

Alternatives to MRI for diagnosing, tracking and predicting Multiple Sclerosis



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ACT
Government

ACT Health

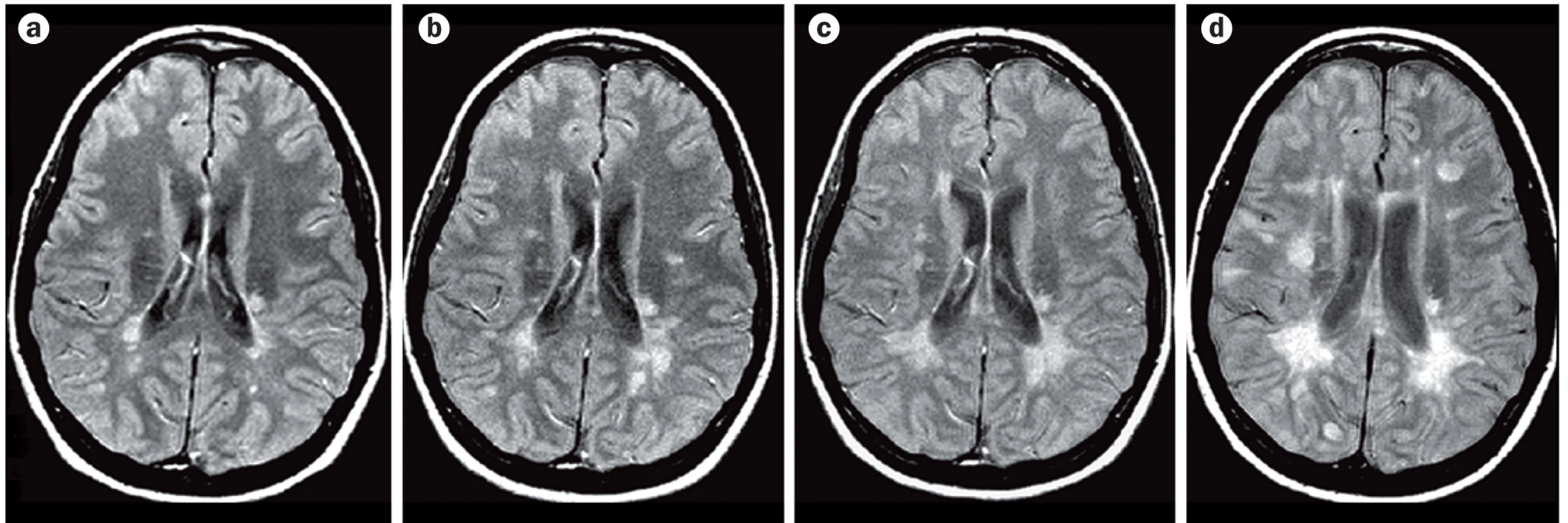
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HUNTER NEW ENGLAND
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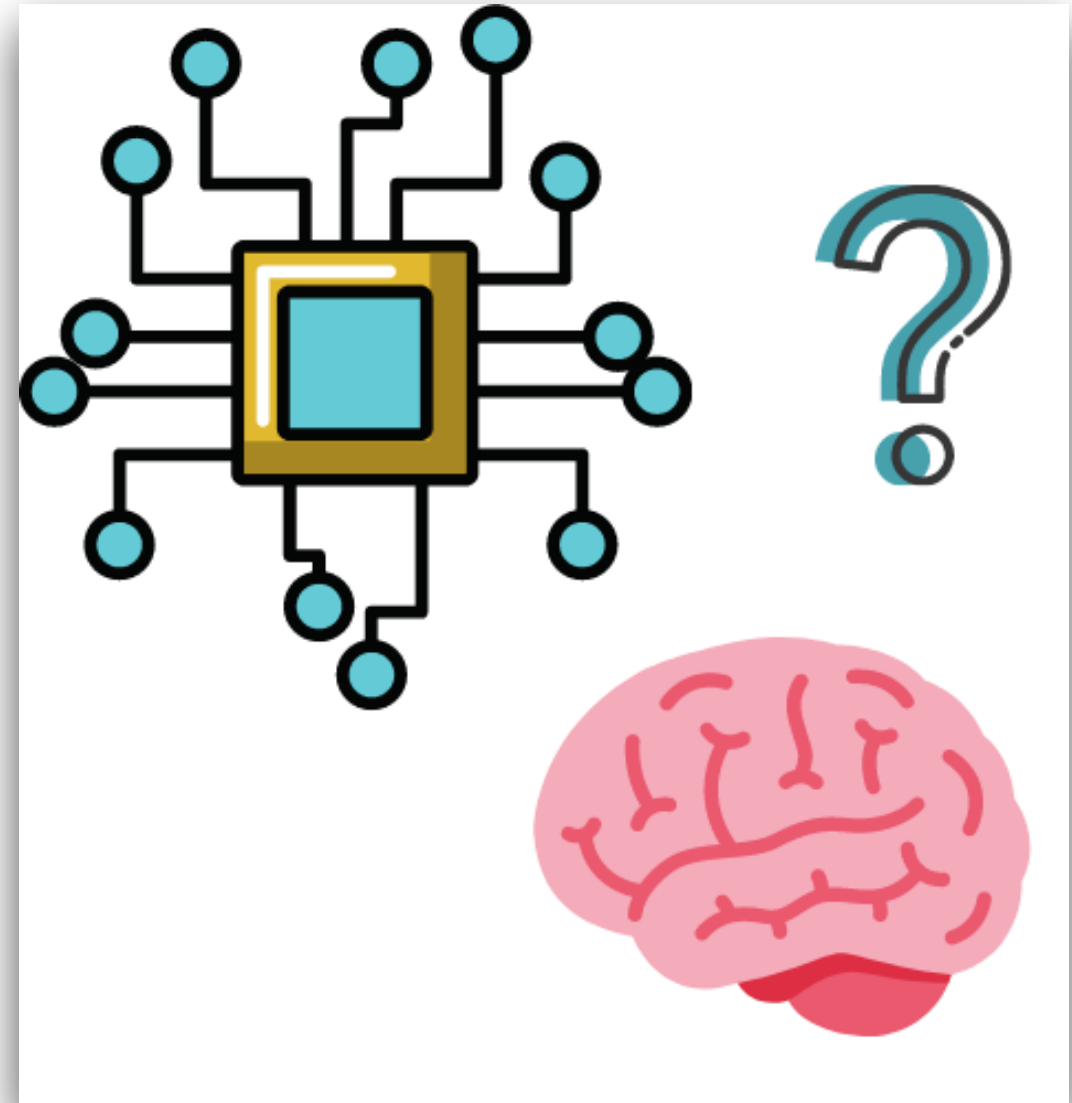
Nature Reviews | **Neurology**


