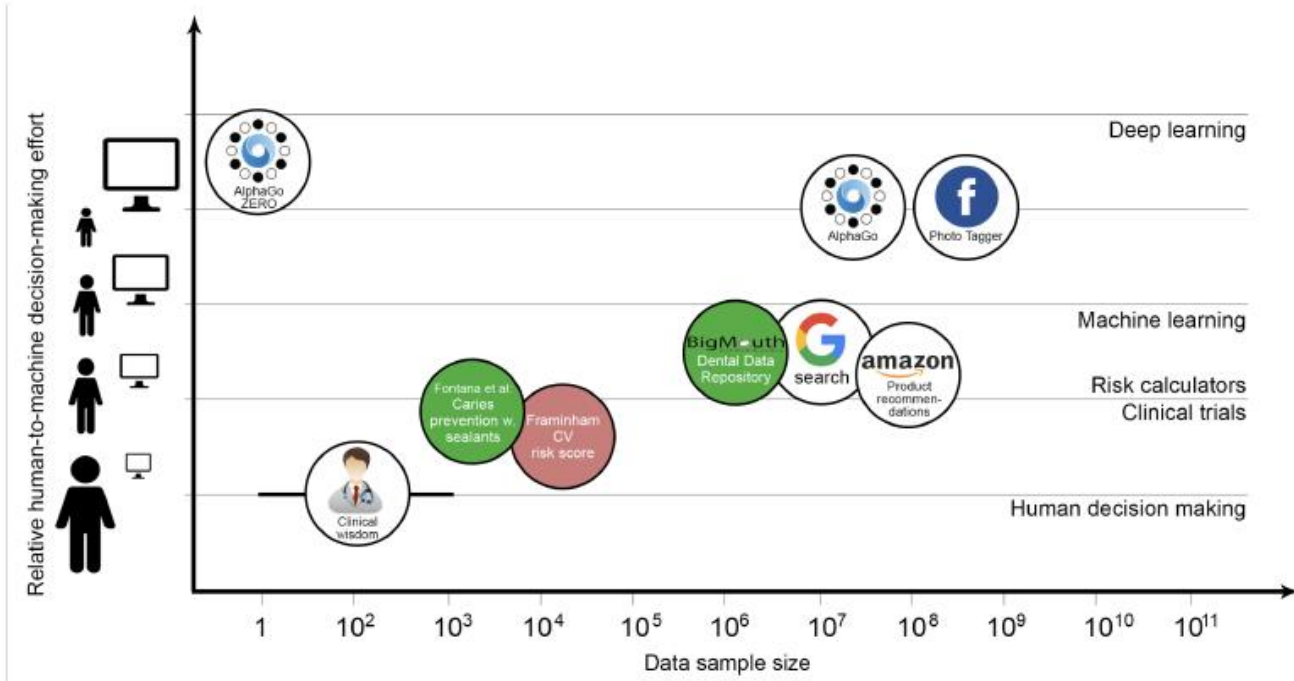


Appendix

Improving Caries Risk Prediction Modeling: A Call for Action

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Appendix Figure 1. Human-to-machine processing and sources of data. The circles represent datasets of different sample size that require a variety of processing methods reflecting a range of human-to-machine approaches to obtain insights from the data (adapted by Spallek.com from Beam AL, Kohane IS. Big data and machine learning in health care. JAMA. 2018 Apr 3;319(13):1317-1318)

Absolute Risk estimation

Probability of an event to happen given specific patient's characteristics, calculated from a risk prediction study:



Example of predictors included in a caries risk prediction model to measure the probability of caries lesions arresting instead of progressing

Example of the absolute risk after applying a hypothetical risk prediction model to a patient:

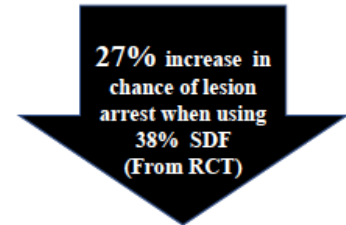
40% probability or chance of having caries lesions arrest
or
4 in 10 probability or chance of having caries lesions arrest



Example of using the absolute risk from the hypothetical risk prediction model to determine the individual-patient chance for a carious lesion to be arrested by using 38% SDF solution applied annually compared to a 12% solution:



40%
chance of lesion arrest
(Without SDF; from prediction model)



51%
chance of lesion arrest
(With 38% SDF)

CONCLUSION: "In absolute terms, and for this patient, receiving 38% SDF solution increases the chance of arresting caries lesions by 11% compared to the same patient receiving a 12% SDF solution after 12 months follow-up".

Relative Risk (RR) estimation

Probability of an event to happen in a group of people exposed to an intervention compared to another group (control).

Example of a group of people exposed to a treatment (in this example, 38% SDF solution applied annually compared to another group receiving 12% SDF solution applied annually)

An RCT compared...



Example of the result of this trial regarding the probability of 38% SDF arresting caries lesions compared to using 12% SDF:

RR: 1.27*

"In relative terms, patients receiving 38% SDF solution annually, have a 27% increased risk (or chance) of arresting carious lesions compared to patients receiving 12% SDF solution after 12 months follow-up."
(High certainty of evidence)

Appendix Figure 2. Role of Absolute risk calculated from caries risk prediction model applied to relative risk estimate to understand the effect of an intervention (caries lesion arrest agent in this example) at the individual level. CRA: Caries risk assessment, SDF: Silver diamine fluoride, RCT: Randomized controlled trial, R: Randomization, RR: Relative risk. (*Data from Urquhart et al. 2019)