- Editorial: Sportscience Reformatted and Revisited. History Makers and more.
- Progressive Statistics Updated. Magnitude-based inferences and injury thresholds.

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Editorial: Sportscience Reformatted and Revisited

Will G Hopkins, Sport and Recreation, AUT University, Auckland, New Zealand. **Email**. Sportscience 13, 13, 2009 (sportsci.org/2009/inbrief.htm#edit). Reviewer: Frank Katch, fkatch@mac.com. Published May, 2009.

I recently reformatted all Sportscience articles to ensure they open with sensible margins when accessed either from a search engine or directly from the article's URL. In the process I revisited all the contributions to this site over the last 13 years. Our creative works soon go out of date, but Frank Katch's outstanding mini-series on History Makers of exercise science will probably outlast all other articles at this site. Frank, thank you for making such a great contribution when Sportscience was still in its infancy as Sportscience News. Some other early ventures came to a premature end, but they were great while they lasted: special thanks to Louise Burke for CompEat, John Hawley for TrainGain, and the authors of the Encyclopedia of Sports Medicine and Science who brought their book chapters to completion for publication here: Tim Noakes, Tom Reilly and Roy Shephard, to name just a few. Among the many others who need thanking again for their help over the years with articles, reviewing or editing are Stephen Seiler, David Martin, Alan Batterham, Ken Daley, Fred Hatfield, and Mary Ann Wallace.

These days Sportscience has become an outlet mainly for research resources and conference reports that traditional journals do not publish. The articles nevertheless count as peer-reviewed publications, and the PDFs have page numbers and the same professional look as any journal article (upgraded this year to include headers and footers). You can also find most Sportscience articles in Google Scholar. Of course, with only one person as its editorial board, editor and principal contributor, Sportscience will never qualify for an impact factor, but it is not without impact. Google *research design* and a Sportscience article comes up as the second of ~140,000,000 hits. Google *quantitative research design* and it comes up first. When I demonstrated these searches to my boss, he agreed to meet the cost of the site's domain name and US hosting charges for the next few years–hence the acknowledgement of sponsorship by AUT's School of Sport and Recreation on this issue's homepage.

Progressive Statistics Updated

Will G Hopkins, Sport and Recreation, AUT University, Auckland, New Zealand. **Email**. Sportscience 13, 13-14, 2009 (sportsci.org/2009/inbrief.htm#update). Reviewer: Ian Shrier, Centre for Clinical Epidemiology and Community Studies, McGill University, Montreal, Canada. Published May, 2009.

The paper on analysis and reporting of statistics I mentioned in an In-Brief item last year finally came out in MSSE this January (Hopkins et al., 2009), so you can now download the slideshow directly. We have also created a version of the paper that we will update regularly. To avoid legal action with a publisher, we will provide the updated version by email rather than by link. Contact Batterham, Hanin, Marshall or me for a copy with the updates described below.

One omission from the original progressive stats paper concerns reporting of magnitude-based inferences. We suggested statements such as *very likely beneficial*, *probably moderately positive*, *possibly trivial*, *likely harmful*, *unclear* and so on, but showing the qualitative magnitude of the lower and upper confidence limits is a useful alternative. For example, an effect on performance might be a *trivial to large benefit*, by which you mean that the lower confidence limit represents a trivial value and that the upper confidence limit is large and beneficial. You also have to show the numeric values of the confidence limits, of course; for example, if this effect was for elite competitive runners, the confidence limits might have been -0.2% to 2.1%. When the confidence interval covers substantial positive and negative values, you should declare it *unclear*, rather than *small harm to very large benefit* or whatever, but a statement such as *any harmful effect is at most small* might also be appropriate for important effects. This approach has one potential problem: it is tied to a symmetrical confidence interval, so strictly speaking it works only for mechanistic inferences. The proper interpretation of clinical or practical effects requires more concern about avoiding harm than missing out on benefit, and for such effects the chances of benefit and harm and/or their odds ratio provide the kind of information needed to make an appropriate inference (Hopkins, 2007).

The thresholds for the various magnitudes (*small, moderate, large…*) have to be justified or cited when you use them to make inferences. In the progressive stats paper, we gave the thresholds for various effect statistics, but we stated that magnitude thresholds for risk, hazard and odds ratios require more research. I have now done some work on these thresholds, to be published as part of a chapter in a book on sports injuries (Hopkins, 2009). For frequent events or injuries (which most athletes can expect to experience in the time-frame under consideration), the thresholds for small, moderate, large, very large and extremely large hazard ratios are 1.3, 2.3, 4.5, 10 and 100. I arrived at these values in two ways, both based on assuming constant hazards (risk per unit time) in two groups. First, these values give rise to risk differences between the groups that at some stage reach maxima of 0.1, 0.3, 0.5, 0.7 and 0.9, or maximum differences in chances of 10%, 30%, 50%, 70% and 90%. Secondly, they correspond approximately to the thresholds for standardized differences in means (0.20, 0.60, 1.2, 2.0 and 4.0) of the log of time to injury in the two groups. The corresponding thresholds for risk and odds ratios could be worked out for a known monitoring period and known risk in one or other group, but it is better to stay with hazard ratios. For rare injuries or events, hazard-ratio thresholds of 1.1, 1.4, 2.0, 3.3 and 10 are justifiable on the grounds that the corresponding proportions of cases attributable to the exposure or effect under investigation are 10%, 30%, 50%, 70% and 90%. For example, if 70 cases arose for whatever reason in a population group in a given period, and exposure of the population group to something produced an extra 30 cases in the same period, 30% of the cases would be due to the exposure; in this case the hazard ratio would be 1.4, and the magnitude would fall on the small-moderate threshold. These thresholds apply also to risk and odds ratios for rare outcomes, which have practically the same values as hazard ratios for such outcomes.

Later this year I will publish a version here of the injury chapter modified to apply to all categorical outcomes. Meanwhile contact me for a manuscript copy of the chapter.

Hopkins WG (2007). A spreadsheet for deriving a confidence interval, mechanistic inference and clinical inference from a p value. Sportscience 11, 16-20

Hopkins WG (2009). Statistics in observational studies of sports injury. In: Verhagen E, van Mechelen W (editors) Methodology in Sports Injury Research. OUP, Oxford. in press

Hopkins WG, Marshall SW, Batterham AM, Hanin J (2009). Progressive statistics for studies in sports medicine and exercise science. Medicine and Science in Sports and Exercise 41, 3-12