Multiple Sclerosis

MRI is current gold standard for diagnosis & tracking

Issues with MRI

- Expensive
- Not very accessible
 - Particularly for rural/regional folk
- Variability in images if taken on different machines
- Doesn't capture day-to-day fluctuations

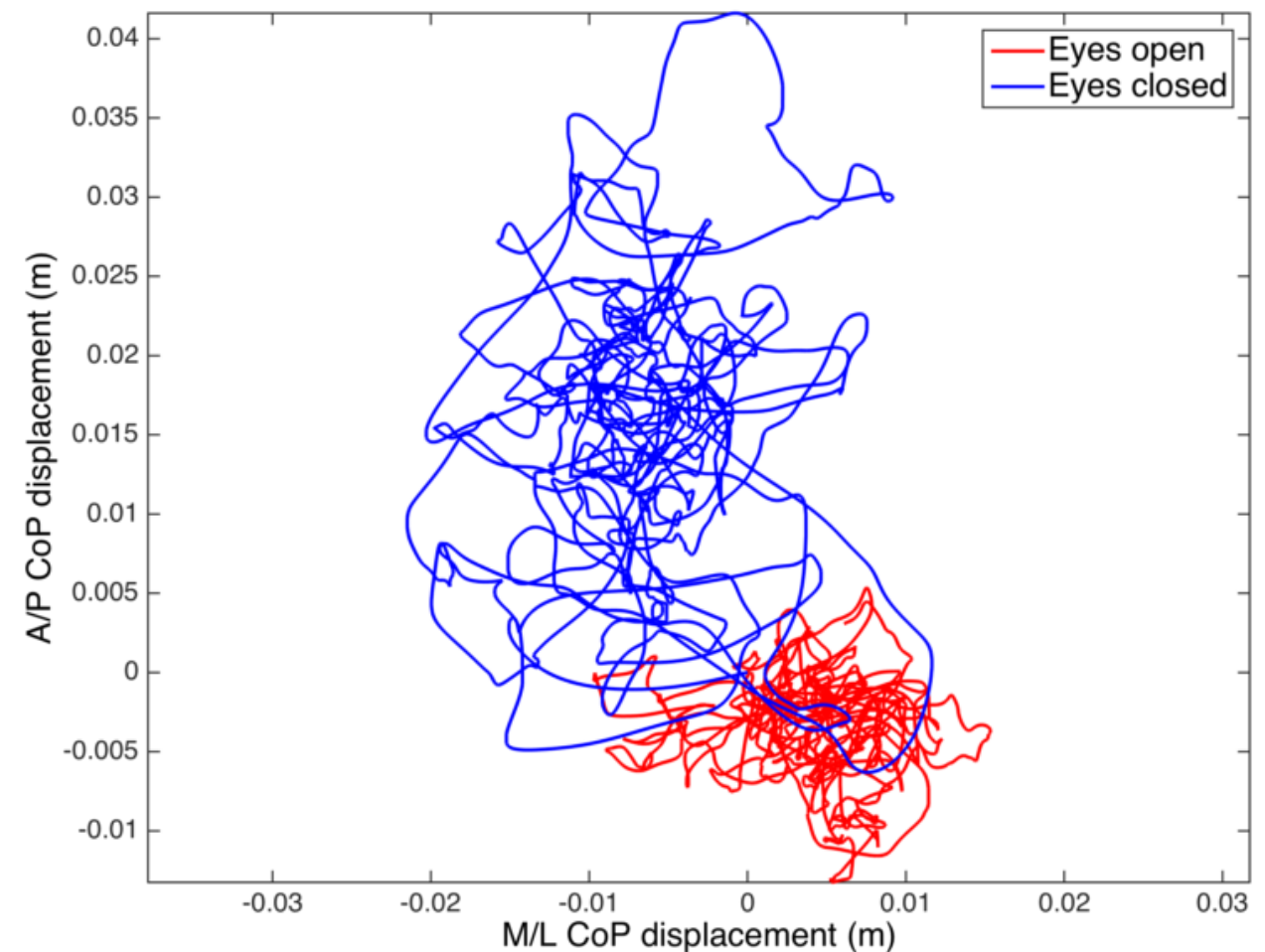
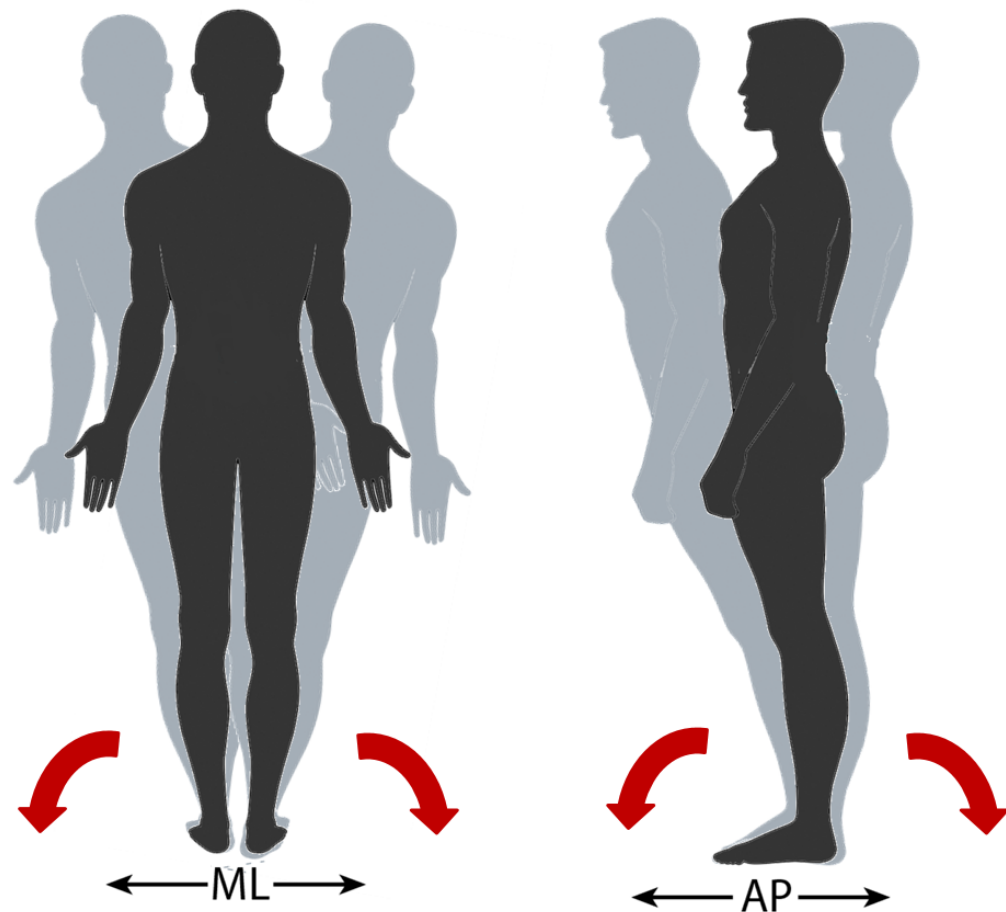


