Big Data for clinical research – how much is wishful thinking?

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Big Data methods in medicine are booming. We investigate which requirements have to be fulfilled for a successful application of such methods in clinical research, whether these are already realized and which future possibilities Big Data offers.

Medical prediction models are much more complex than pattern recognition models and proof of clinically relevant performance has still not been given. Consideration of the intended patient population and randomized follow-up studies are key to promising translations to clinical surroundings. Without validation the results of Big Data studies should be interpreted with care. One example, where further studies are indicated, are polygenic risk scores. Other important aspects for Big Data methods are causality versus correlation and the differentiation between available and suitable data.

Unsustainable promises and unfulfillable expectations should be avoided in the context of Big Data and be replaced by realistic views and evidence-based conclusions. The advent of Big Data in clinical research will increase the understanding that medicine is, and always has been, a data-based science. This will improve efforts to generate structured, standardized large datasets.

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