

Technology and Dementia

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UK Dementia
Research Institute



Founding funders:



Medical
Research
Council



Disclaimer

I have received honorarium for consultancy for the following companies;
Janssen, Roche, Biogen, Lilly

I am the clinical lead for Care Research and Technology Centre

Current dementia care

- Family and friends
- Charity and voluntary organisations
- Health care services
- Day centres
- Social service care
- Paid carer (part time or full time)
- Day canthers
- Care homes

Smart home

Smart lighting

Electrical appliance use monitoring

GPS location and tracking devices

Smart Heating

Door sensors and safety

Amazon Halo, Alexa, Google Home ...

Home cameras

Social media, YouTube, Twitter ...

Reminder messages

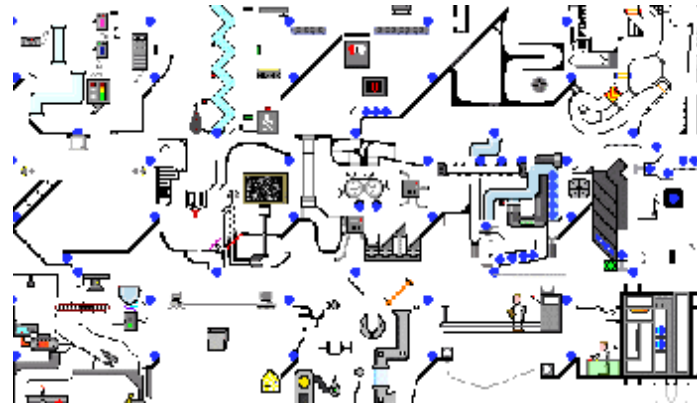
Therapeutic robot PARO (comPANion Robot)

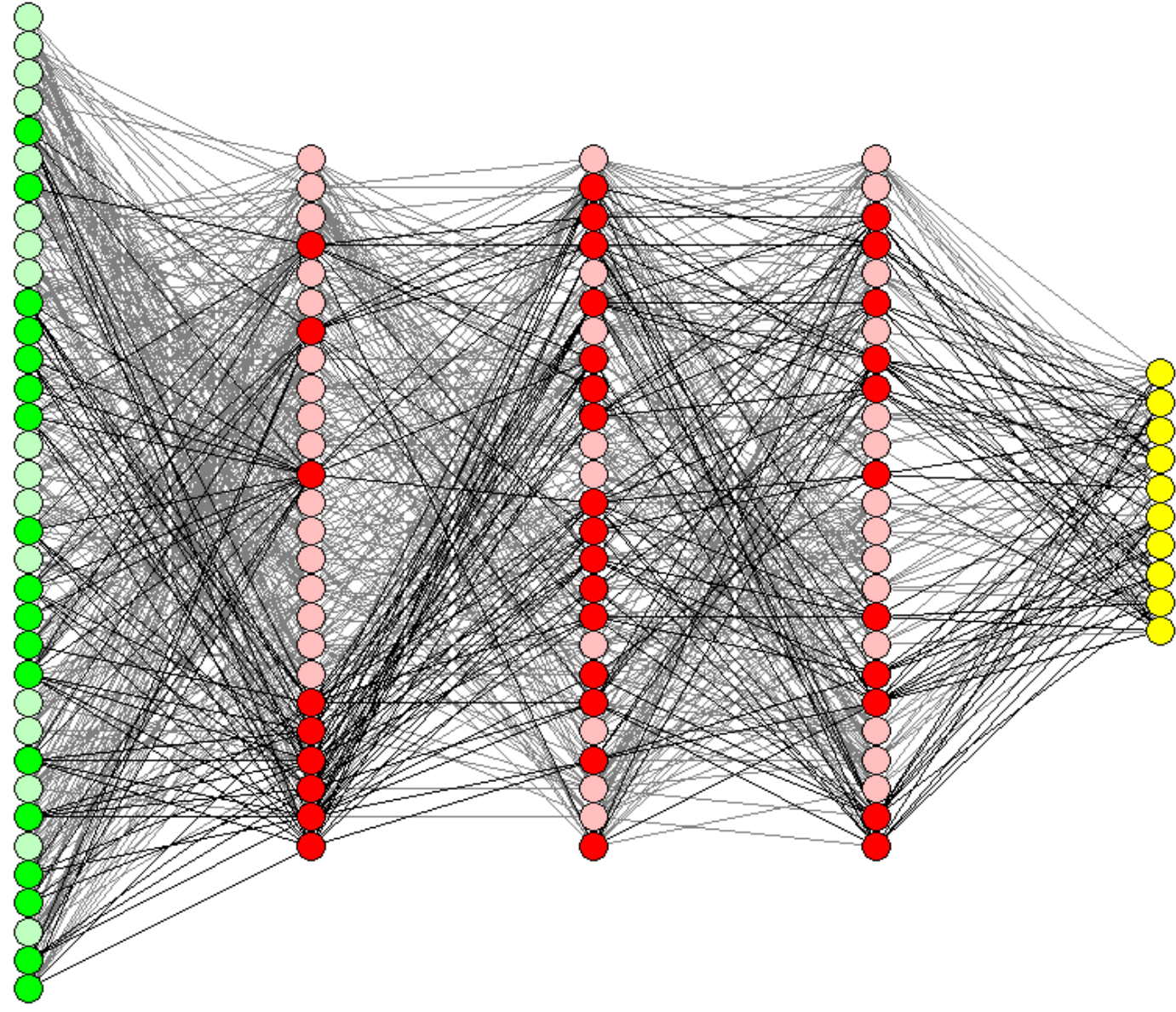
Gerontechnology

Designing technology and an environment to promote independent living autonomy of older person with Strengthening the support of their network

Human mind

- Needs constant training
- Everyone is different
- Not able to compare many variables
- Only look for predicted signs that we are comfortable with it
- Not able to link all the information





