Wearables Employment in Alzheimer's Disease and Related Dementias Research [WEAR]

Development of Guidelines for Device Selection and Participant Protocols

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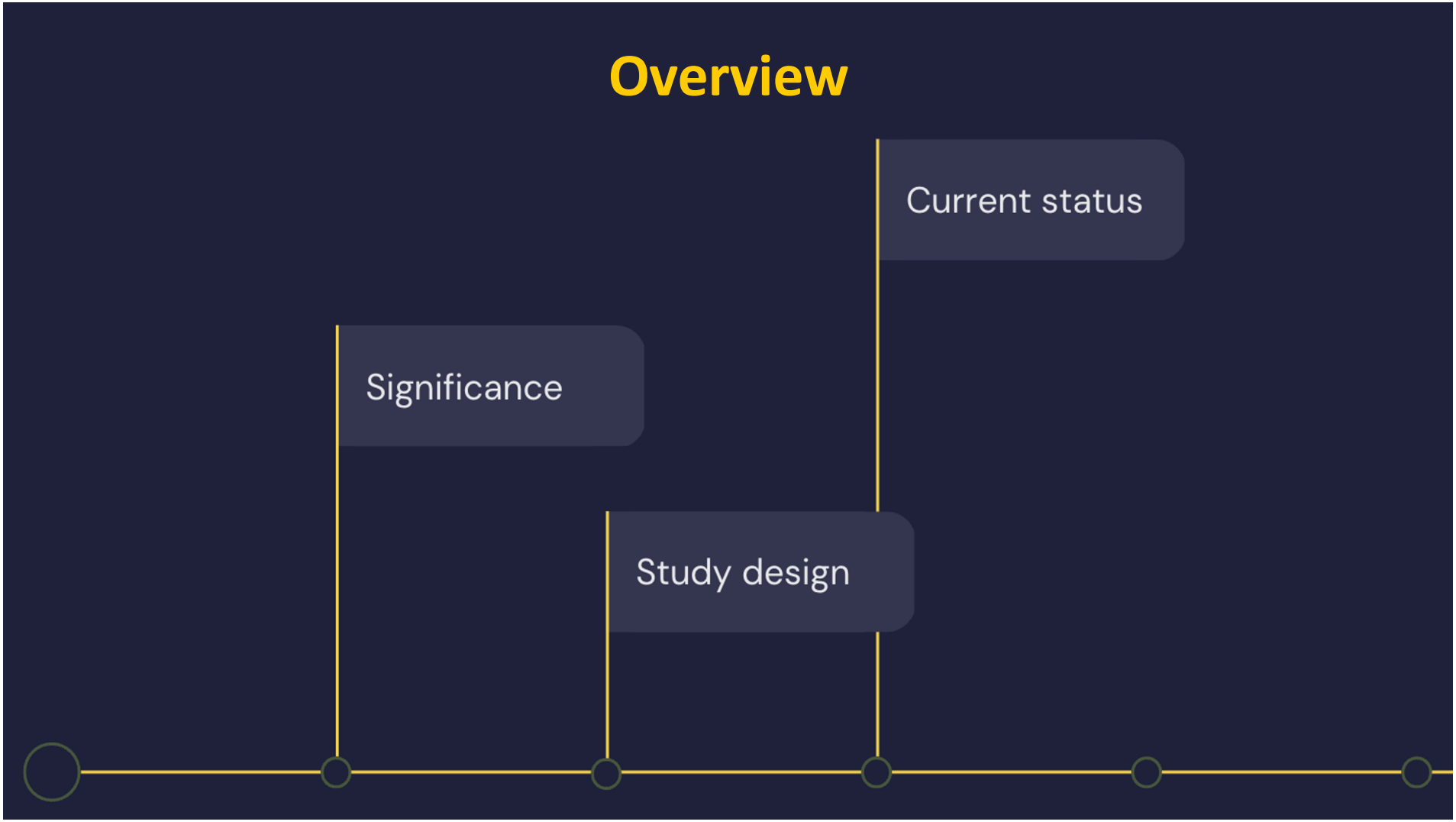
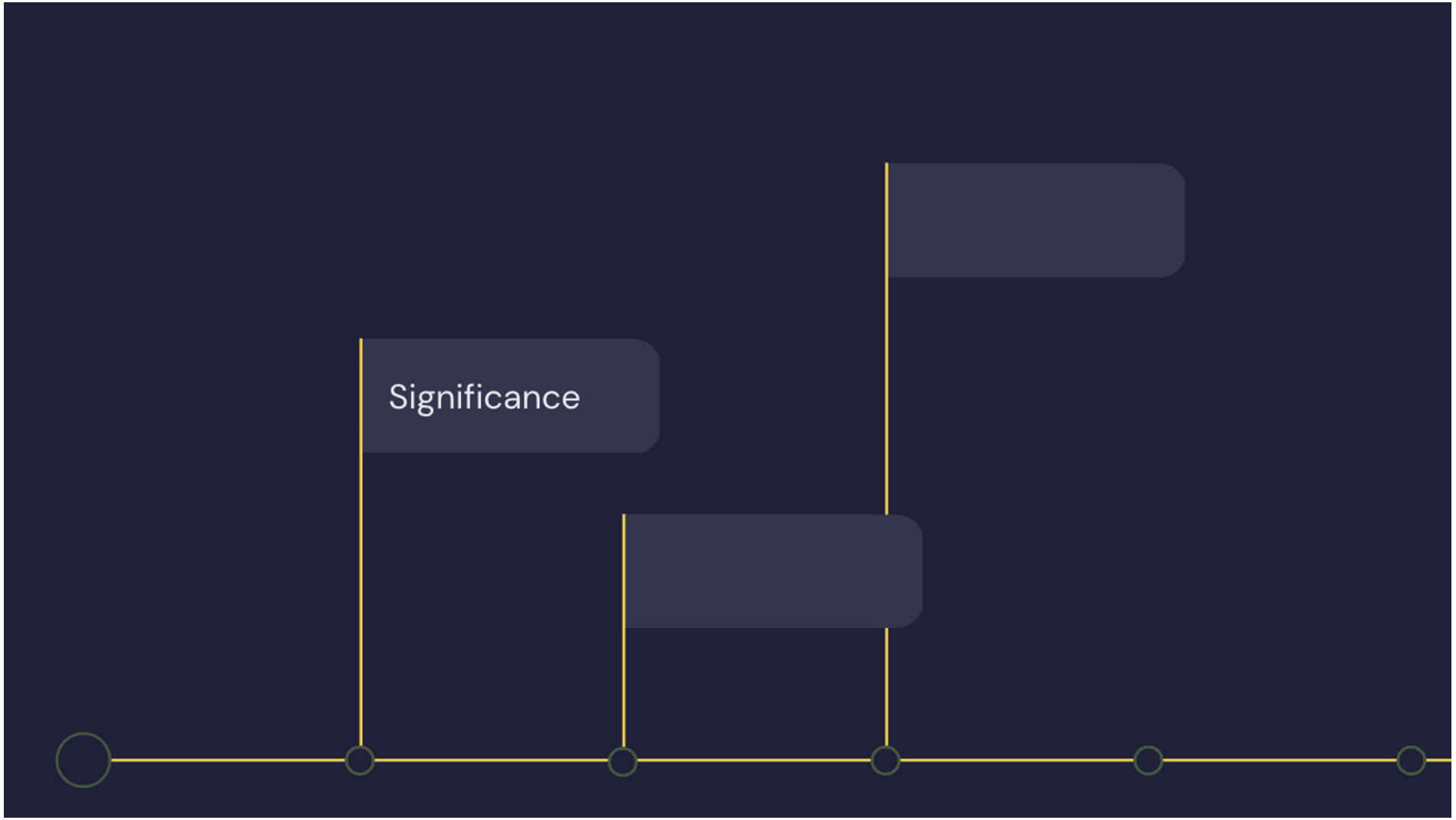
NIMLAS - 2/8/2023


Overview
Current status
Significance
Study design


Significance

Increased prevalence of dementia and related caregiver strain

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Challenges of conducting research with this population

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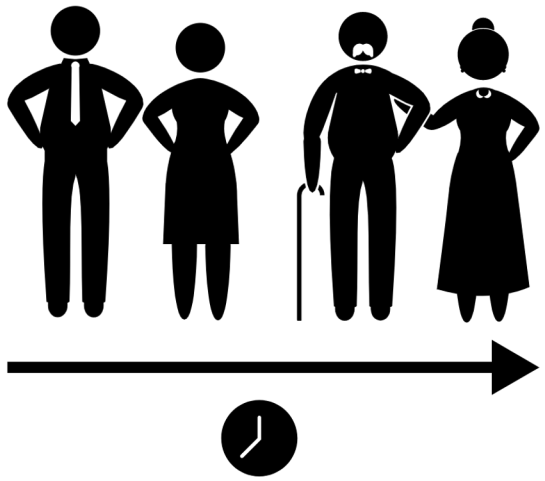
Need more effective and innovative methods to enhance long-term research in the area



