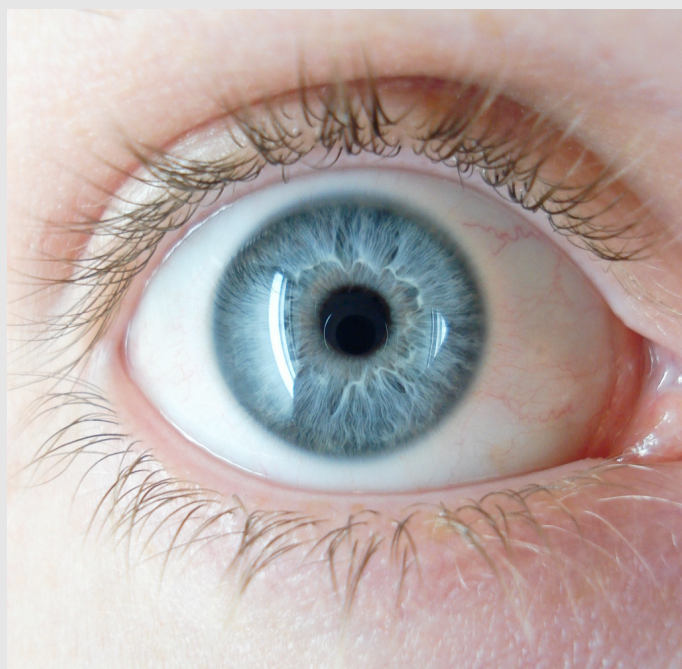
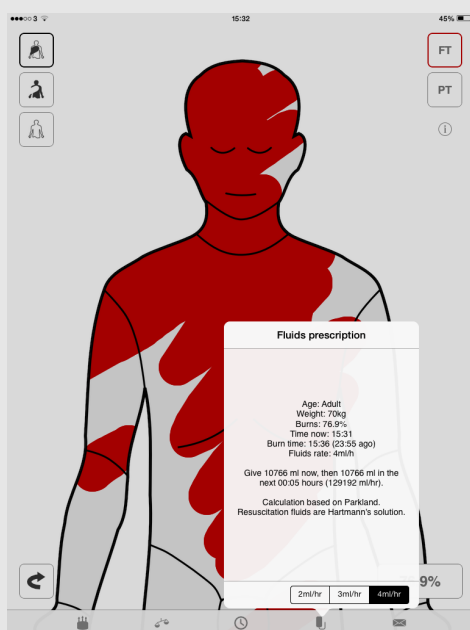


Safety hazards in clinical calculators and apps

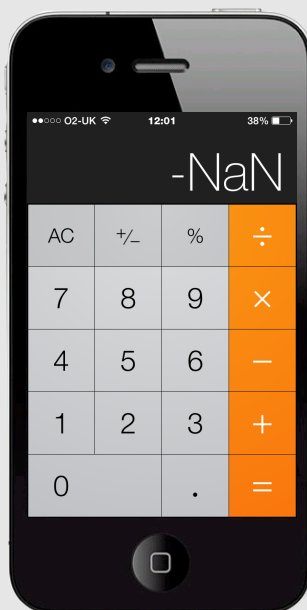


Errors happen and lead to harm because we don't see them happening at the time. Graphical and animated user interfaces are often beautifully designed and make apps look attractive. But invisible software faults are hard to see; they are hard to avoid in design, and they are impossibly hard for users to recognise. Surprisingly, basic errors are widespread particularly in the deceptively simple parts of user interfaces, such as number entry, where developers unfortunately pay insufficient attention. This poster presents a few examples.

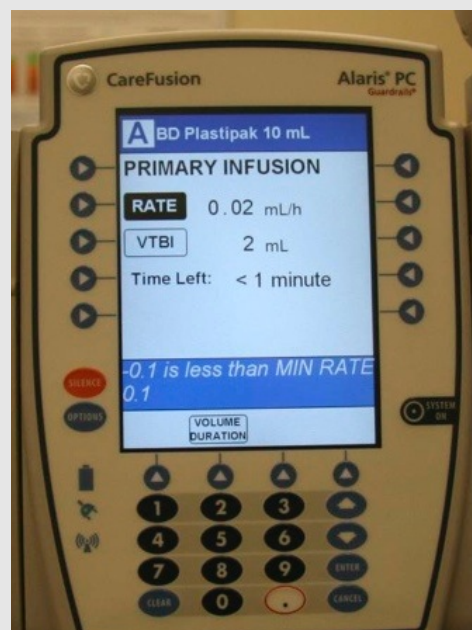
It is very worrying when unnoticed bugs lead to patient harm, especially when the logs are used in investigations and taken as unquestioned evidence to prosecute clinicians. Integration with EHR only compounds the problems.



It should not be a problem if your idea of the time and the app's are a few minutes out. Here, your estimate of the time is 5 minutes ahead of the app's, which takes it to be 23:55 hours ago, and then makes further calculation errors — here recommending an infusion of over 20 liters in the next 5 minutes. (A typical adult has only 4.7 liters of blood.)



NaN ("not a number") shows the calculator has made an internal error. Critically, if the user continues the error message disappears and incorrect results will be displayed. (In the middle of a calculation, users are more likely to be looking at the keypad than at the display, so transient error messages won't be seen.)



On this infusion pump, the rate is simultaneously shown as 0.02 mL/h and in an error warning as -0.1. What does the log say?

We must increase awareness for investigators and clinicians, as well as regulators and manufacturers. Our research is finding many powerful ways to fix the problems: please ask or email us.

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