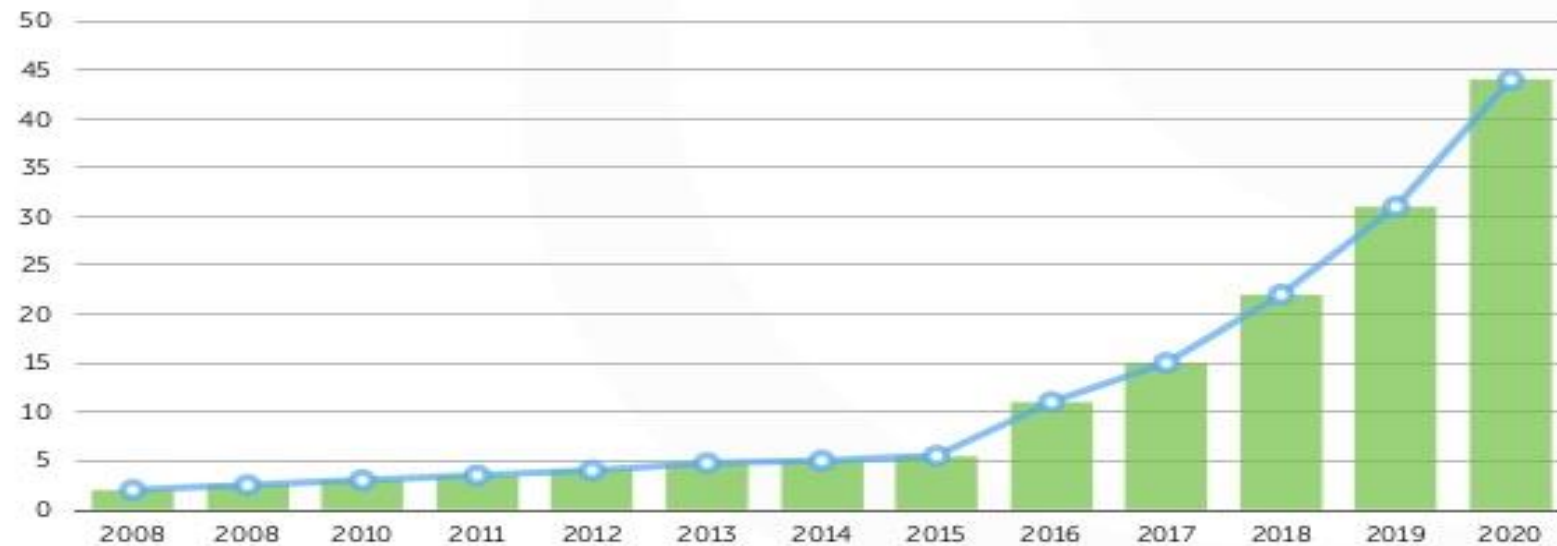
Data

BIG DATA IS GROWING AT 40% ANNUALLY



Data is growing at a 40 percent compound annual rate, reaching nearly 45ZB by 2020

Data in Zettabytes (ZB)



Source: Oracle, 2012

1 Zettabyte= 1Trillion gigabytes.

1000 Exabyte= 1 Zettabyte

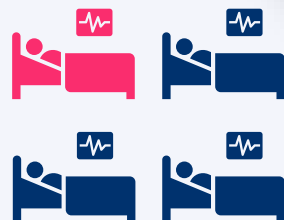
Dementia Research Institute

Care Research and Technology Centre (CR&T)

Mission: To transform dementia care through the use of new technology



85%
would prefer to
live at home for as
long as possible



1 in 4
hospital beds for
people living with
dementia



70%
increase over the
last **5 years**

Care is limited by lack of real world data

Opportunities from the integration of new technologies
for home monitoring with machine learning/AI

Holistic approach to major real-world problems

- Personalised intervention
- Sleep disturbance
- Infections
- Agitation/aggression
- Social isolation



Our participant's perspective

Watch here:



We don't think of it as a smart home

I would hate to go into care, this is the next best thing

Afzal

I feel reassured that there's a way ahead and it's not a dark future

Zohra

It is invisible support for carers

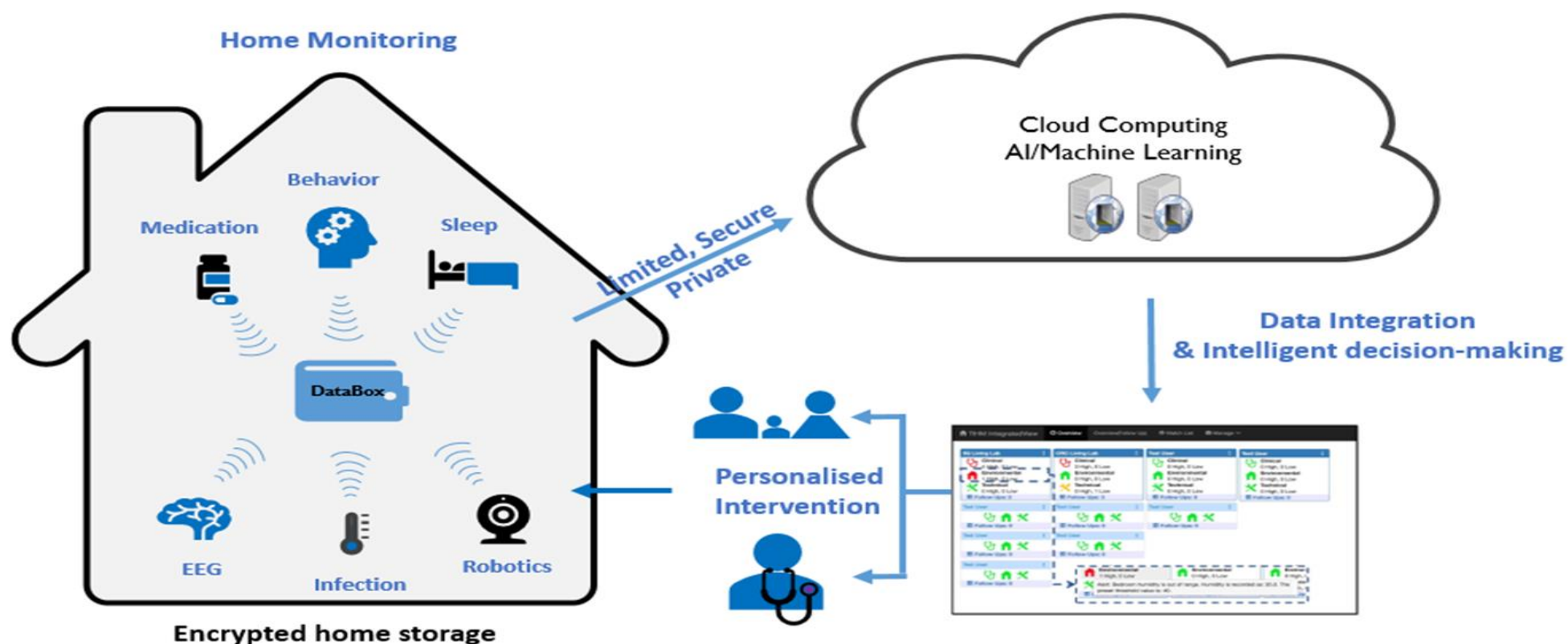
it takes the scary bits away; it means I'm not on my own

