for a sprained joint and soft-tissue injury. Cold applied for >20 minutes may be detrimental, although

there are several reports that suggest that longer application may continue to cool the joint without additional complications (Merrick, Jute, & Smith, 2003).

There is insufficient information to make recommendations on optimal frequency, duration, and initial timing of cryotherapy after an acute injury (MacAuley, 2001; Bleakley, McDonough, & MacAuley, 2004). Many textbooks are not consistent in their recommendations related to duration, frequency, and length of ice treatment (MacAuley, 2001).

To prevent cold injury to the skin and superficial nerves, it is best to limit ice to periods  $\leq 20$  minutes at a time with a protective barrier (Bassett et al., 1992; Graham & Stevenson, 2000). A damp cloth or plastic bag barrier may be ideal, whereas cold is not conducted as well through padded elastic bandages (MacAuley, 2001). Caution should be exercised when applying ice to an injury in a person with little subcutaneous fat, especially over areas of superficial peripheral nerves (Bassett et al., 1992; Otte et al., 2002).

## **Dental Injuries**

### *Tooth Avulsion*

The consensus of the experts is that the potential harm from attempted reimplantation of an avulsed tooth outweighs the potential benefit, and that avulsed teeth should be stored in milk and transported with the injured victim to a dentist as quickly as possible.

## **Environmental Injuries**

### **Snakebite**

First aid providers should not apply suction to snakebite envenomation sites.

Properly performed pressure immobilization is recommended for first aid treatment of elapid snakebites. The first aid provider creates this pressure by applying a snug bandage that allows a finger to slip under the bandage.

### **Cold Injuries**

#### *Hypothermia*

The first aid provider should provide passive warming (using blankets) as feasible for victims of hypothermia. Victims should be transported to a facility where active rewarming can be initiated. If the victim is in a remote location far from medical help, the first aid rescuer may initiate active rewarming.

#### *Frostbite*

The first aid provider should rewarm a frostbitten body part unless there is a possibility that it might refreeze.

## **Toxic Exposure and Chemical Burns**

### *Water Irrigation*

To treat skin or eye exposure to acid or alkali, the first aid provider should immediately irrigate the skin or eye with copious amounts of tap water.

### **Ingested Poisons**

#### *Water and Gastrointestinal Decontamination*

The administration of water or milk to the victim of ingested poison is not recommended.

Based on lack of evidence of benefit and documentation of potential harm, syrup of ipecac is not recommended for toxic ingestions.

There is insufficient evidence to recommend for or against the use of activated charcoal in first aid.

### **Definitions:**

#### **Levels of Evidence**

**Level 1:** Randomized clinical trials or meta-analyses of multiple clinical trials with substantial treatment effects

**Level 2:** Randomized clinical trials with smaller or less significant treatment effects

**Level 3:** Prospective, controlled, nonrandomized cohort studies

**Level 4:** Historic, nonrandomized cohort or case-control studies

**Level 5:** Case series; patients compiled in serial fashion, control group lacking

**Level 6:** Animal studies or mechanical model studies

**Level 7:** Extrapolations from existing data collected for other purposes, theoretical analyses

**Level 8:** Rational conjecture (common sense); common practices accepted before evidence-based guidelines

### **CLINICAL ALGORITHM(S)**

None provided

## **EVIDENCE SUPPORTING THE RECOMMENDATIONS**

### **REFERENCES SUPPORTING THE RECOMMENDATIONS**

[References open in a new window](#)

## **TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS**

The type of evidence supporting selected recommendations is provided in the "Major Recommendations" section of this summary.

## **BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS**

### **POTENTIAL BENEFITS**

Appropriate administration of first aid to reduce morbidity and mortality and improve outcomes

### **POTENTIAL HARMS**

Active prehospital rewarming may lead to increased complications such as the "afterdrop phenomenon," in which vasodilation results in increased perfusion of cold extremities and delivery of acidotic blood to the central circulation.

## **QUALIFYING STATEMENTS**

### **QUALIFYING STATEMENTS**

This document summarizes current evidence for the recognition and response to sudden life-threatening events, particularly sudden cardiac arrest in victims of all ages. The broad range and number of topics reviewed and the inevitable limitations of journal space require succinctness in science statements and, where recommendations were appropriate, brevity in treatment recommendations. This is not a comprehensive review of every aspect of resuscitation medicine; some topics were omitted if there was no evidence or no new information.