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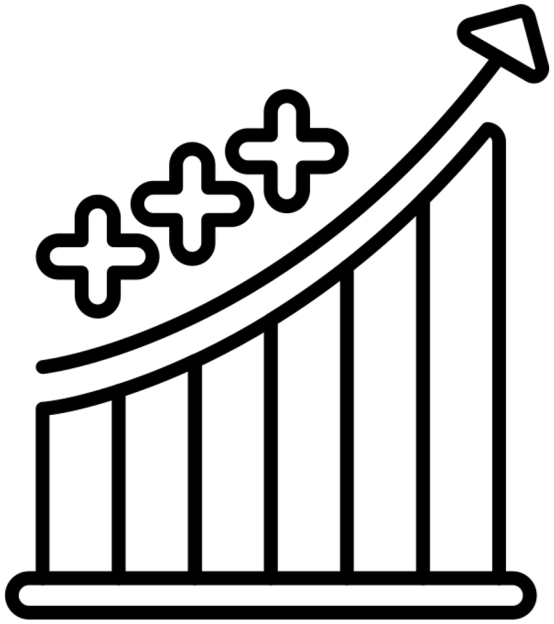
Wearable technology has great potential in long-term dementia research



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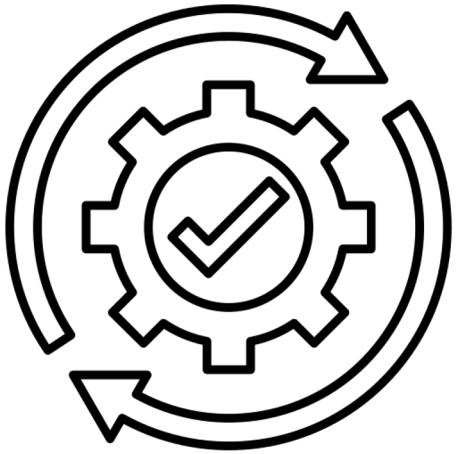
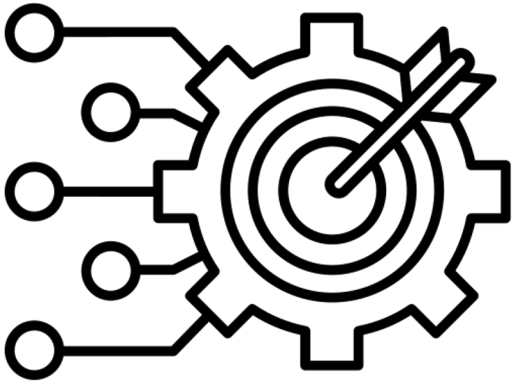
https://article.murata.com/en-eu/article/solid-state-battery-that-supports-wearables-1



Increase the amount and quality of information



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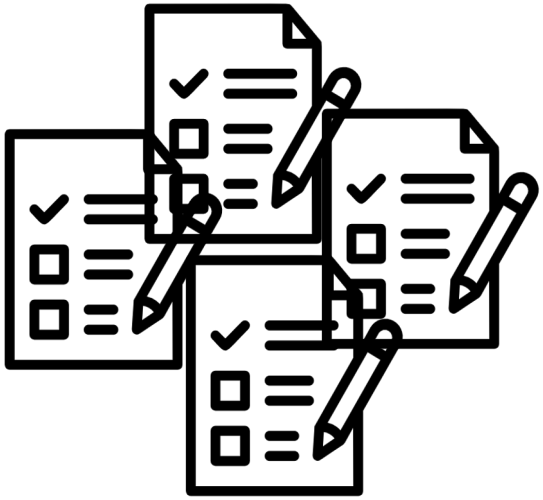
Could improve study retention by reducing burden



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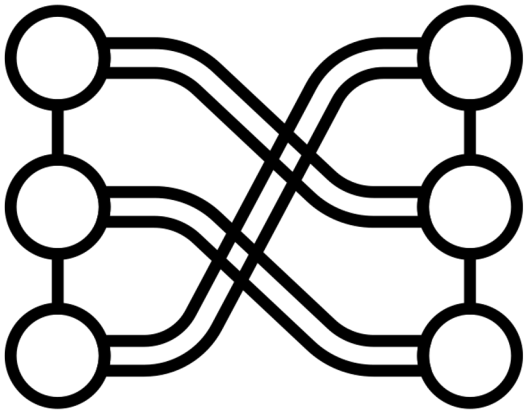
Better implementation of wearables can advance dementia studies



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Evidence-based
device selection
and participant protocols?

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Devices that meet researcher needs

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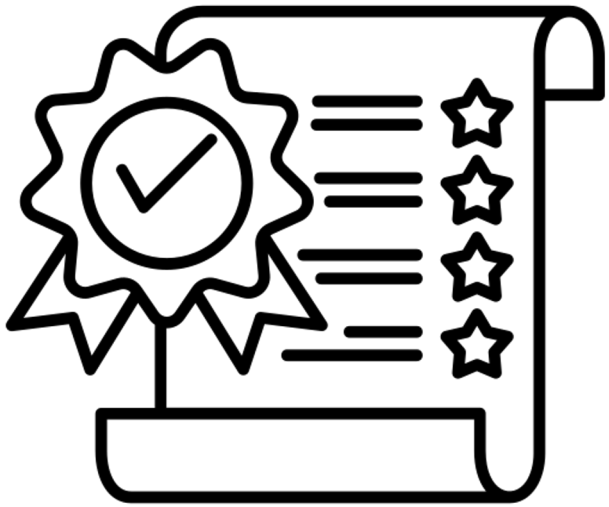
Data usability

Data accessibility

Limited technical problems



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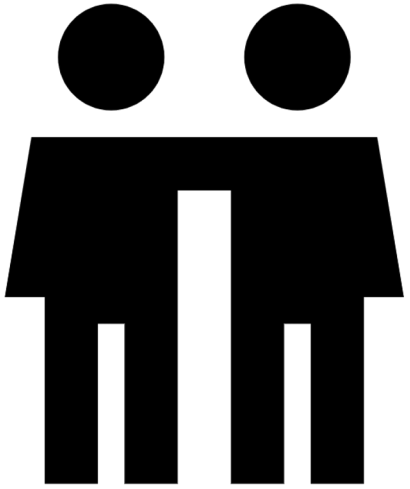
Devices that meet participant needs and preferences



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Facilitators to buy-in

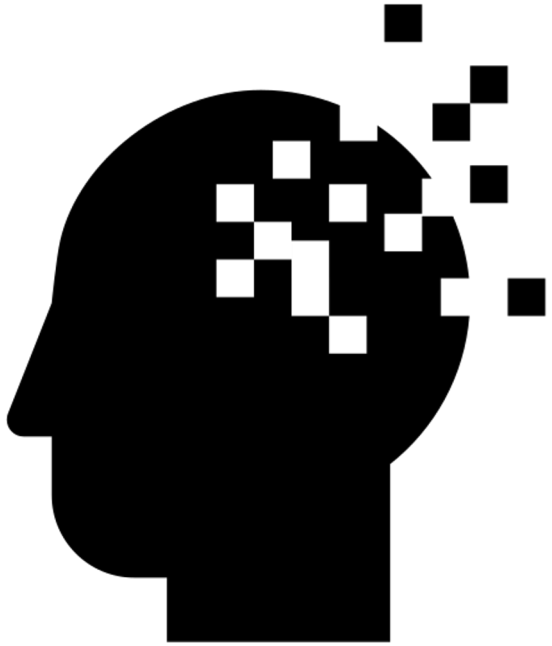
trust, unobtrusiveness, design type, ease