<https://vimeo.com/620695913> →



UK Dementia
Research Institute

Dementia Research Institute Healthy Home



Digital platform - Minder

The screenshot displays the Minder digital platform interface, which is organized into a main timeline view and a right-hand sidebar.

Timeline View:

- Timeline Tab:** The active tab, showing a vertical timeline of patient encounters.
- Notes (25):** A tab for viewing all notes.
- Filters:** Buttons for adding different types of notes: Encounter, Observation, Procedure, Communication, and Questionnaire.
- Encounter List:**
 - Communication:** Notification (telephone) - 5 hours ago.
 - Communication:** Instruction (telephone) - 5 hours ago.
 - Encounter:** General Practice - a day ago.
 - Communication:** Notification (telephone) - a day ago.
 - Communication:** Instruction (telephone) - 2 days ago.
 - Blood pressure:** Partially visible at the bottom.

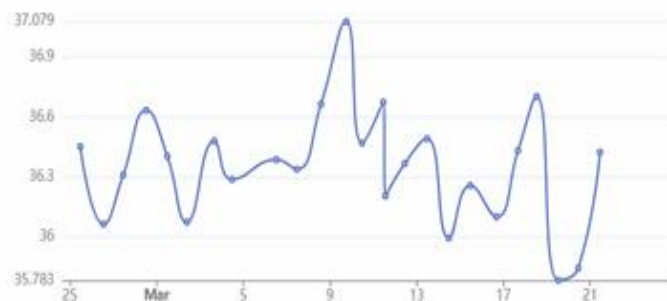
Right-Hand Sidebar:

- Latest readings:** A section showing vital signs.
 - Oxygen saturation in Arterial blood:** 98% (3 hours ago).
 - Heart rate:** 60 beats/minute (3 hours ago).
 - Blood pressure:** 113 mmHg (3 hours ago) and 62 mmHg (3 hours ago).
 - Body temperature:** 36.425 DegreesCelsius (3 days ago).
 - Body weight:** No data.
 - Total body water:** No data.
- Active conditions:** A section showing current conditions. It states "No active conditions. [View all.](#)"
- Open issues:** A section showing ongoing issues.
 - Blood in Urine:** Modified 4 hours ago, Created 8 days ago.
 - Thermometer body temperature data (missing for longer t...):** Missing data, Modified 4 hours ago, Created 4 hours ago.
 - Carer Enquiry about Alexa:** Modified 3 days ago, Created 6 days ago.

