

Perioperative Risk Models: A Narrative Review

Chad M Craig^{1,3*}, Craig Basman³, Emily S Wang², Michael Shoffeitt² and C Ronald MacKenzie^{1,3}

¹Department of Medicine, Weill Medical College of Cornell University, New York, USA

²Department of Medicine, University of Texas Health Science Center at San Antonio, Texas, USA

³Department of Medicine, Division of Perioperative Medicine, Hospital for Special Surgery, New York, USA

*Corresponding author: Chad M. Craig, MD, FACP, Assistant Professor, Department of Medicine, Division of Perioperative Medicine, Hospital for Special Surgery, Weill Medical College of Cornell University, New York, USA, Tel: 646-714-6314; E-mail: craigch@hss.edu

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Abstract

A variety of perioperative risk models have been published attempting to aid clinical decision making in the perioperative period. The primary goal of such models is to objectively classify risks numerically, or into categories that can be readily understood by clinicians and patients. Some models have been extrapolated from non-surgical patient populations, whereas others have been derived and validated solely in surgical cohorts. We present here a narrative review of key preoperative models developed over time, with the aim of highlighting models and classification tools to aid informed clinical decision making. These models relay general risk assessments as well as problem- or specialty-specific assessments.

Keywords: Perioperative risk; Preoperative risk; Risk model; Risk score; Preoperative assessment

Supplementary Appendix A: Methodology

A PubMed search was conducted for the date range of January 1, 2004 through December 31, 2014, utilizing the Medical Subject Heading terms “perioperative” OR “preoperative,” AND “risk.” Randomized controlled trials and observational studies were included in the search. English language, human subjects, adults nineteen years of age and older, studies including male and female patients, and full text availability were additional criteria. This yielded 1,283 search results. Titles of these results were reviewed for further abstract review. 41 of these articles were selected as relevant to our review, and references of these selected articles were additionally reviewed to identify other important risk models that might not otherwise have been included.

Supplementary Appendix B: ASA Physical Status Classification System [9]

ASA PS Classification*	Definition
ASA I	A normal healthy patient
ASA II	A patient with mild systemic disease
ASA III	A patient with severe systemic disease
ASA IV	A patient with severe systemic disease that is a constant threat to life
ASA V	A moribund patient who is not expected to survive without the operation
ASA VI	A declared brain-dead patient whose organs are being removed for donor purposes

*The addition of “E” to any of the classes denotes emergency surgery, with emergency defined as existing when delay in treatment of the patient would lead to a significant increase in the threat to life or body part.

Supplementary Appendix C: S-MPM Risk Factors, Score, and 30-Day Mortality [42]

Surgical Mortality Probability Model (S-MPM) Scoring System for Estimating Risk of 30-Day Mortality After Non-cardiac Surgery.

Risk Factor	Points Assigned
ASA physical status	
I	0
II	2
III	4
IV	5
V	6
Procedure risk	
Low risk	0
Intermediate risk	1
High risk	2
Emergency	
Nonemergent	0
Emergency surgery	1

S-MPM Levels and Associated Risk of 30-Day Mortality

Class	Point Total	Mortality
I	0-4	<0.50%
II	5-6	1.5-4.0%
III	7-9	>10%

Supplementary Appendix D: Societies Endorsing 2014 ACC/AHA Perioperative Guidelines [73]

The 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery was approved for publication by the governing bodies of the American college of Cardiology and the American Heart Association, and endorsed by the following professional organizations:

- American College of Surgeons
- American Society of Anesthesiologists
- American Society of Echocardiography
- American Society of Nuclear Cardiology
- Heart Rhythm Society
- Society for Cardiovascular Angiography and Interventions
- Society of Cardiovascular Anesthesiologists
- Society of Hospital Medicine
- Society of Vascular Medicine