Barriers to adherence

memory, charging needs, simplicity of use

Address ethical concerns

fluctuating consent, privacy concerns



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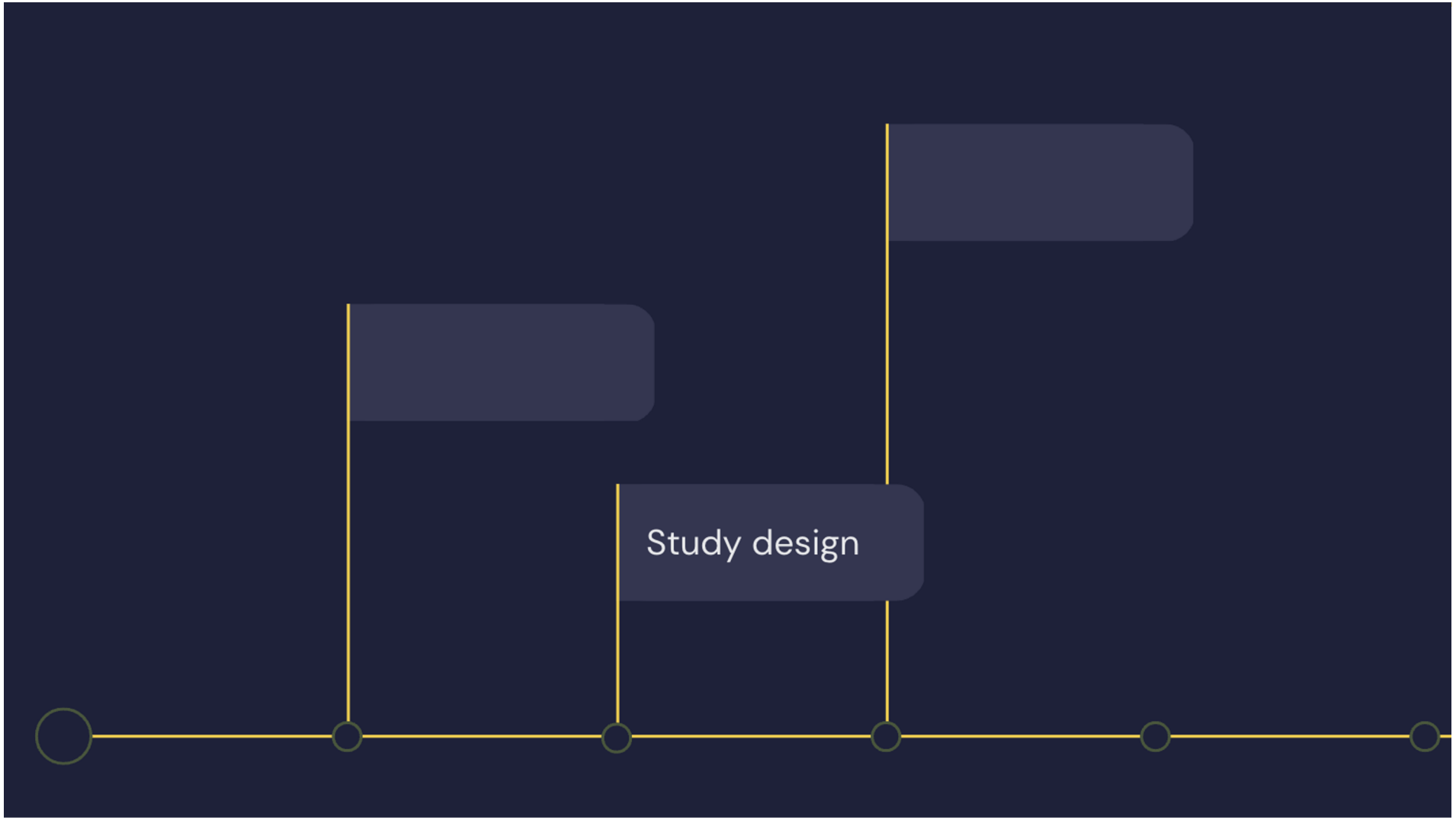
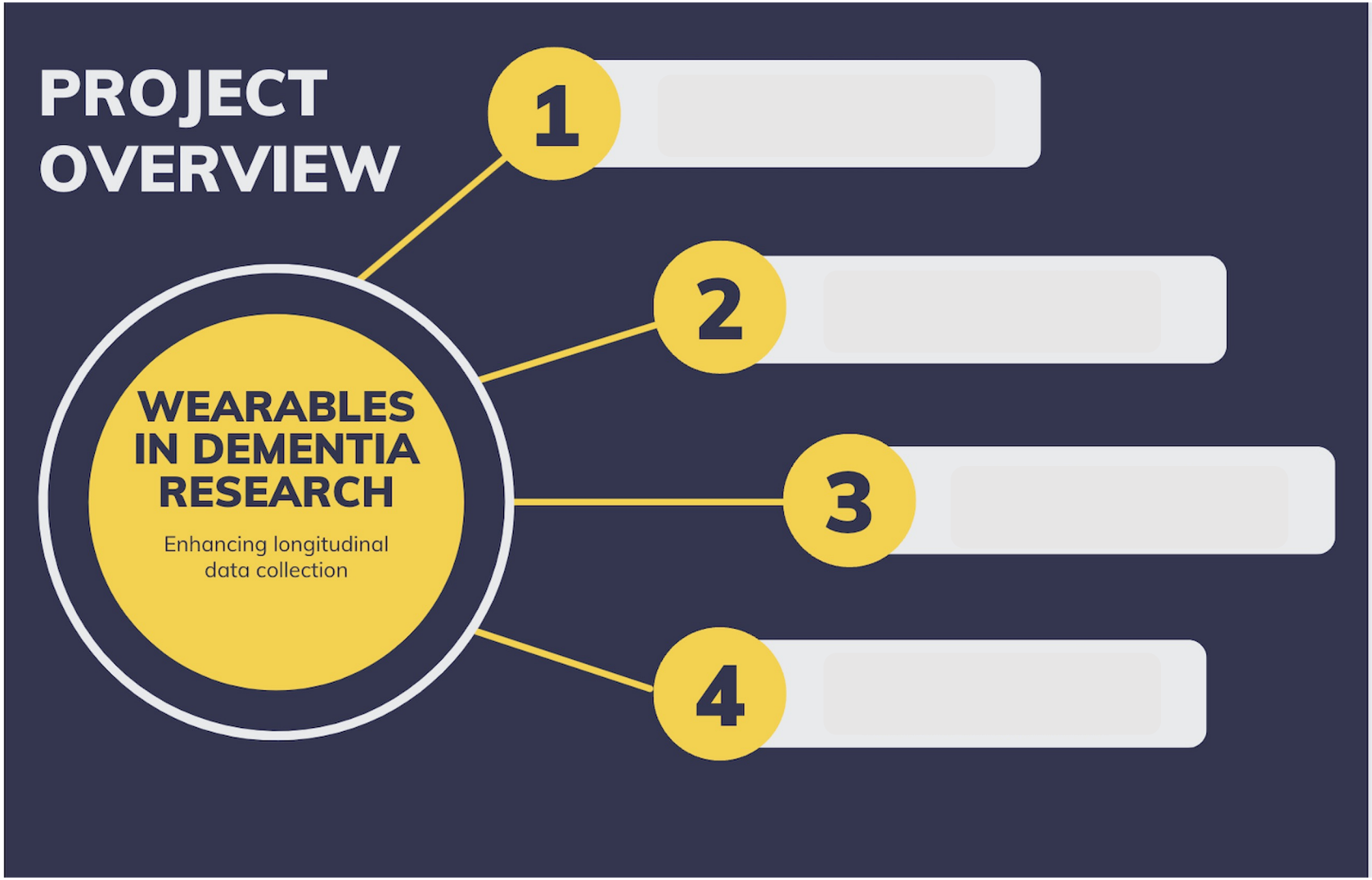