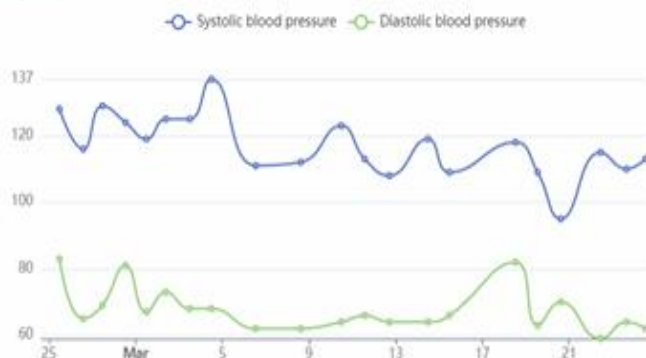


Integrated view- Patient 101

Body temperature



Blood pressure



3 hours ago

Heart rate

60 beats/minute
3 hours ago

Blood pressure

113 mmHg
3 hours ago
62 mmHg
3 hours ago

Body temperature

36.425 DegreesCelsius
3 days ago

Body weight

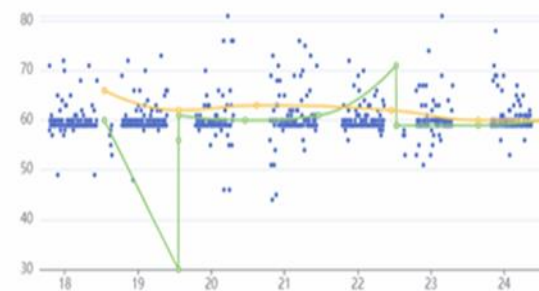
No data

Total body water

No data

Heart rate

● Sleep mat ● pulse ox ● blood pressure monitor



