

Background

A recent case-crossover study (Broderick et al 2008) followed 104 boys with haemophilia A or B aged 4-18 years for up to one year. The study provided estimates of the effect on bleeds risk of participation in vigorous physical activities. Estimates of the effect of physical activity on bleeds risk could inform decisions about participation in vigorous physical activity. In practice, however, these estimates (exposure odds ratios) are difficult to interpret and difficult to use.

Aim

To develop a free, web-based bleeds risk calculator that makes it easy to quantify the absolute bleeds risk (i.e., expected number of bleeds) associated with different patterns of physical activity.

Methods

A web-based calculator has been developed. It is called **BRuCe, the AHCCDO bleeds calculator**. The calculator uses information about bleeds history (past rate of bleeds) and past physical activity to generate person-specific estimates of the rate of bleeds expected to occur in the future given a particular future physical activity profile.

Development of the calculator involved (a) development of statistical methods, and (b) production of a web site. Consumer feedback has been sought. Ongoing feedback will be required for further development.

Statistical development

Statistical development involved demonstrating that:

1. the logic of case-control studies (Rothman & Greenland 1998) can be extended to case-crossover studies. It was shown that, in a case-crossover study with recurrent events, the exposure odds ratio provides an unbiased estimate of the incidence rate ratio, provided the control periods are sampled without regard to exposure.
2. The expected number of bleeds can be expressed as the sum of the expectancies of three Poisson models in which the expectancies are of the number of bleeds experienced while (a) inactive or participating in low risk activities, (b) participating in medium risk activities, and (c) participating in high risk activities. Given data on past exposure to physical activity and past bleed rates, as well as the incidence rate ratios derived from a case-crossover study, the combined model can be used to estimate a hypothetical "baseline" rate of bleeds (the expected number of bleeds in the absence of any physical activity).
3. Once the baseline rate has been determined it is possible to use the model to make predictions about the expected number of bleeds associated with a particular pattern of physical activity.

Web site development

BRuCe
The AHCCDO bleeds risk calculator

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BRuCe - bleeds risk calculator
BRuCe is a calculator for children with haemophilia and their families.

Welcome to BRuCe

BRuCe is a calculator for children with haemophilia and their families. It provides information about how changes in patterns of physical activity influence risk of bleeds. The risk of bleeds is expressed in terms of expected number of bleeds in a year.

You can use BRuCe to estimate the expected risk of bleeds associated with a particular pattern of physical activity. For example, you could use BRuCe to estimate the effect on risk of bleeds of playing two hours of soccer each week.

BRuCe has been produced by researchers at the George Institute for Global Health with funding from AHCCDO, the Australian Haemophilia Centre Directors' Organisation.

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Design by

A snapshot of a draft (beta) version of the BRuCe homepage is shown. We are now seeking feedback from potential users about the usability of the web site. *If you are interested in testing the site and providing feedback, please contact Professor Rob Herbert at rherbert@george.org.au.*

Conclusions

BRuCe is a free, web-based calculator designed to quantify the risk of bleeding associated with participation in physical activity. It will assist families of children with haemophilia to make evidence-based decisions about whether to participate in particular types of physical activities.

Acknowledgments

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References

- Broderick CR, Herbert RD, Latimer J, Barnes C, Curtin JA, Monagle P (2008) Estimation of transient increases in bleeding risk associated with physical activity in children with haemophilia. *BMC Blood Disorders* 8: 2.
- Rothman KJ, Greenland S (1998) *Modern Epidemiology* (2nd edn). Philadelphia, PA: Lippincott-Raven.