Study design


PROJECT OVERVIEW
WEARABLES IN DEMENTIA RESEARCH
Enhancing longitudinal data collection
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2
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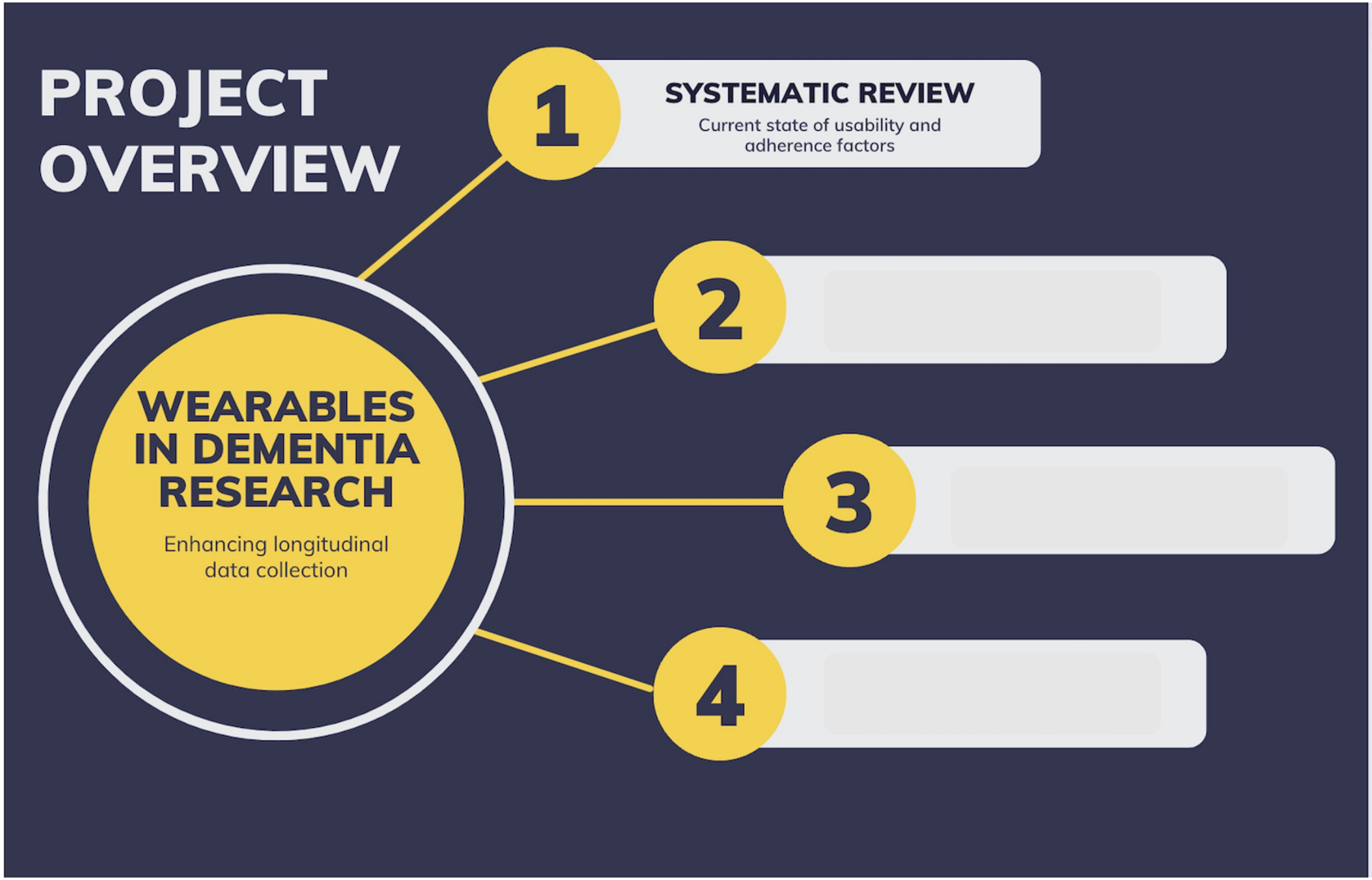
PROJECT OVERVIEW
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SYSTEMATIC REVIEW
Current state of usability and adherence factors
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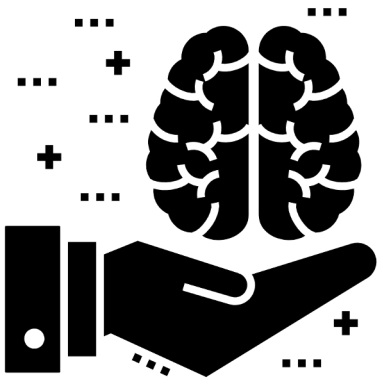
WEARABLES IN DEMENTIA RESEARCH
Enhancing longitudinal data collection

2016+ original research articles

Participants

Viewpoints and experiences



Researchers

Adherence issues and solutions

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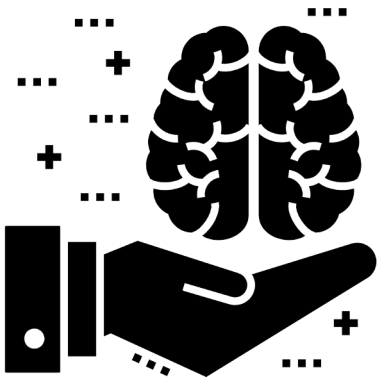
Expected results

Participants

Barriers and facilitators to use



Researchers

Device and protocol needs

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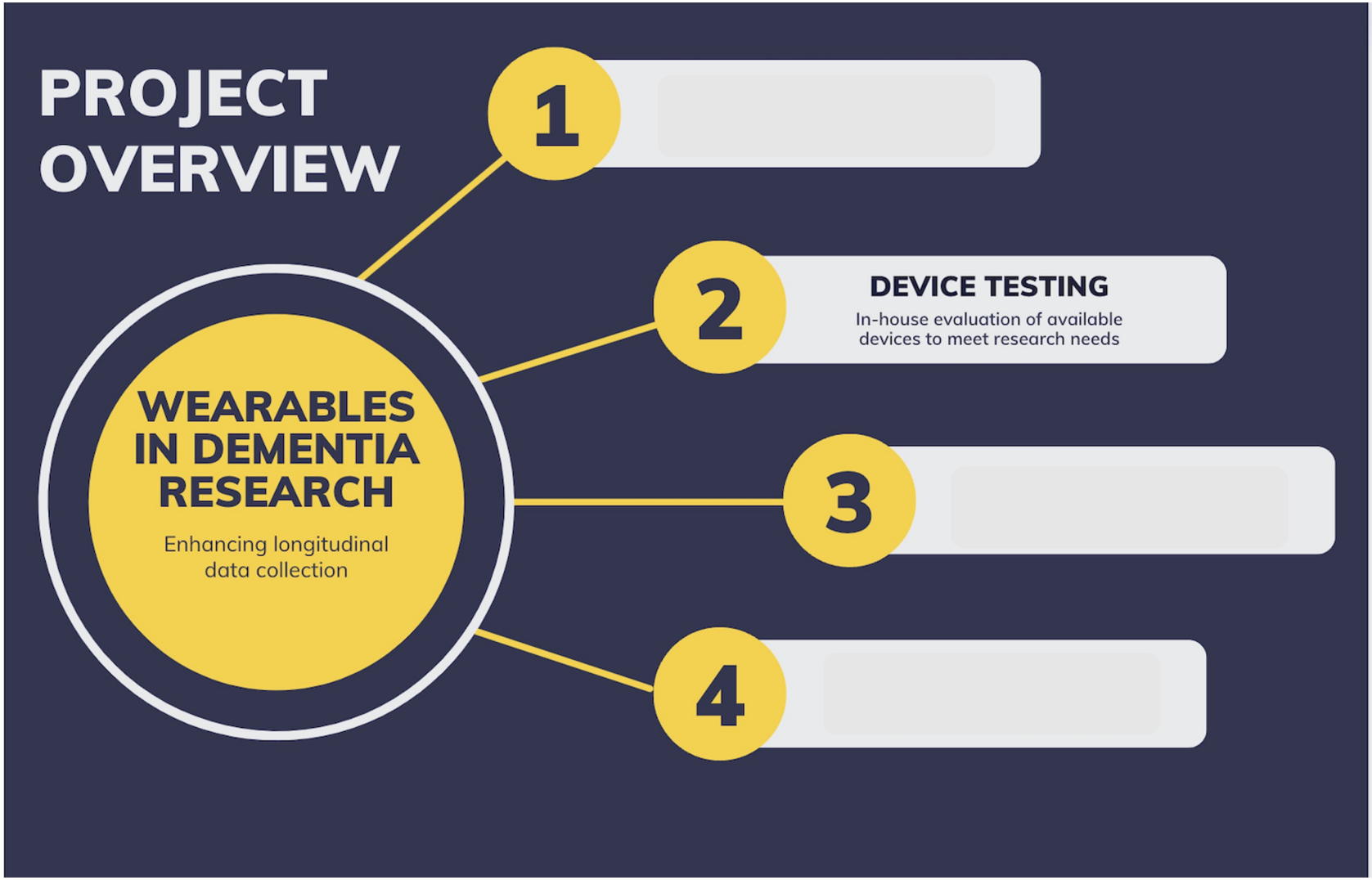
PROJECT OVERVIEW
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DEVICE TESTING
In-house evaluation of available devices to meet research needs
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Wearables candidates

Participants

Meet preferences
and reduces barriers

Researchers

Variety of forms and data targets

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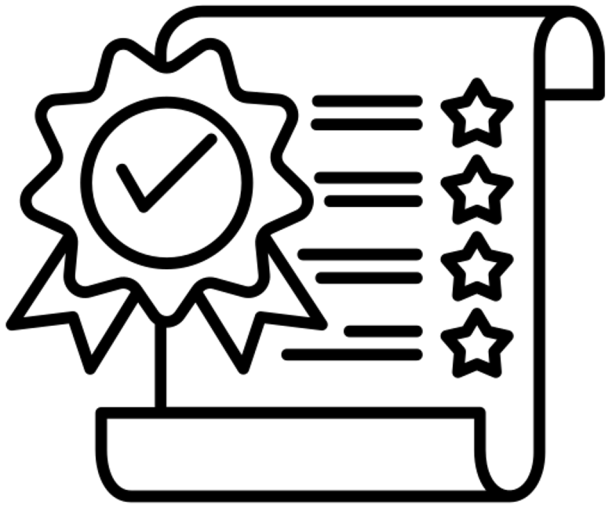
In-house testing scenarios

