

# Understanding and Communicating Perioperative Risk

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In healthcare, risk is defined as the probability of quantifiable injury, loss or harm associated with medical interventions. We use the term in an epidemiological sense, as the cumulative incidence. We will mostly discuss perioperative risk of mortality as there is reasonable data and it is unclouded by issues of definition or diagnosis. This principle of cumulative incidence is obvious in the 5 or 10 year periods that cardiovascular risk calculators such as the New Zealand version of the Framingham risk tool use(1). There are two dimensions to risk, the absolute instantaneous risk and the time evolution and each contribute to the total cumulative incidence or risk.

Risk after surgery is most often described as a cumulative incidence by one month. Almost all current tools for risk stratification and calculation use a one month endpoint (2). There is a tacit assumption here that the majority of the accumulated risk has occurred at this point and if there is additional risk then it is only a slight underestimate. We will examine this assumption.

Some complications of surgery have a high early incidence that falls to zero over time eg surgical bleeding. This is not true for most complications and risks such as myocardial infarction (MI) and death where there is an ongoing baseline risk. We cannot understand risk after surgery without a better understanding of competing risks. Some risks are commoner after surgery than the baseline risk from patient comorbidities would confer e.g. MI. If an MI occurs in the postoperative period it is challenging to associate or attribute to surgery at an individual case level. We can use epidemiological methods to help us describe surgical risk separate from baseline risk in this situation. Current sources for providing risk information do not incorporate appropriate timings cumulative risk or discuss the issues of competing risk (2). This means that risk information is more inaccurate and often underestimates risk beyond the uncertainty introduced by calibration and discrimination issues with current tools.

Knowing this how are we to proceed? Firstly, improved understanding of the epidemiology of risk means we know the kind of data we need in the future and how to improve our interpretation. Communicating risk information should be delivered by standard methods eg positive and negative framing, place risk in context, deliver appropriate numerical and graphical data (3), and lastly we should be more circumspect about the accuracy of our risk information and communicate an appropriate degree of uncertainty (4).

## References

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