The background of the slide is a microscopic image of tissue, likely stained with hematoxylin and eosin (H&E). The tissue shows a dense population of cells with purple nuclei and pinkish cytoplasm/extracellular matrix. There are some larger, lighter-colored areas that could be cysts or areas of necrosis. The overall texture is granular and complex.

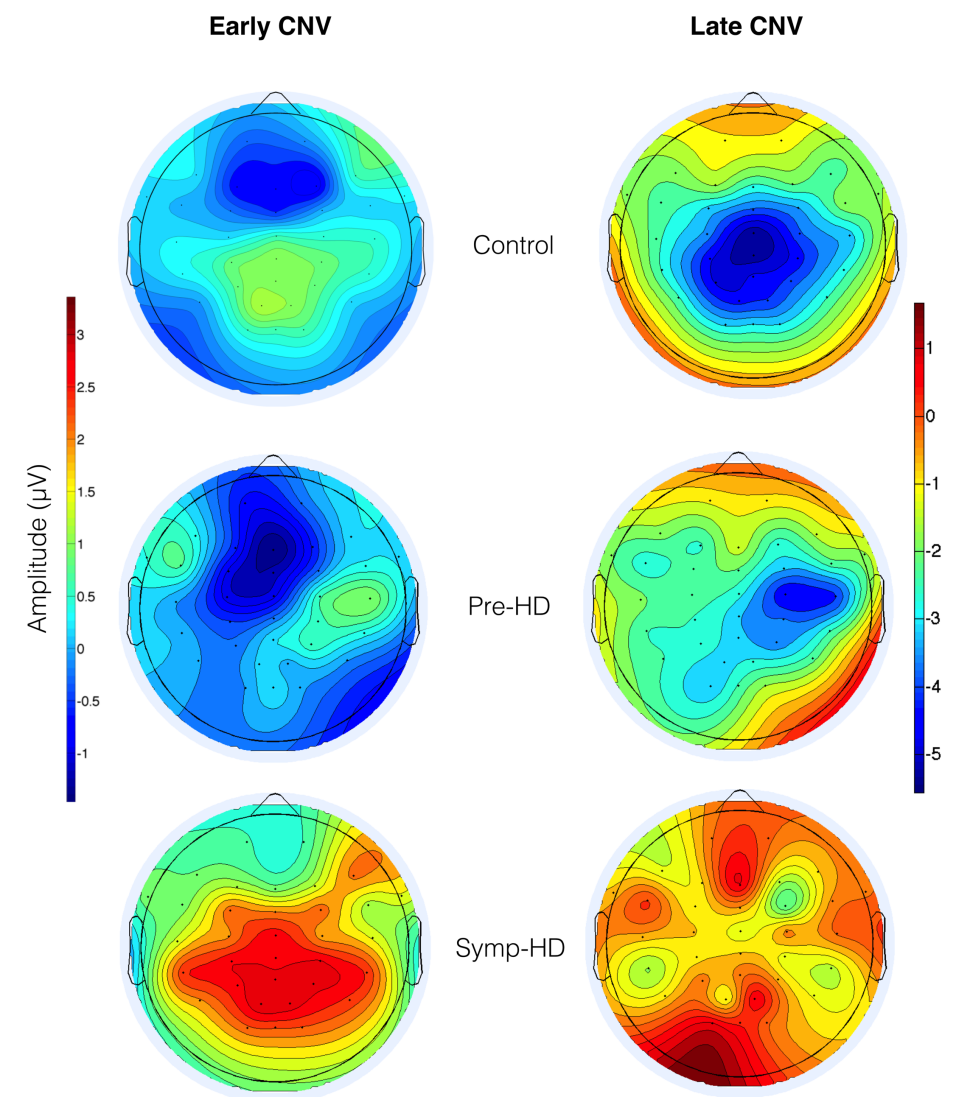
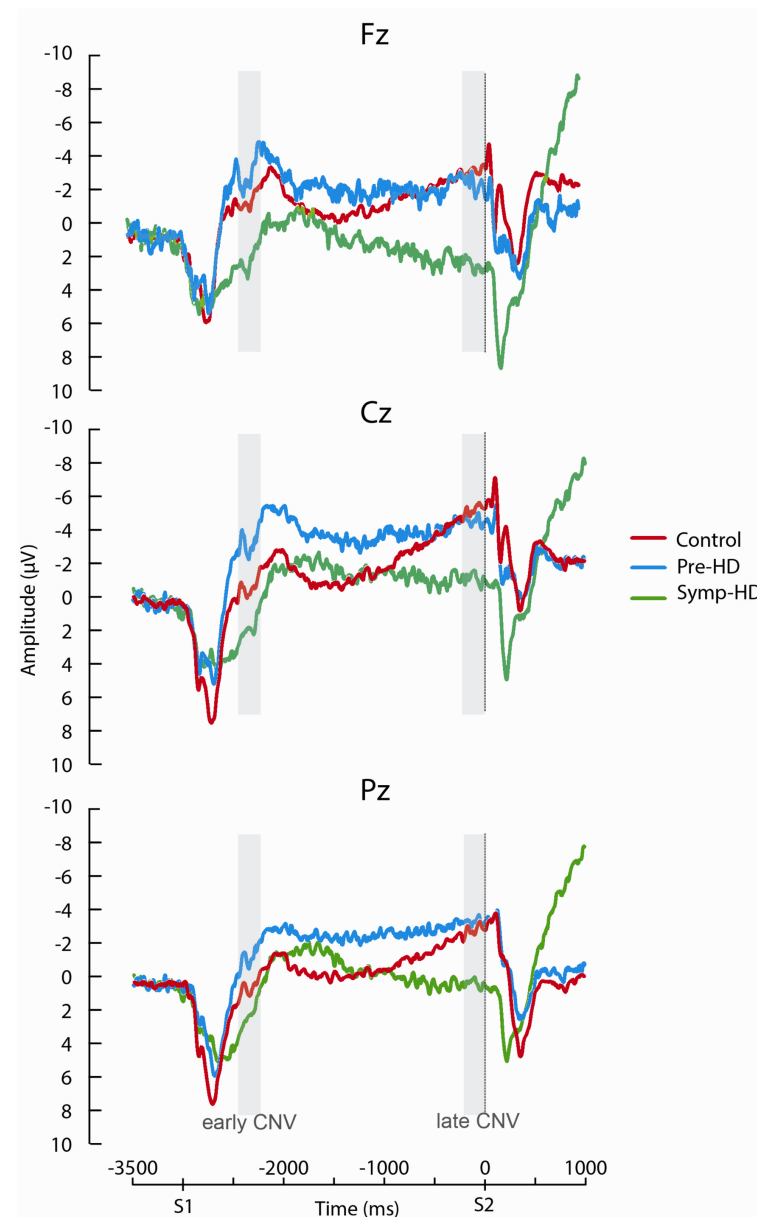
Other possible measures?

