PROMs and AI & digital therapeutics: are we ready for that?

Samantha Cruz Rivera, on behalf of CPROR

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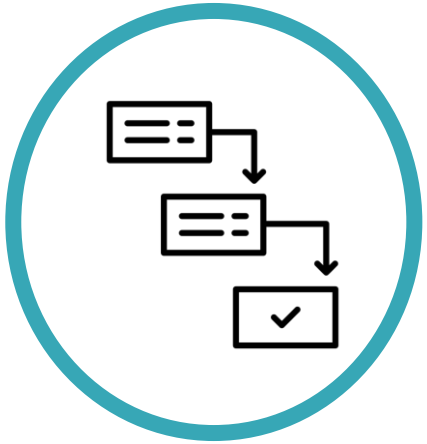
Benefits of AI in healthcare

Support *clinicians* in rapid and accurate image interpretation



Support *healthcare systems* through improved workflow and avoidable medical errors

Support *patients* through more efficient and accessible care

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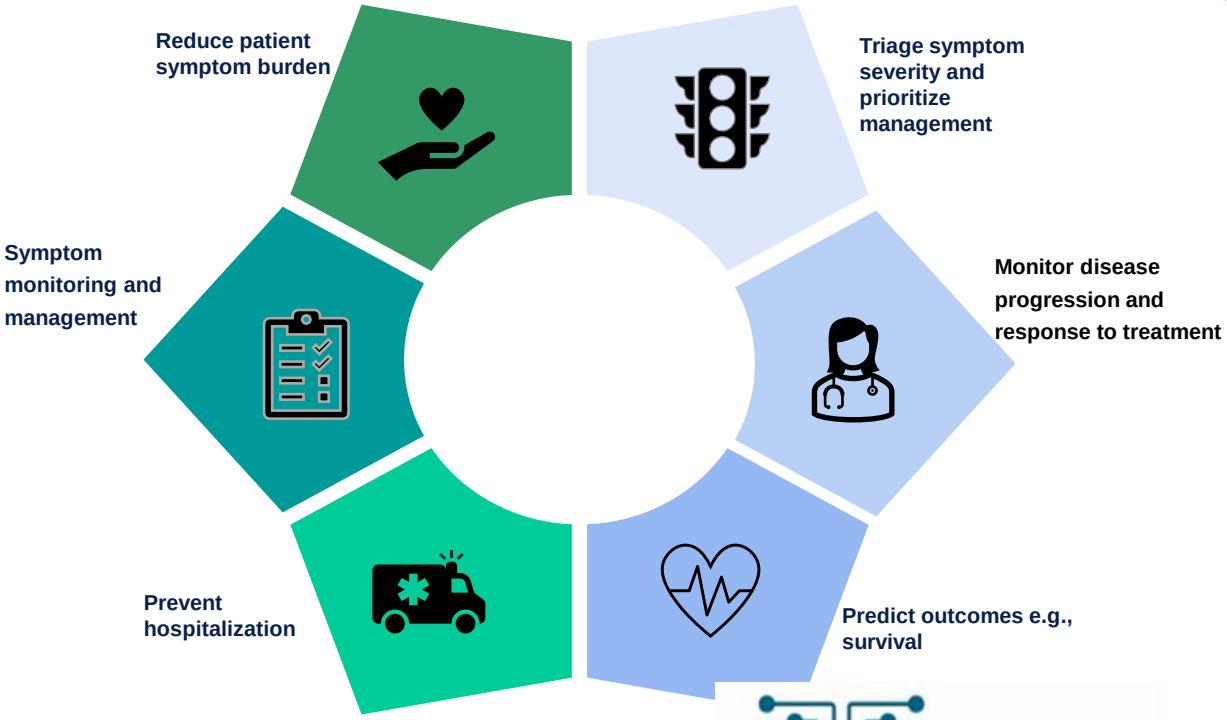
Use of PROs beyond clinical trials