3 hours ago

Heart rate

60 beats/minute
3 hours ago

Blood pressure

113 mmHg
3 hours ago
62 mmHg
3 hours ago

Body temperature

36.425 DegreesCelsius
3 days ago

Body weight

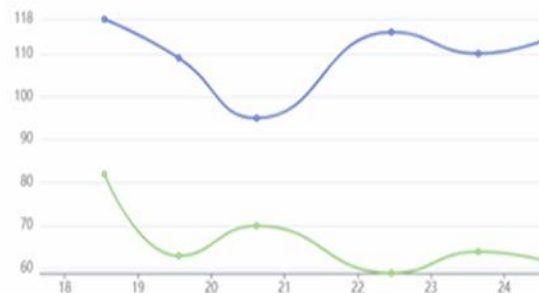
No data

Total body water

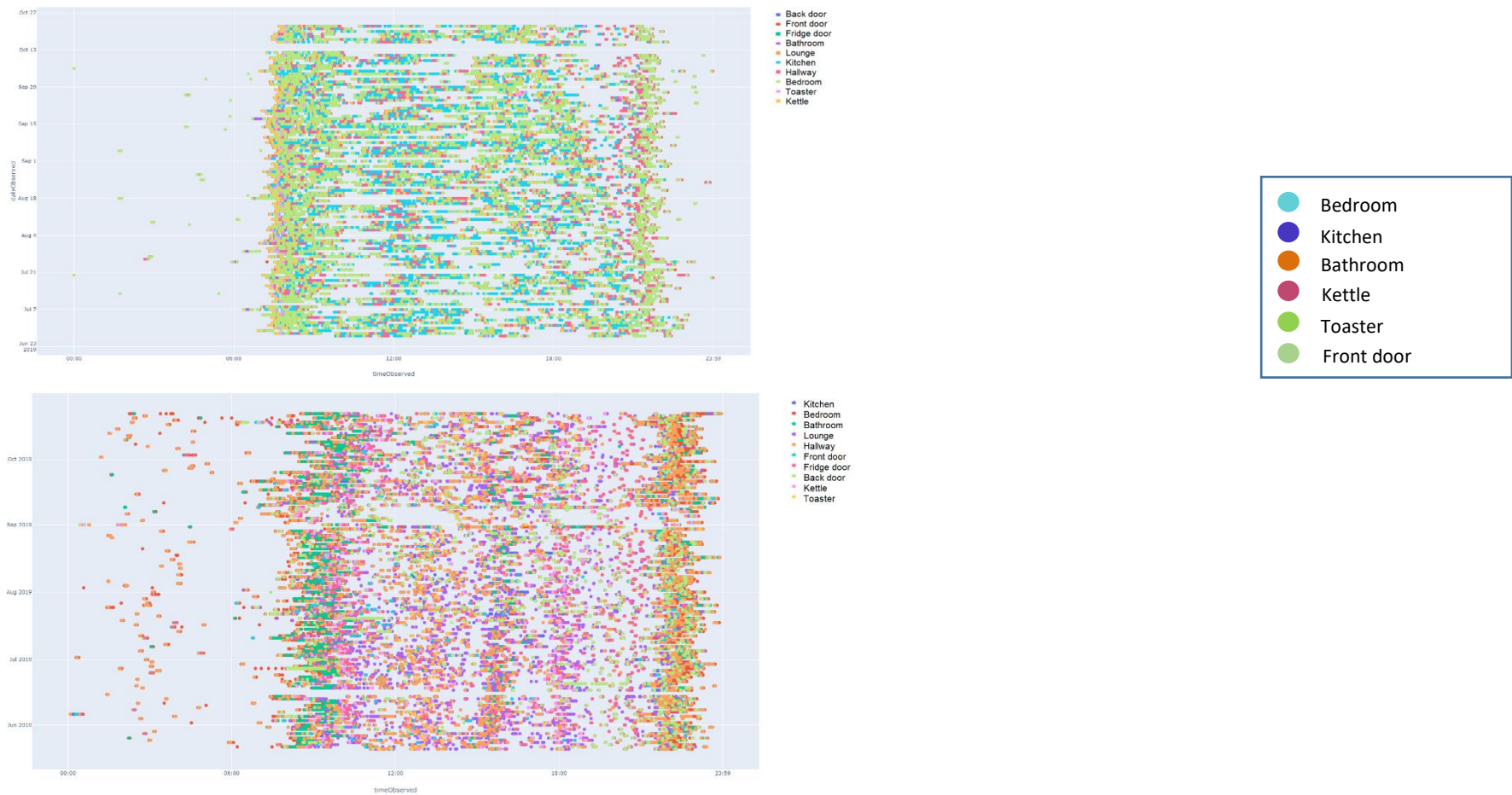
No data

Blood pressure

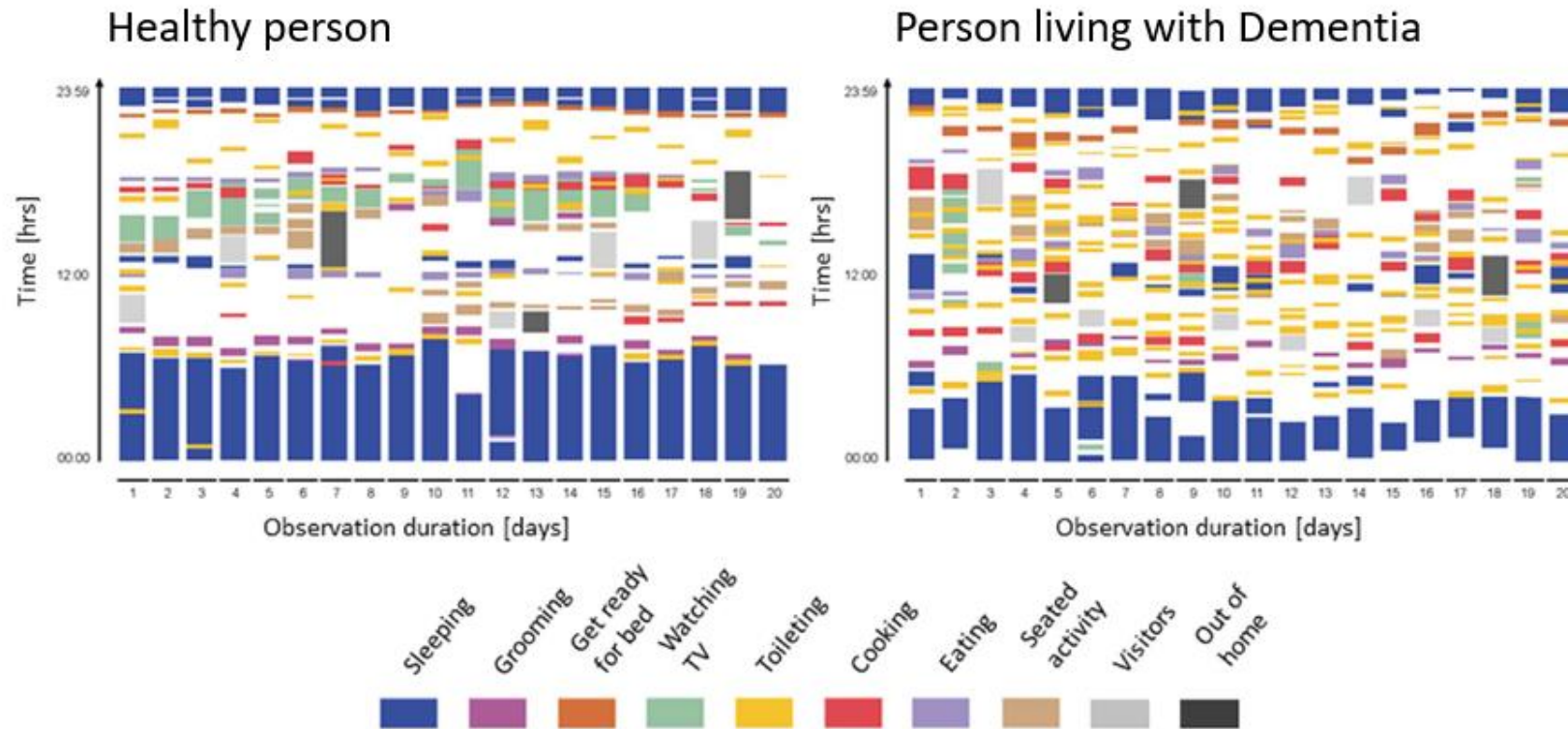
● Systolic blood pressure ● Diastolic blood pressure