Postural Sway

Measures movement of centre of pressure (CoP) while standing on a force plate (like a fancy set of scales)



EEG



Turner, L. M., Croft, R. J., Churchyard, A., Looi, J. C. L., Apthorp, D., & Georgiou-Karistianis, N. (2014). Abnormal Electrophysiological Motor Responses in Huntington's Disease: Evidence of Premanifest Compensation. PLoS ONE, 10(9), e0138563–e0138563

Finger tapping (Android app)



41% 4:31 pm

NEXT >

Please answer the following questions:

1. Gender

☐ Female ☐ Male ☐ Other

2. Age

3. Which one do you identify yourself as?

☐ Right Handed
☐ Left Handed
☐ Ambidextrous

4. Have you been clinically diagnosed with Parkinson's Disease?

☐ Yes ☐ No

93% 5:37 pm

?

30s ⌚

TAP TAP

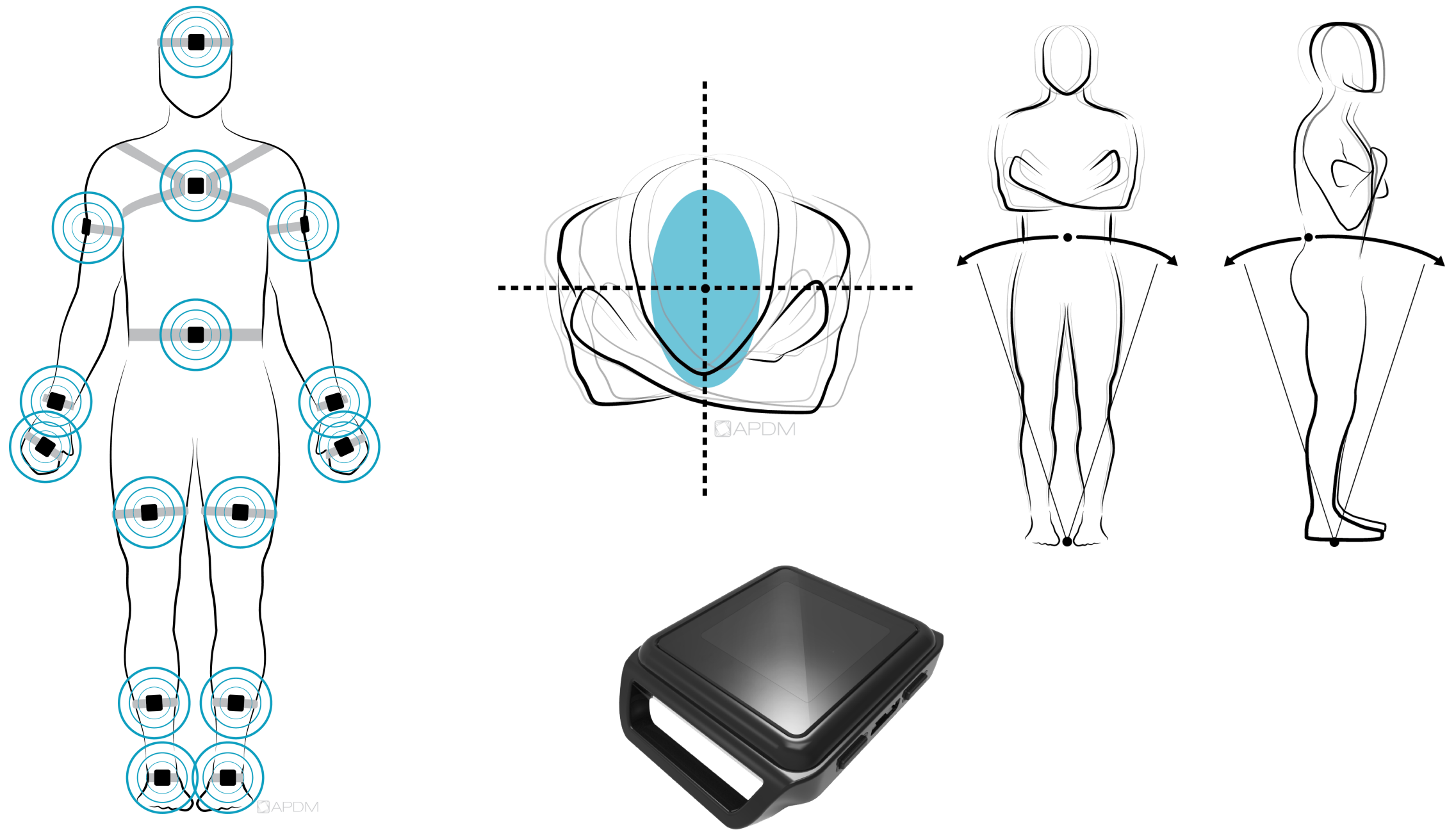
START

Cognitive testing

- Cognitive issues are common in MS (~70%)
- Processing speed, complex attention, memory
- Primary progressive MS differs from secondary progressive
- Can predict symptom progression
- Combine with other measures?