Data access

Data quality

Initial usability/durability



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Expected results

Device name	Class (form)	Sensor availability	API Link (data access)	Battery assessments

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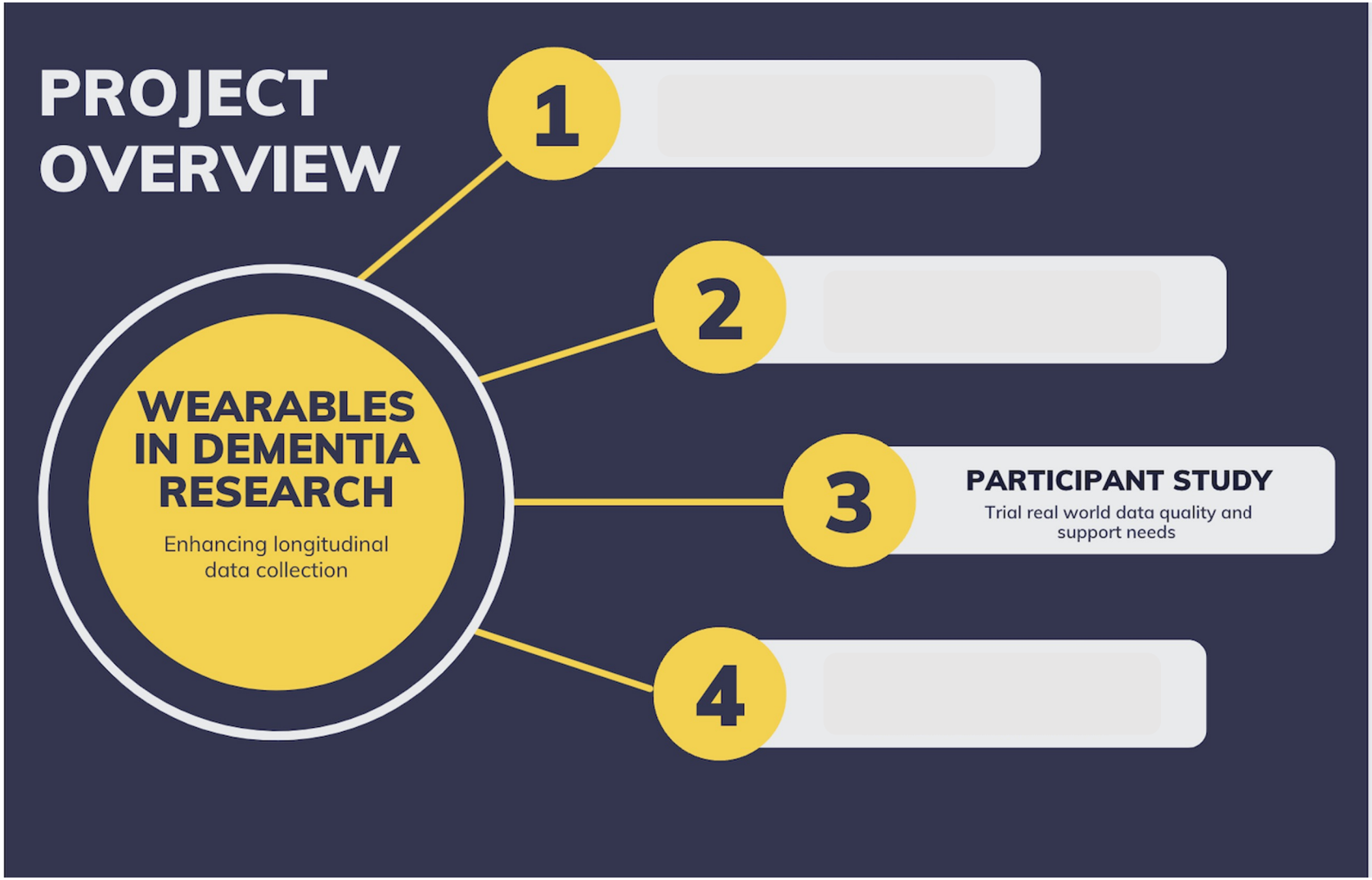
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WEARABLES IN DEMENTIA RESEARCH
Enhancing longitudinal data collection
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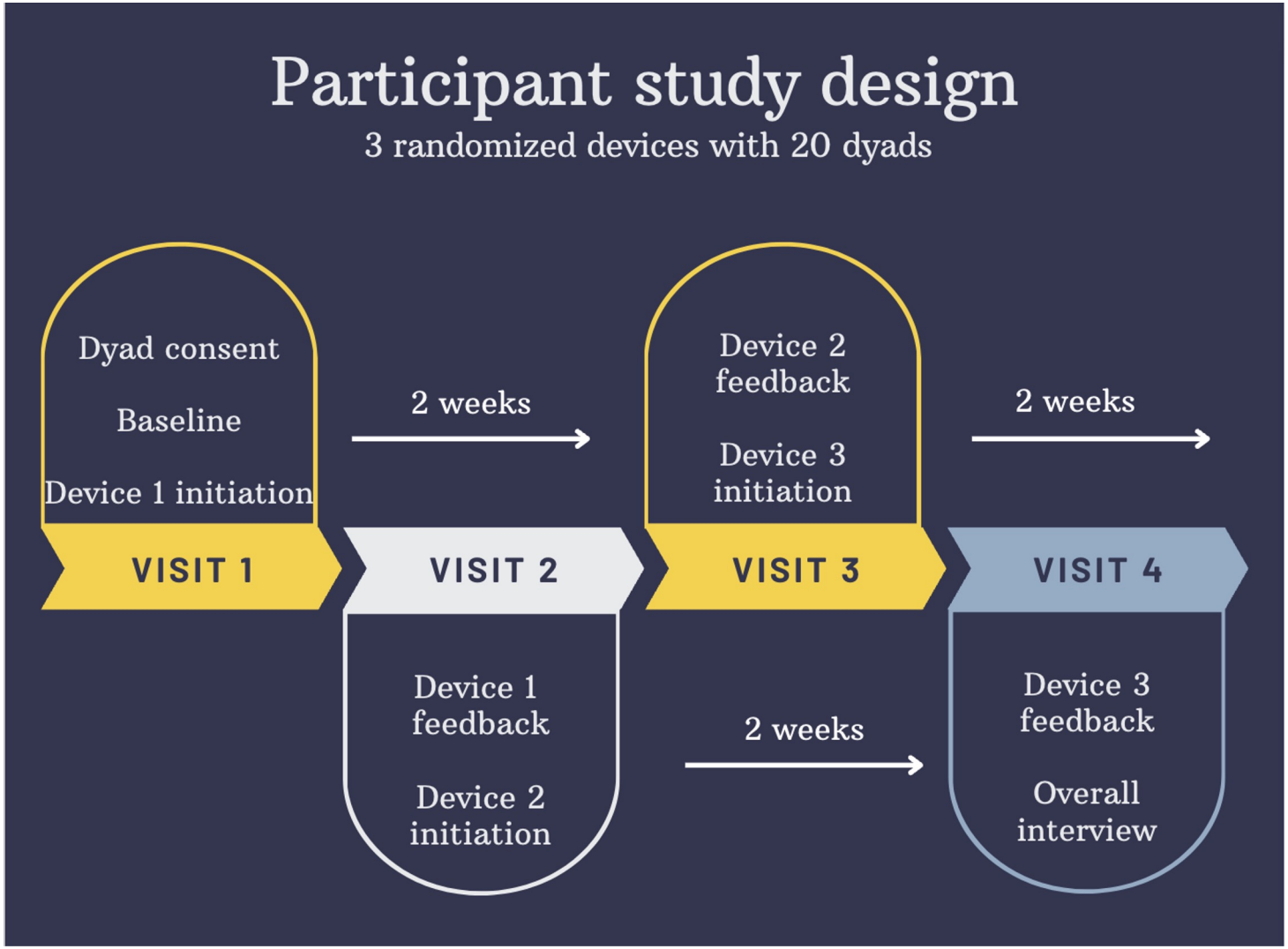
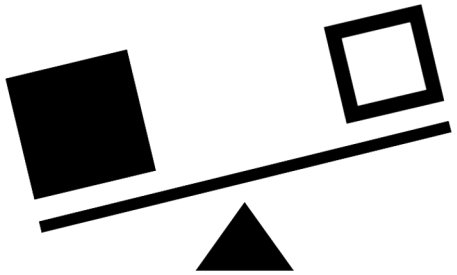
PARTICIPANT STUDY
Trial real world data quality and support needs
4