Daily activity pattern analysis

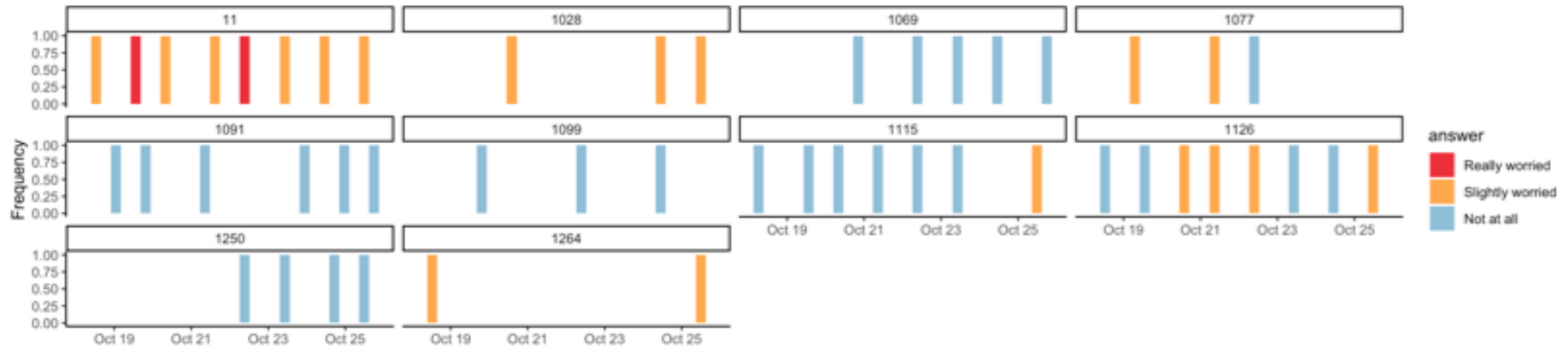


Monitoring behaviour in the home



Wellbeing questionnaire

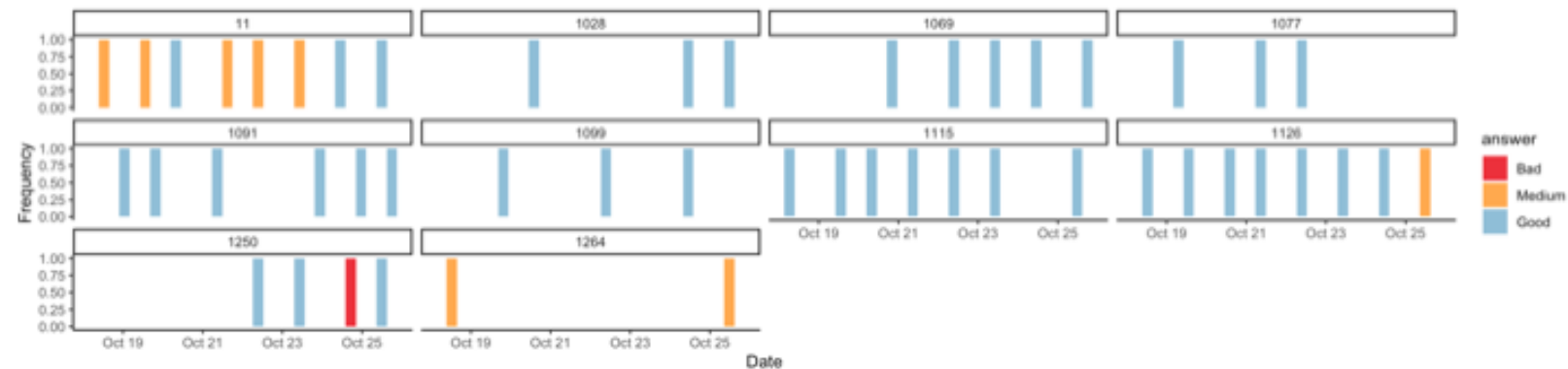
Health



Mood

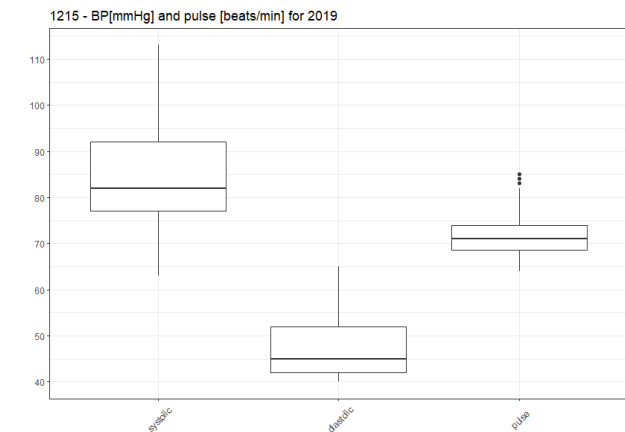
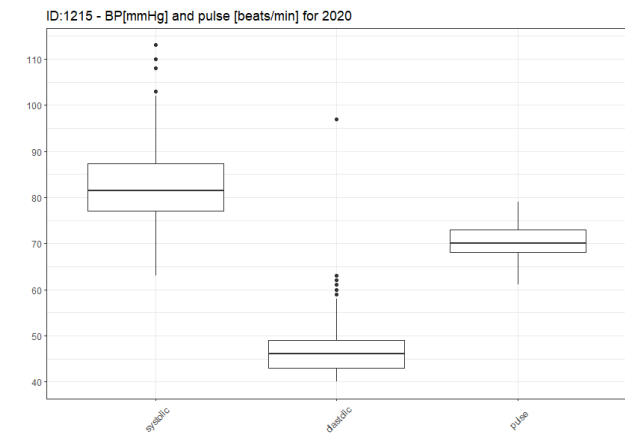
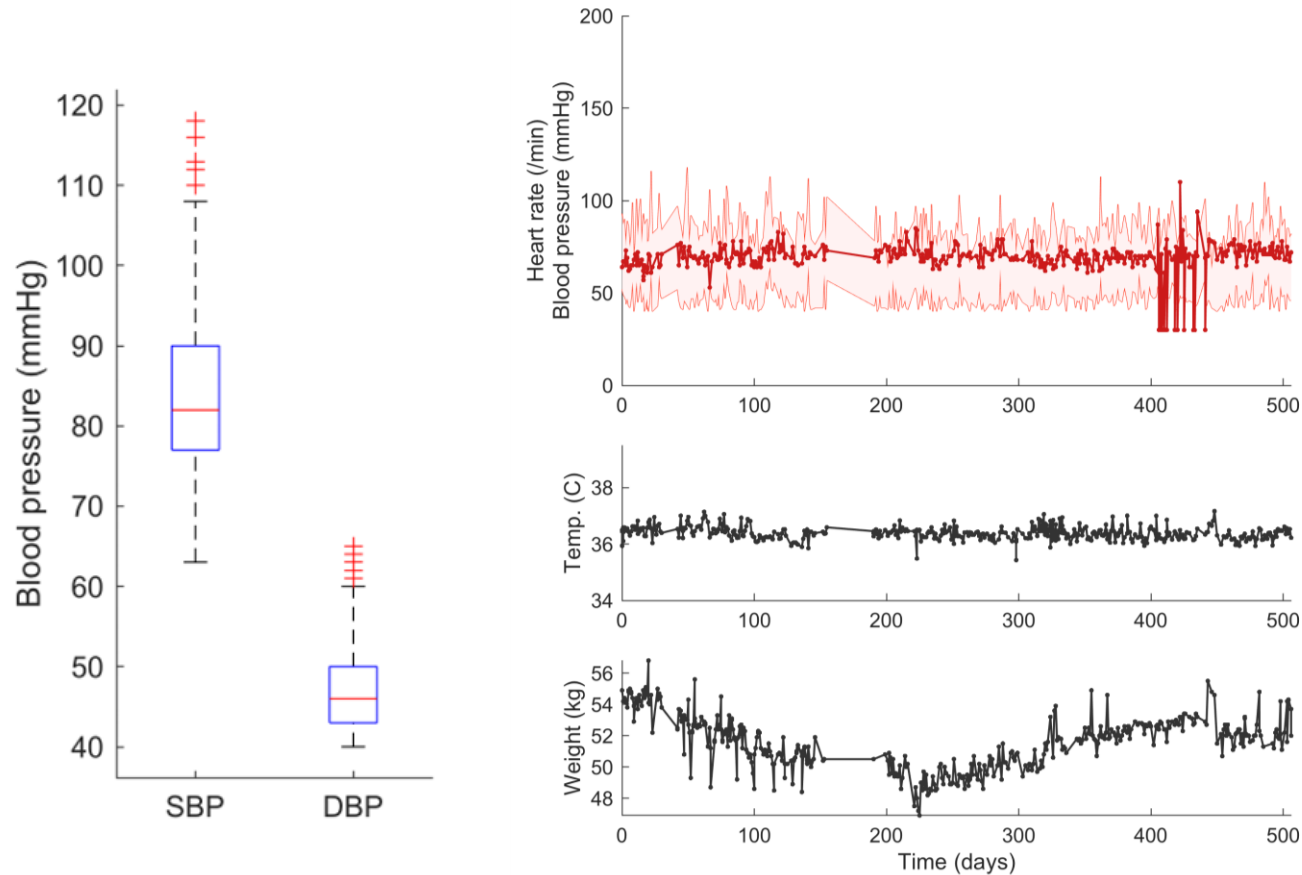


Sleep



Care home 2021 - 1215

- Persistent hypotension in the context of dementia in PD



ID: TU11

Diagnosis: Dementia in AD,
atypical or mixed type

Gender: F

Age: 81

Medication:

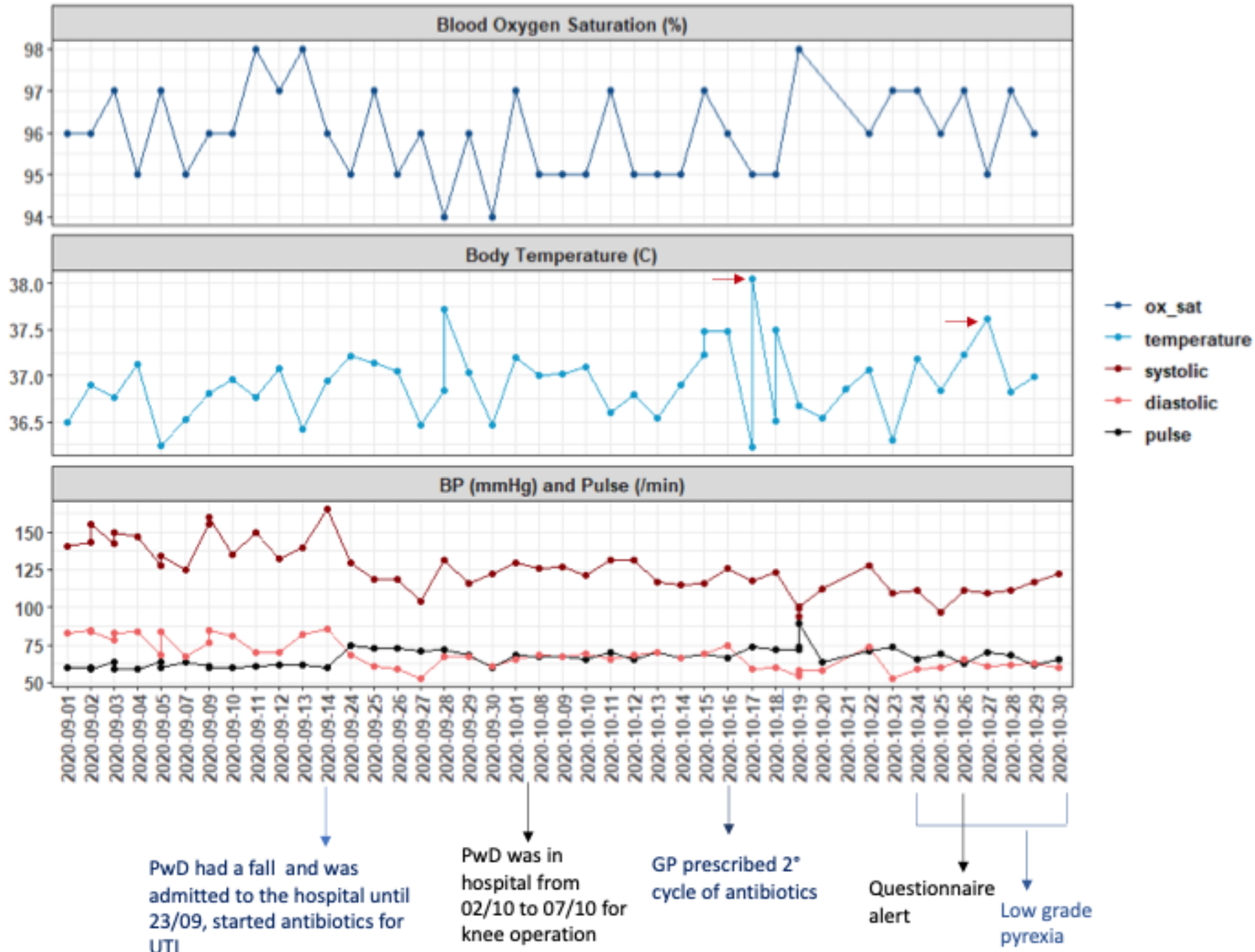
- Galantamin 4mg (2016)
- Mometasone 50mg (2015)
- Atorvastatin 10mg (2015)
- Losartan 50mg (2015)

Health Conditions:

- Diet controlled tablets
- Raised Cholestrol

Action:

Temp alert - On threshold,
CMT to monitor and to phone
if increased temperature
persists



ID 1126 – weight loss

Alert on 09/2020: 5% body weight loss since last two months's average. Recorded weight loss of 3.64kg. Last two months's average weight was 63.06kg.