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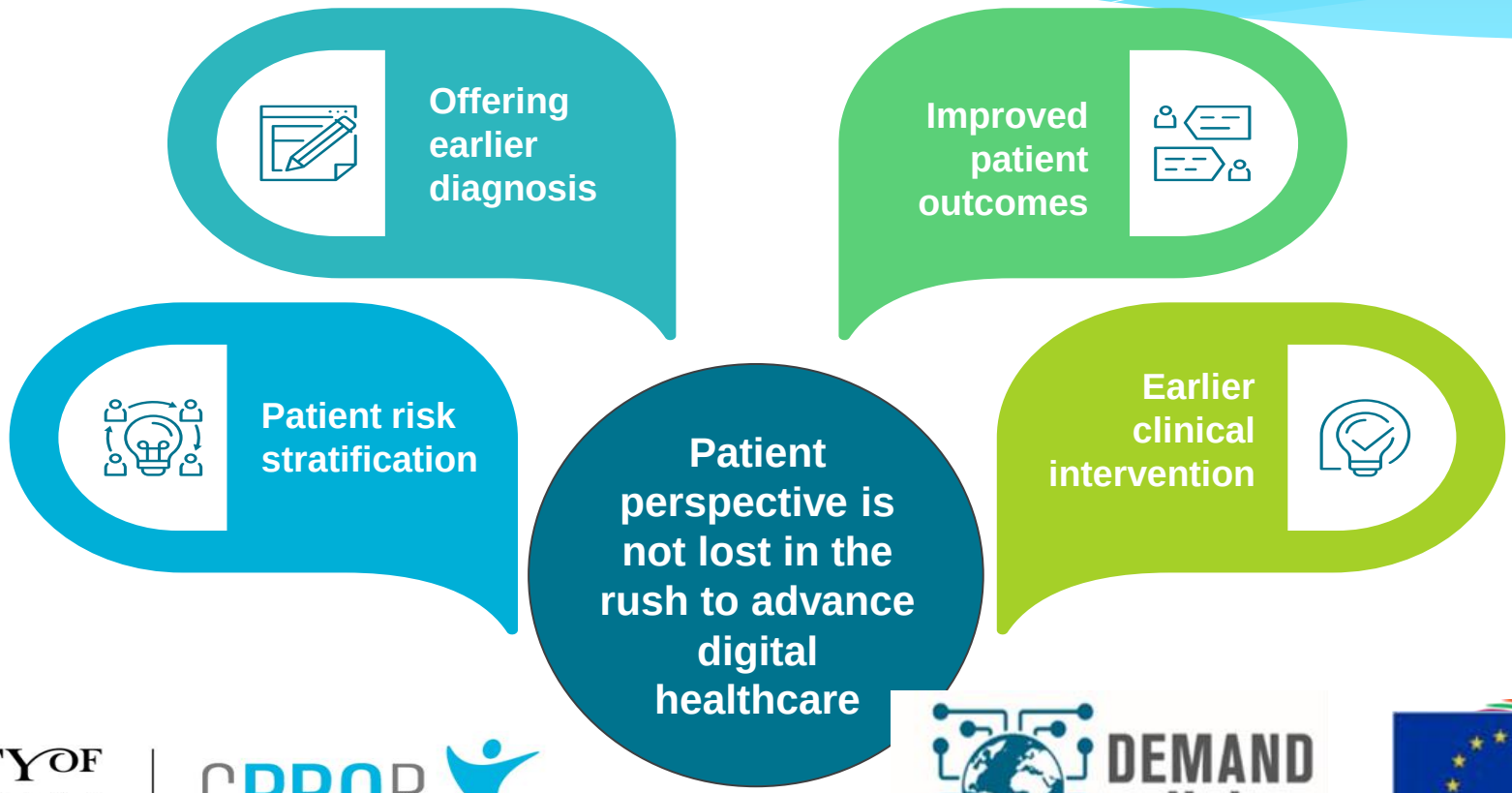
PROs go digital: ePROs



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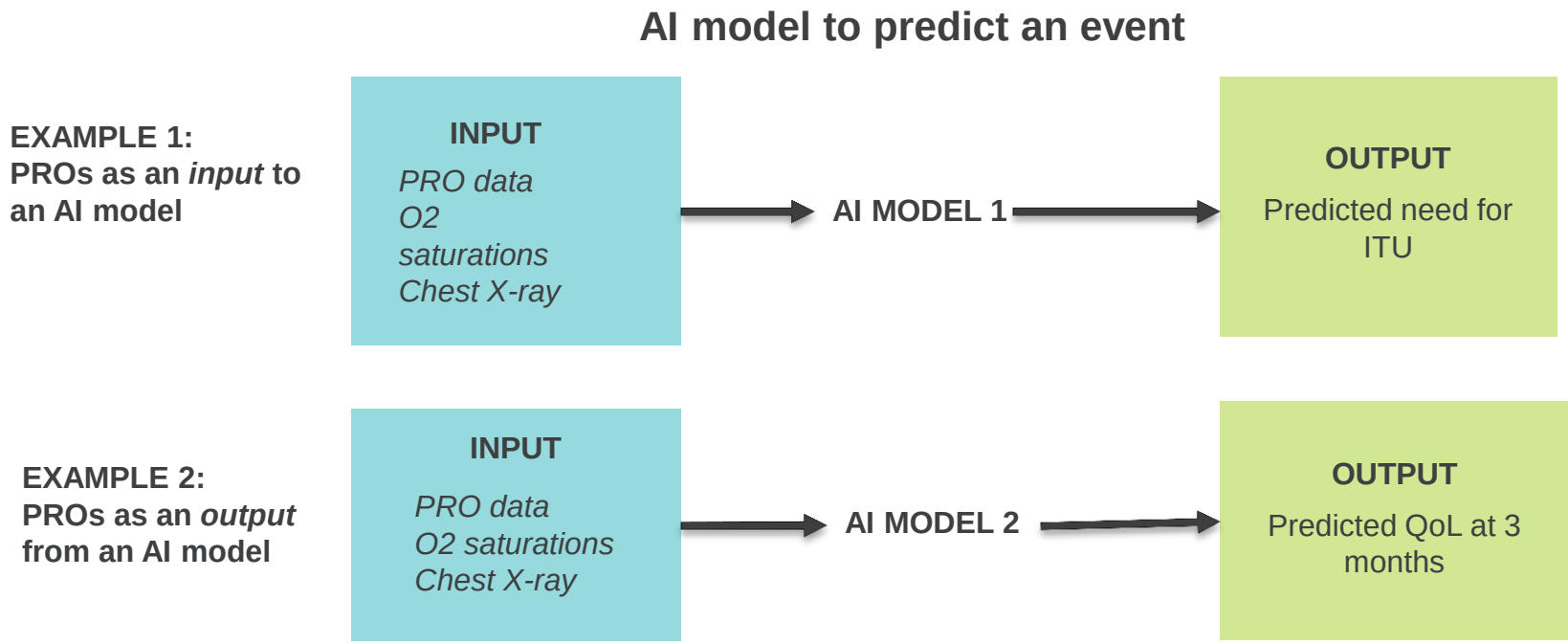
PROs as an input and output