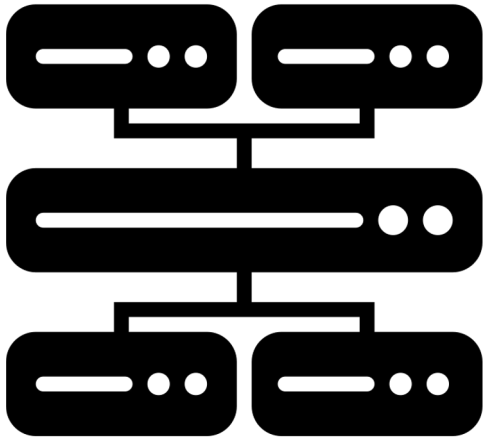

Participant study design
3 randomized devices with 20 dyads
Dyad consent
Baseline
Device 1 initiation
2 weeks
Device 2 feedback
Device 3 initiation
2 weeks
VISIT 1
VISIT 2
VISIT 3
VISIT 4
Device 1 feedback
Device 2 initiation
2 weeks
Device 3 feedback
Overall interview

Expected results

Comparative insights into device (dis)advantages



Adherence and support protocols



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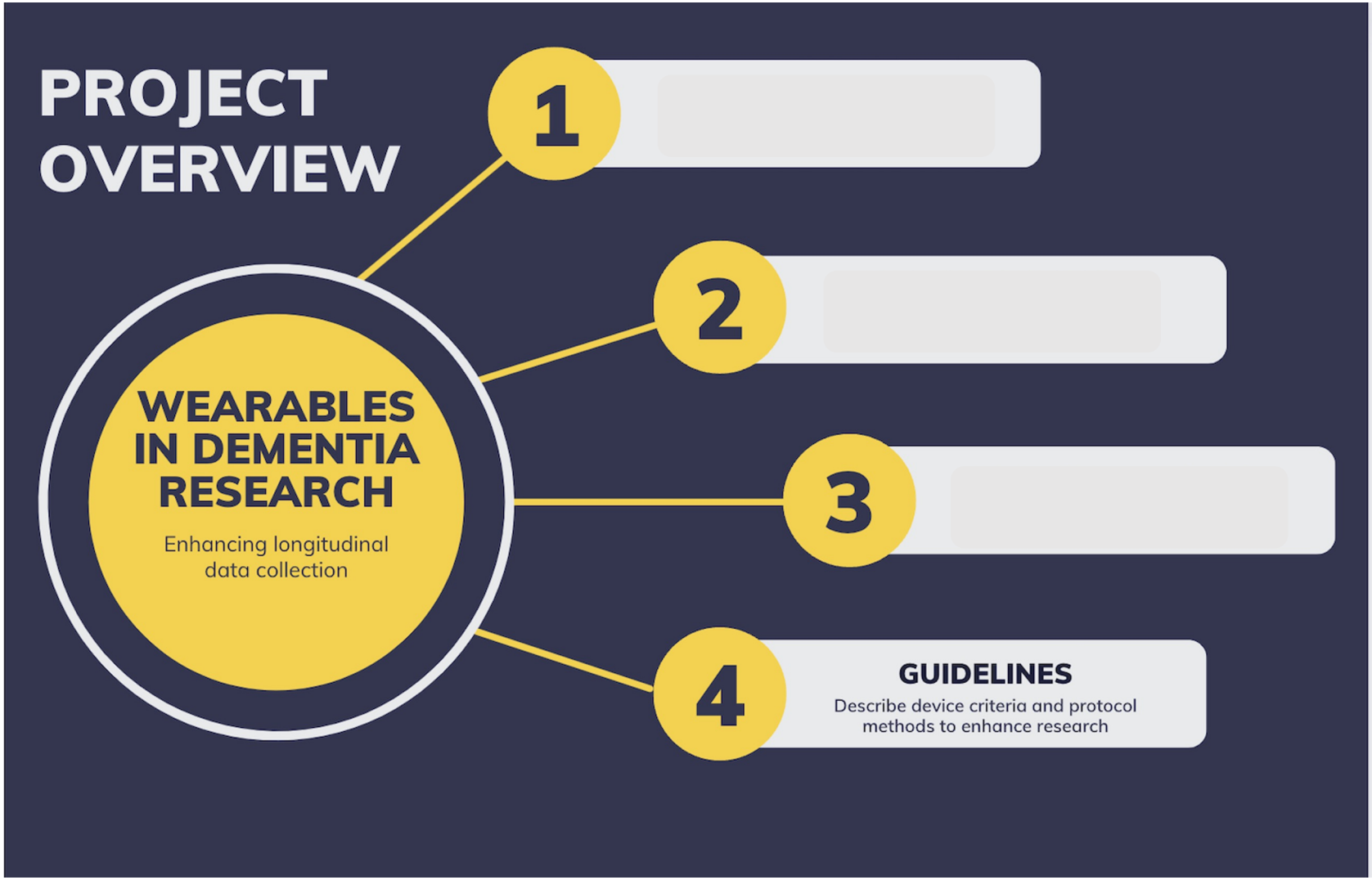
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GUIDELINES
Describe device criteria and protocol methods to enhance research

Expected results

Evidence-based guide synthesizing key takeaways from Aims 1-3

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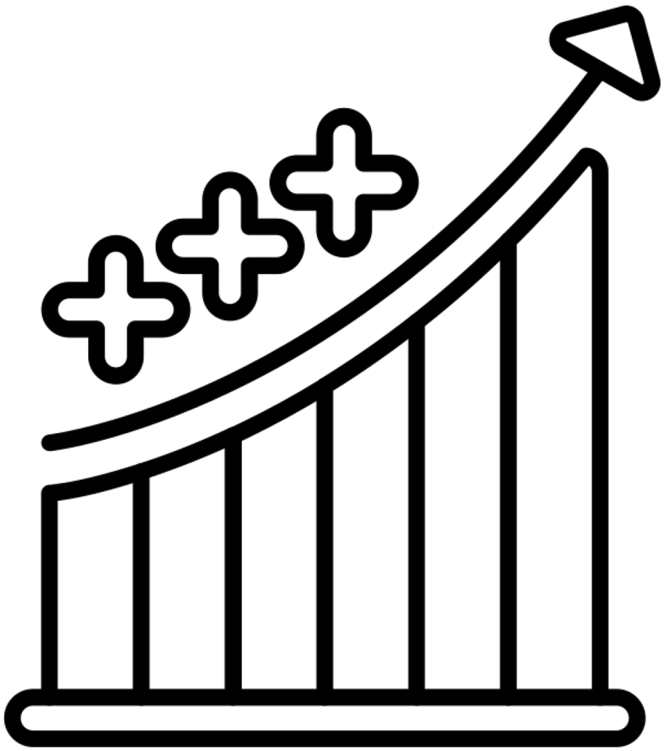
Expected results

Support superior long-term wearables research with dementia populations

Inform longer-term usability and protocol testing matched to specific behavioral targets