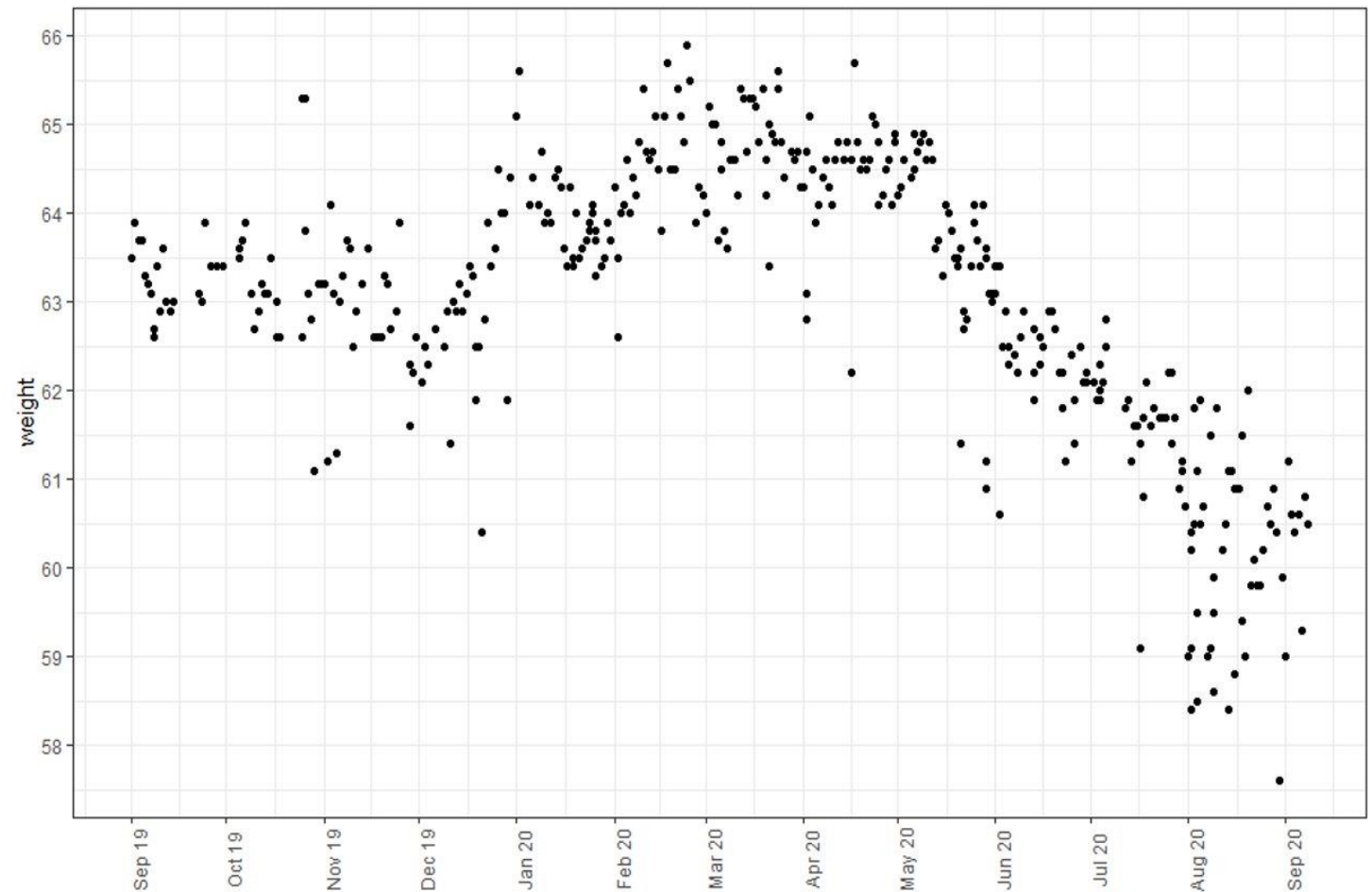
NPI - Appetite and eating behaviours

June :

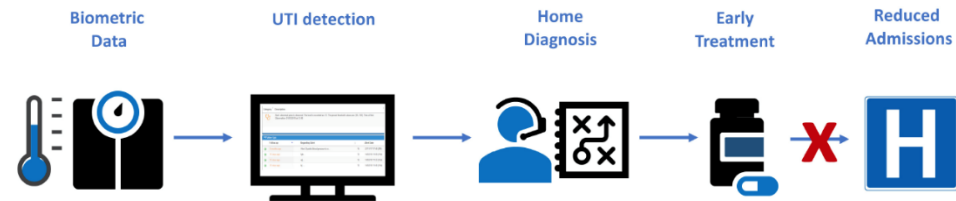
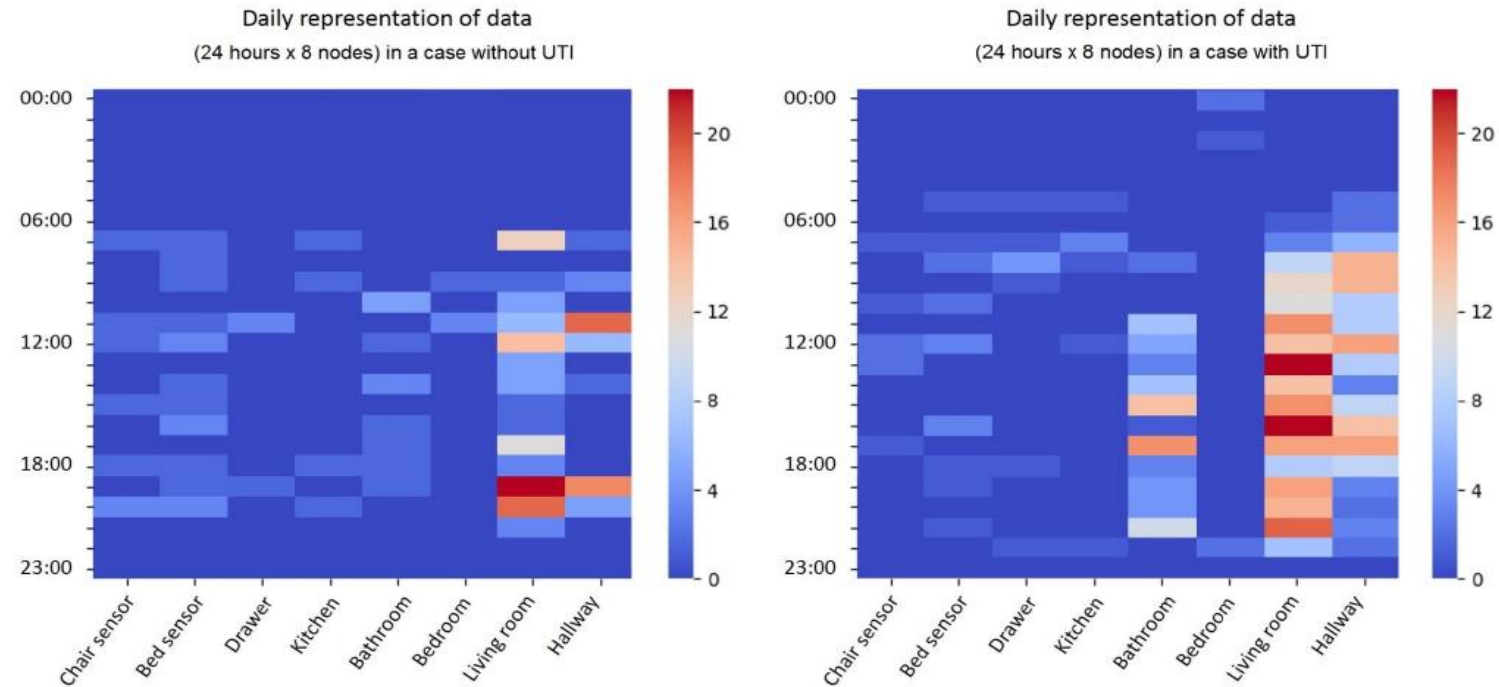
Frequency3, severity 1, carer distress from 0

July: frequency 2, severity 2, distress 2

July 2020: no change in appetite, weight or eating habits



Urinary Tract Information risk analysis



New service for people with dementia

- Integrated data of primary, secondary and social services
- Live data
- Environmental and passive data
- Predictors of relapse alerts
- Monitoring service (flow charts for every alerts)
- Clinicians use alerts to prioritise the workload
- Visit people at home when it is required
- Risk assessments based on real data

Thank you

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