

# Epilepsy Networks Project

Dr. Rupert Page

Consultant Neurologist & Clinical Lead, Dorset Epilepsy Service  
CCIO & CSO, Poole Hospital

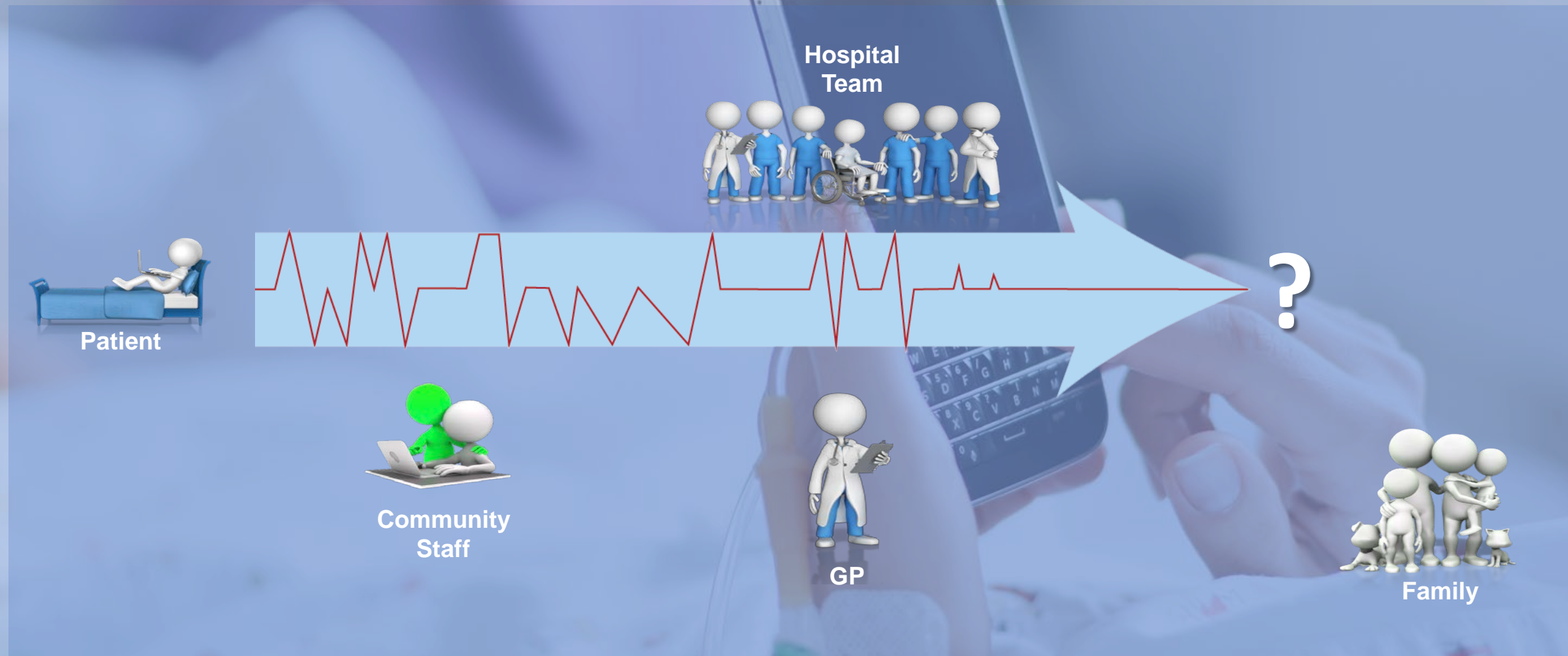
# Disclosures

- Educational support:
  - GSK, UCB, Orion Pharma, Bial
- Clinical IT innovation funding:
  - Innovate UK – Epilepsy Care Alliance, Project TACTIC
  - Wessex AHSN – NeurAvatar project
- IT Consultancy: UCB
- Speaker fees: UCB, GSK
- Off-label product usage: none





# The problem - Silos of care



# Epilepsy

2-3% of ED attendances & 1.3M bed days/year

Current best treatment is underperforming by ~25%

Misdiagnosis in >25% (syncope, dissociative...)

Annual cost of treating epilepsy in UK £2B (direct & indirect - NICE)

500,000 in the UK

990 deaths  
a year in  
England

365 young adults or  
children

400 **preventable** deaths

1 in 131 citizens

Potential savings from improvements in care:  
**£134M/year** for England  
**£55M/year** through reduced DLA payments



# Epilepsy

2-3% of ED attendances & 1.3M bed days/year

Current best treatment is underperforming by ~25%

Misdiagnosis in >25% (syncope, dissociative...)