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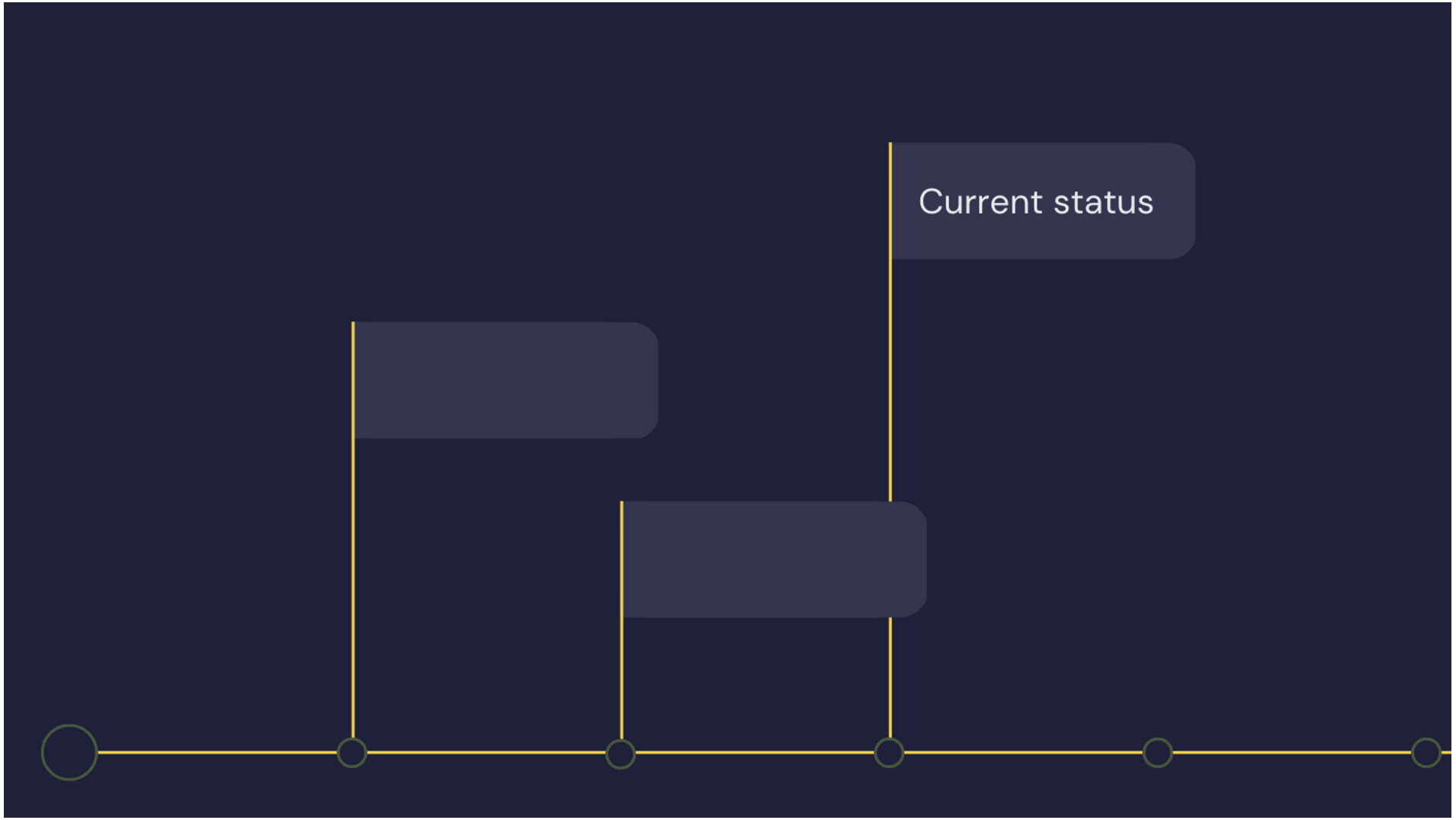
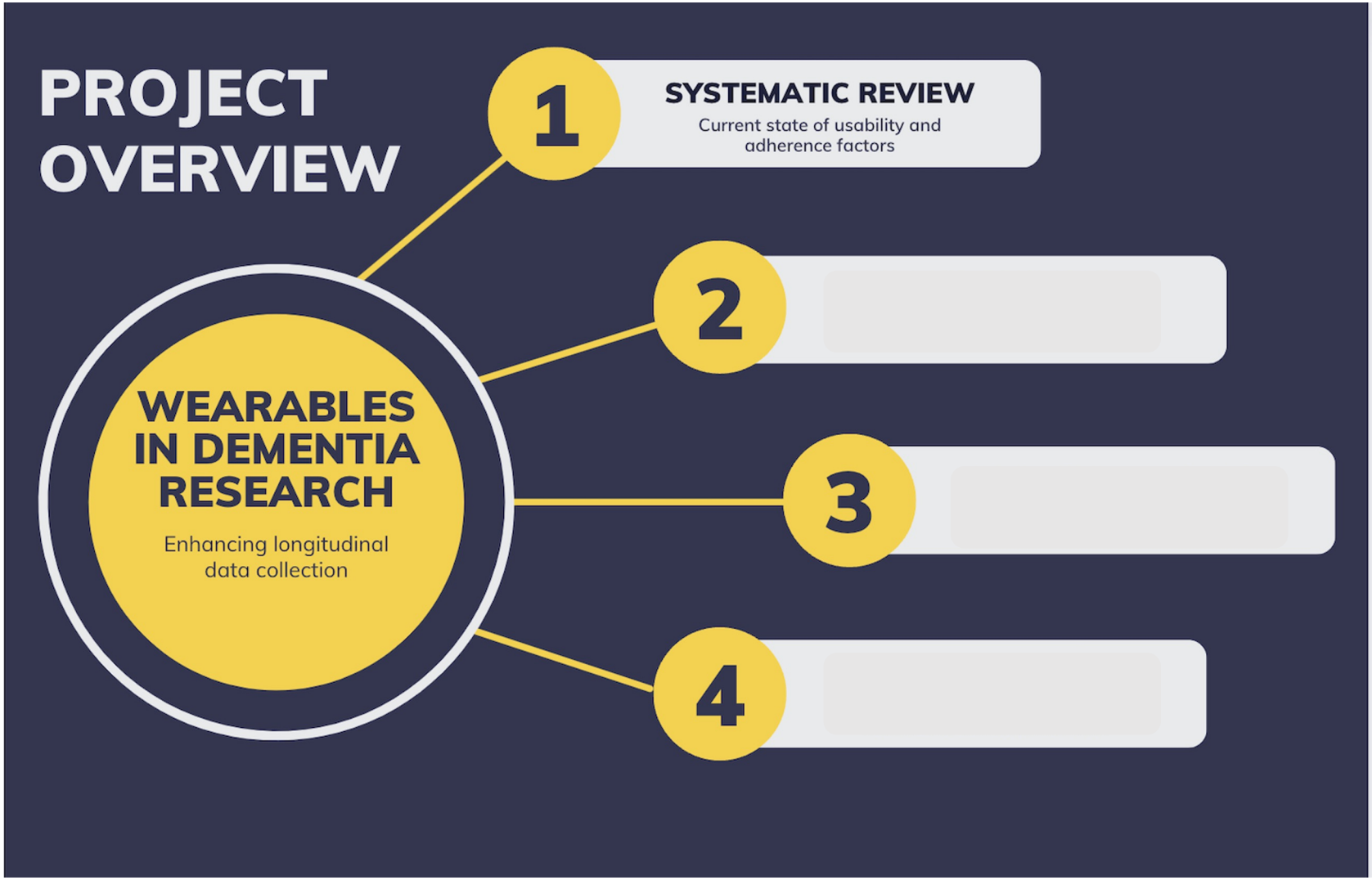

Current status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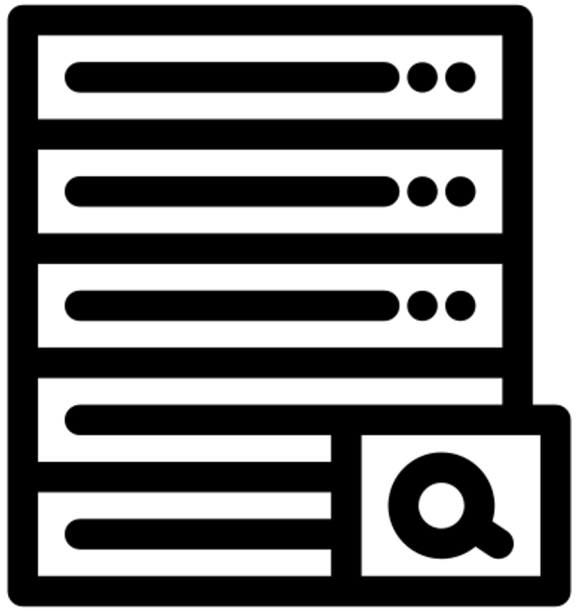
PubMed/MEDLINE

((("Wearable Electronic Devices"[MeSH Terms] OR "Electronic Skin" OR "Wearable Devices" OR "Wearable Electronic Devices" OR "Wearable Technology") AND ("Dementia"[MeSH Terms] OR "Amentia" OR "Dementia" OR "Familial Dementia")) OR (((((dementia) OR (Alzheimer* Disease)) OR ("memory loss") OR ("cognitive impairment"))) AND ((((wearable*) OR (wearable electronic*) OR (biosensor*) OR (FitBit) OR (geolocat*) OR ("remote monitoring") OR (pedometer)))))