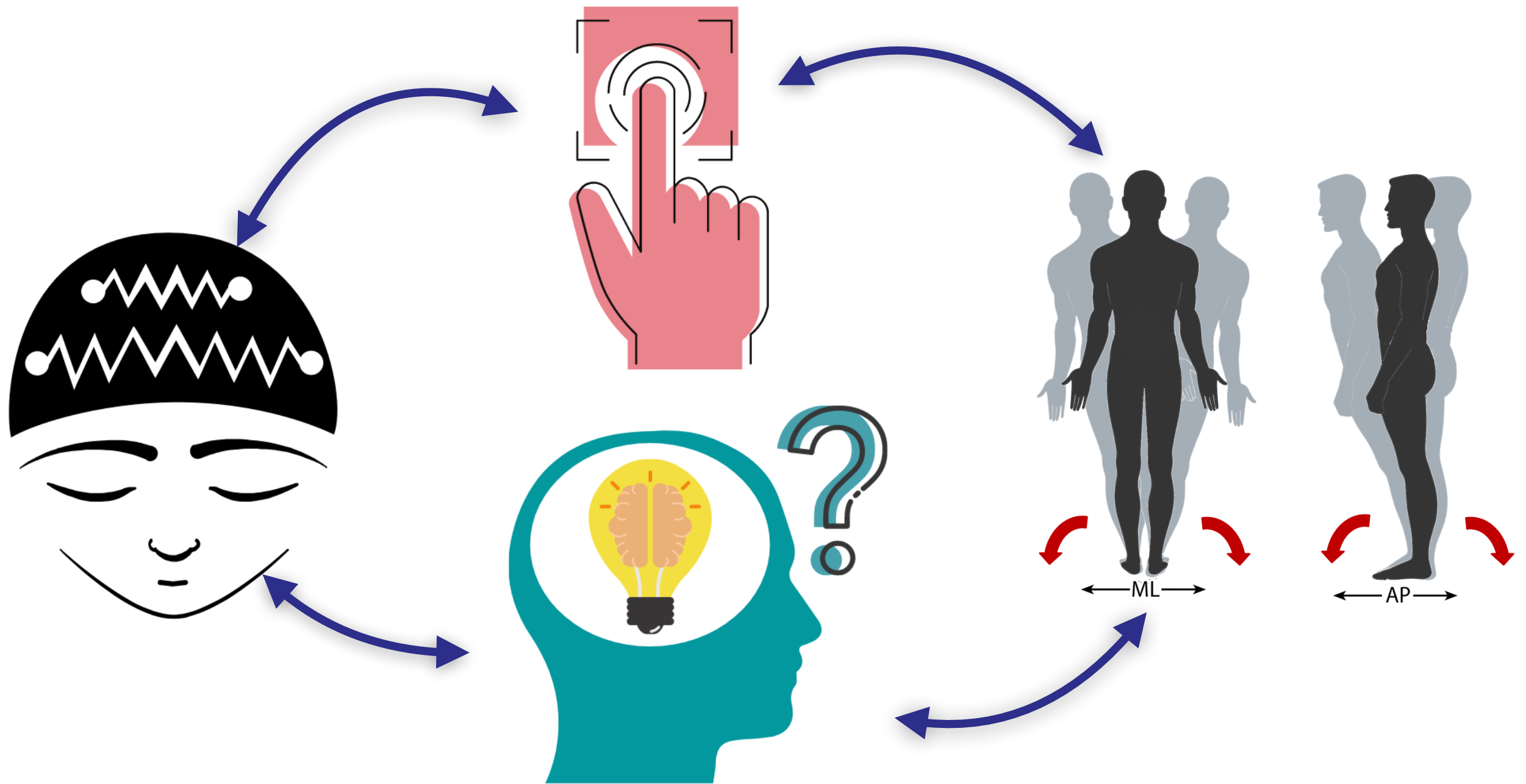
Future: wearable sensors?