## **IMPLEMENTATION OF THE GUIDELINE**

### **DESCRIPTION OF IMPLEMENTATION STRATEGY**

An implementation strategy was not provided.

## **INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES**

### **IOM CARE NEED**

Getting Better

### **IOM DOMAIN**

Effectiveness

## IDENTIFYING INFORMATION AND AVAILABILITY

### **BIBLIOGRAPHIC SOURCE(S)**

First aid. In: 2005 International Consensus Conference on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. Circulation 2005 Nov 29;112(22 Suppl):III115-25. [153 references]

### **ADAPTATION**

Not applicable: The guideline was not adapted from another source.

### **DATE RELEASED**

2005 Nov 29

### **GUIDELINE DEVELOPER(S)**

American Heart Association - Professional Association

### **SOURCE(S) OF FUNDING**

American Heart Association

### **GUIDELINE COMMITTEE**

International Liaison Committee on Resuscitation (ILCOR)

### **COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE**

Not stated

### **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

A robust conflict of interest policy was developed to ensure full disclosure of potential conflicts and to protect the objectivity and credibility of the evidence evaluation and consensus development process. This policy is described in detail in an editorial companion document (see "Availability of Companion Documents" field). Representatives of manufacturers and industry did not participate in this conference.

Potential conflicts of interest of the editorial board are listed in Appendix 3 of the original guideline document (see "Availability of Companion Documents" field). Potential conflicts of interest of the worksheet authors are noted in the worksheets and can be accessed through the links to the worksheets contained in the original guideline document. All 380 attendees were required to complete forms in order to document their potential conflicts of interest. Most attendees were also worksheet authors. The information from the conflict of interest forms completed by all conference attendees, including worksheet authors, can also be

accessed at the website [http://circ.ahajournals.org/content/vol112/22\\_suppl/#APPENDIX](http://circ.ahajournals.org/content/vol112/22_suppl/#APPENDIX). Readers of the print version can also access the statements at the American Heart Association website: [www.C2005.org](http://www.C2005.org).

## **GUIDELINE STATUS**

This is the current release of the guideline.

## **GUIDELINE AVAILABILITY**

Electronic copies: Available from the [American Heart Association Web site](#).

Print copies: Available from the American Heart Association, Public Information, 7272 Greenville Ave, Dallas, TX 75231-4596; Phone: 800-242-8721

## **AVAILABILITY OF COMPANION DOCUMENTS**

The following are available:

- Introduction. 2005 International Consensus Conference on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Circulation* 2005 Nov 29;112(22 Supplement):III-1-III-4.
- The evidence evaluation process for the 2005 International Consensus Conference on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Circulation* 2005 Nov 29;112(22 Supplement):III-128-III-130.
- Conflict of interest management before, during, and after the 2005 International Consensus Conference on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Circulation* 2005 Nov 29;112(22 Supplement):III-131-III-132.
- Controversial topics from the 2005 International Consensus Conference on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Circulation* 2005 Nov 29;112(22 Supplement):III-133-III-136.
- Appendix 1: Worksheet topics and authors. *Circulation* 2005 Nov 29;112(22 Supplement):B1-B14.
- Appendix 3: Conflict of interest for editors, editorial board, special contributors and reviewers, and honorees. *Circulation* 2005 Nov 29;112(22 Supplement):B16-B18.
- 2005 International Consensus Conference on Cardiopulmonary Resuscitation (CPR) and Emergency Cardiovascular Care (ECC) Science with Treatment Recommendations. Section 2: stroke and first aid. *Circulation* 2005 Nov 29;112(22 Supplement):III-109.

Electronic copies: Available from the [American Heart Association Web site](#).

Print copies: Available from the American Heart Association, Public Information, 7272 Greenville Ave, Dallas, TX 75231-4596; Phone: 800-242-8721

## **PATIENT RESOURCES**

None available

## **NGC STATUS**

This NGC summary was completed by ECRI on February 6, 2006. The information was verified by the guideline developer on March 7, 2006.

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