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AI model trained to predict knee pain scores (output)

ARTICLES
https://doi.org/10.1038/s41591-020-01192-7
nature medicine
Check for updates

An algorithmic approach to reducing unexplained pain disparities in underserved populations

Emma Pierson[1,2], David M. Cutler[3], Jure Leskovec[4], Sendhil Mullainathan[5] ✉ and Ziad Obermeyer[6]

Underserved populations experience higher levels of pain. These disparities persist even after controlling for the objective severity of diseases like osteoarthritis, as graded by human physicians using medical images, raising the possibility that underserved patients' pain stems from factors external to the knee, such as stress. Here we use a deep learning approach to measure the severity of osteoarthritis, by using knee X-rays to predict patients' experienced pain. We show that this approach dramatically reduces unexplained racial disparities in pain. Relative to standard measures of severity graded by radiologists, which accounted for only 9% (95% confidence interval (CI), 3–16%) of racial disparities in pain, algorithmic predictions accounted for 43% of disparities, or 4.7× more (95% CI, 3.2–11.8×), with similar results for lower-income and less-educated patients. This suggests that much of underserved patients' pain stems from factors within the knee not reflected in standard radiographic measures of severity. We show that the algorithm's ability to reduce unexplained disparities is rooted in the racial and socioeconomic diversity of the training set. Because algorithmic severity measures better capture underserved patients' pain, and severity measures influence treatment decisions, algorithmic predictions could potentially redress disparities in access to treatments like arthroplasty.

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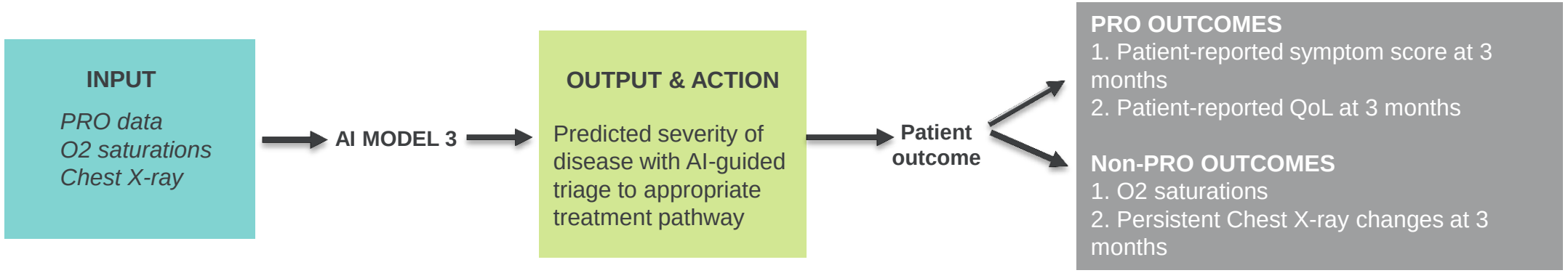
PROs as an outcome

AI as an intervention



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Challenges – are we ready for it?

PRO data collection is fragmented and may not be representative of the diverse target population

Lack of large-scale PRO data to train AI systems

AI systems are trained and validated against human performance rather than outcome data

Selection of PROs requires careful consideration to

Design of studies involving PRO and/or AI are often suboptimal

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Conclusion

Unless we include PROS, we risk promoting survival at the expense of well-being

PROs support the humanization of AI for health and ensure the patient's voice is not lost in a rush to digitize and automate healthcare

"What is the point of simply surviving – not living – if your existence is a painful, feeble and miserable one?"

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Thank you for listening!

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