Collecting data in rural/regional Australia - the Van

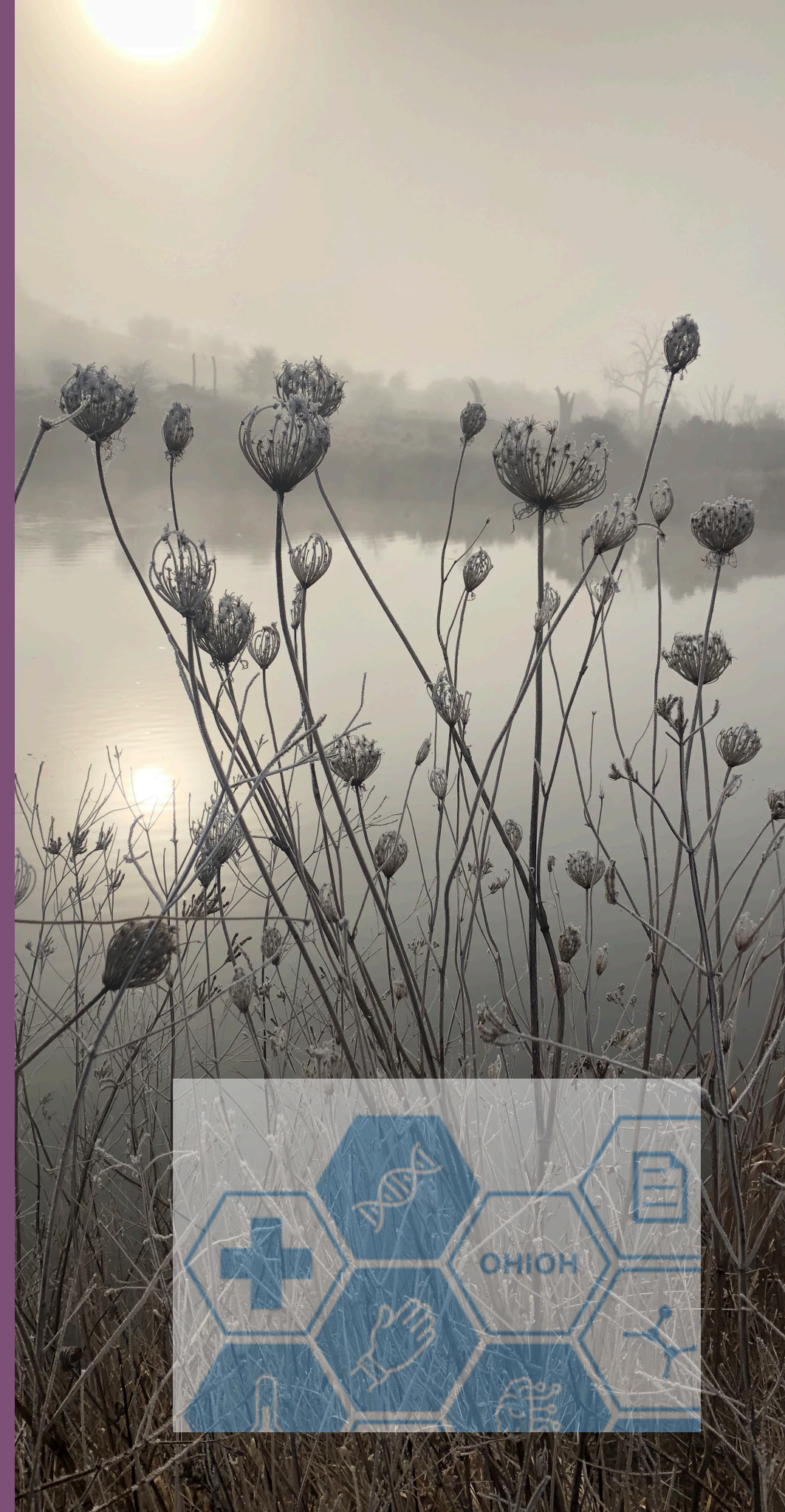


Machine learning



Future:

- Combine sources of information
- Which is most informative?
- Which combination is most informative?
- Clinical translation
- Remote diagnosis/tracking



Thanks!

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