Filters: from 2016 – 2023



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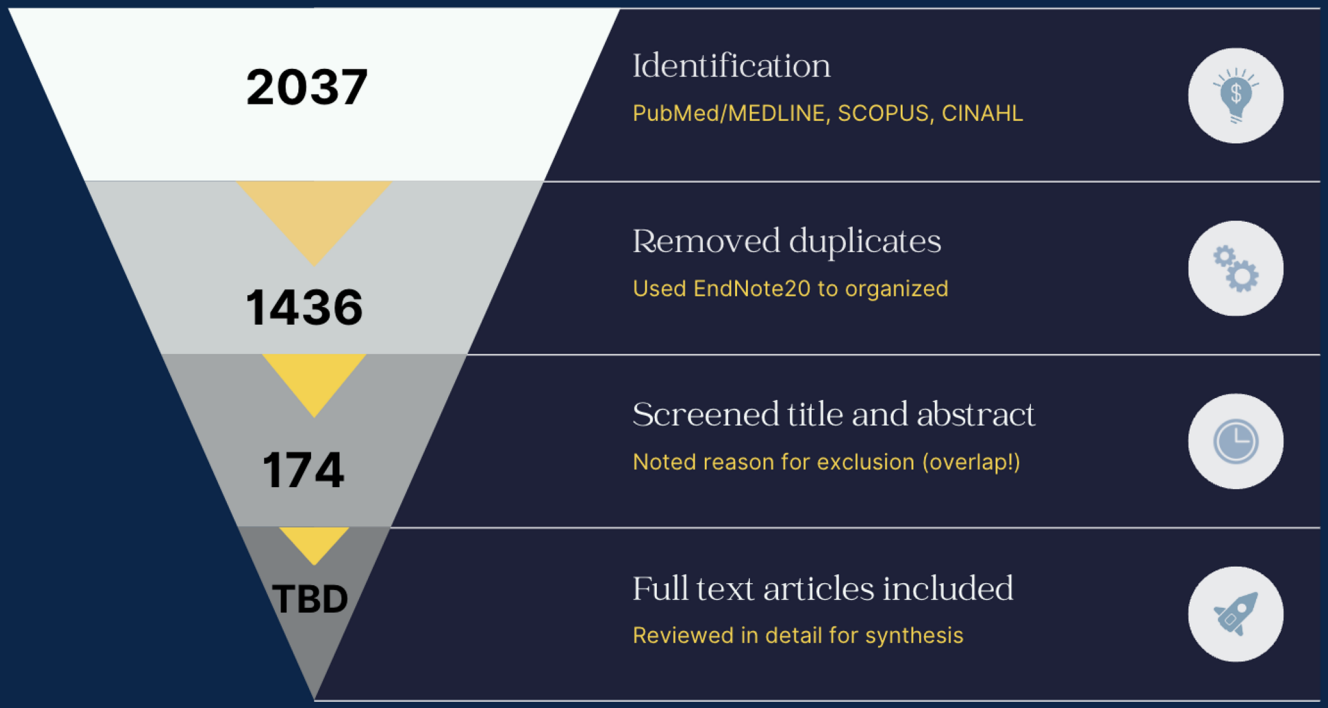
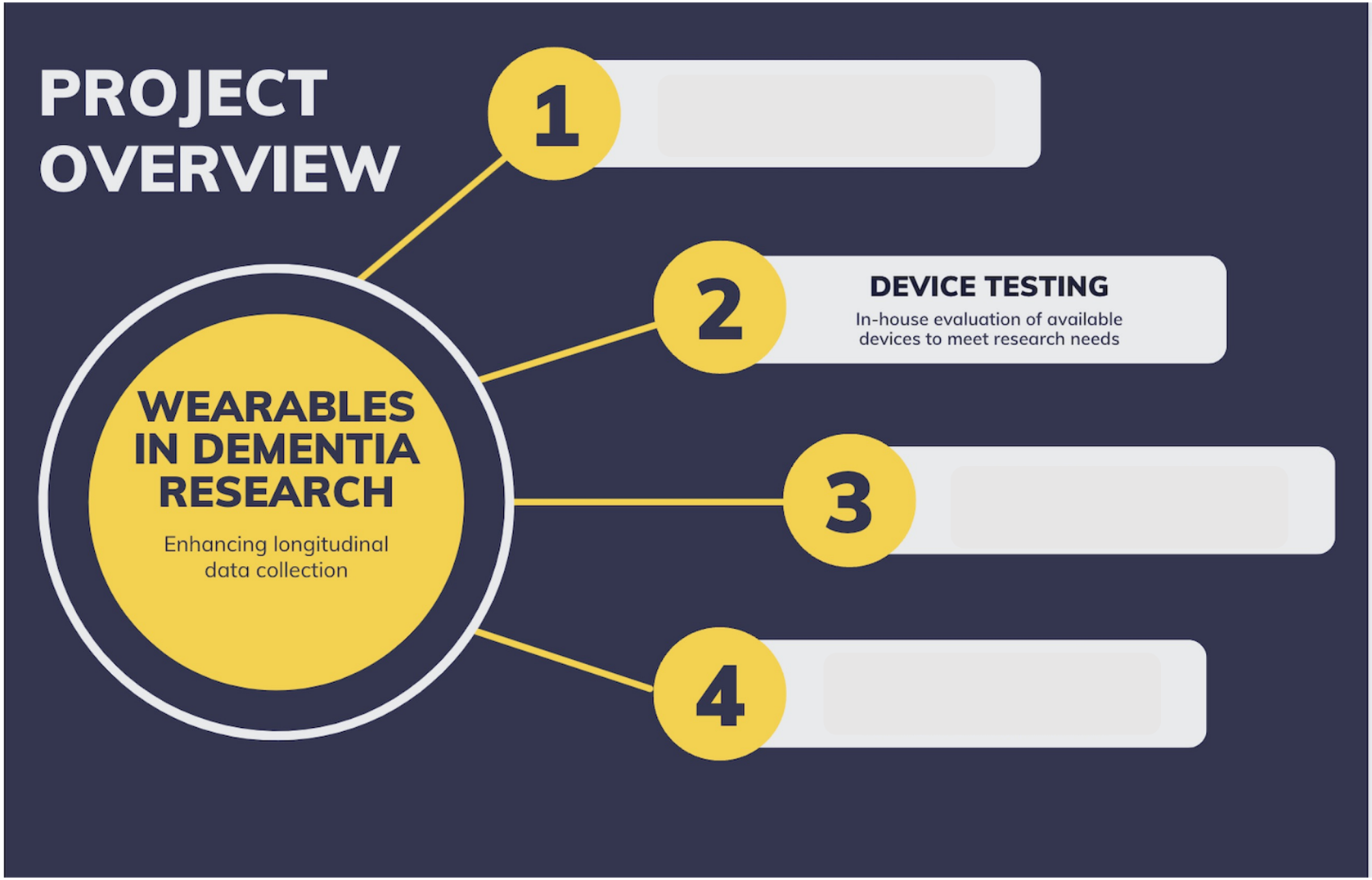
Using PRISMA 2020

Systematic review flow

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Software exploration

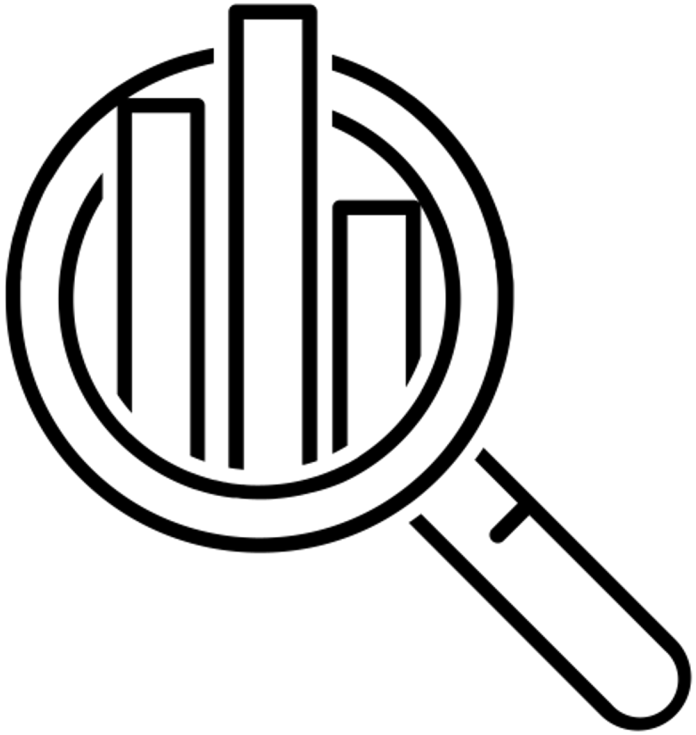
Sensor data types and forms

Direct access

- Environment sensors
- GPS and WIFI RTT
- Geomagnetic, accelerometer/gyroscope

  proximity sensors

Battery life management and concerns



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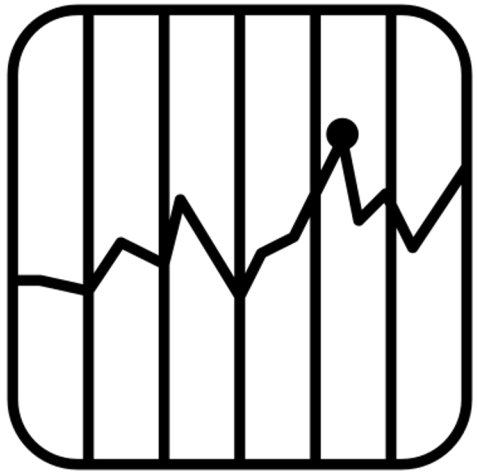
Thank you!

Questions?
Comments?



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