Annual cost of treating epilepsy in UK £2B (direct & indirect - NICE)

500,000 in the UK

990 deaths  
a year in  
England

365 young adults or  
children

400 **preventable** deaths

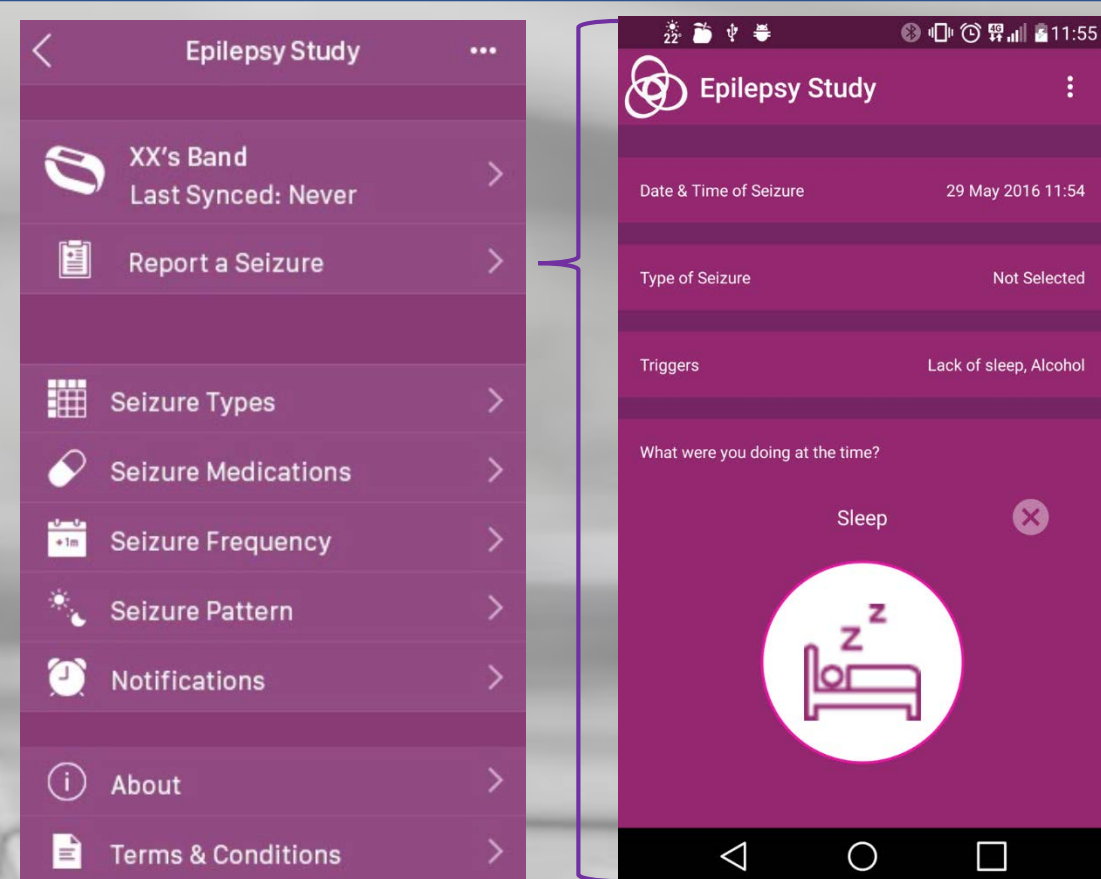
1 in 131 citizens

Potential savings from improvements in care:  
£134M/year for England  
£55M/year through reduced DLA payments

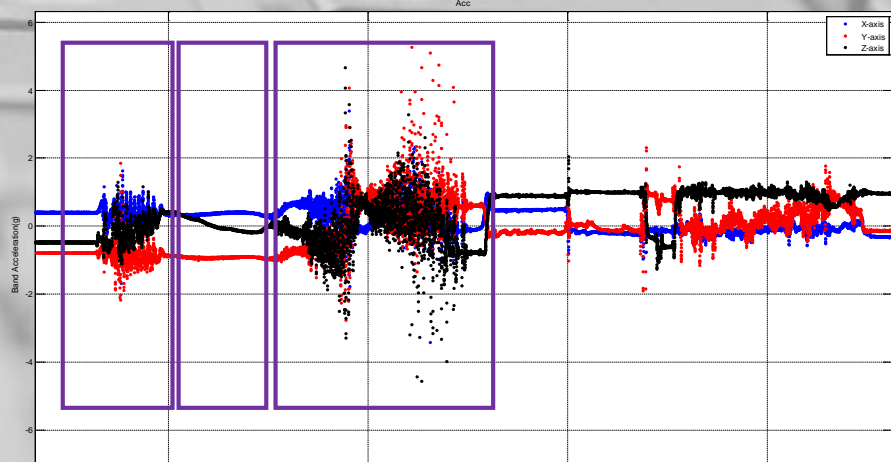
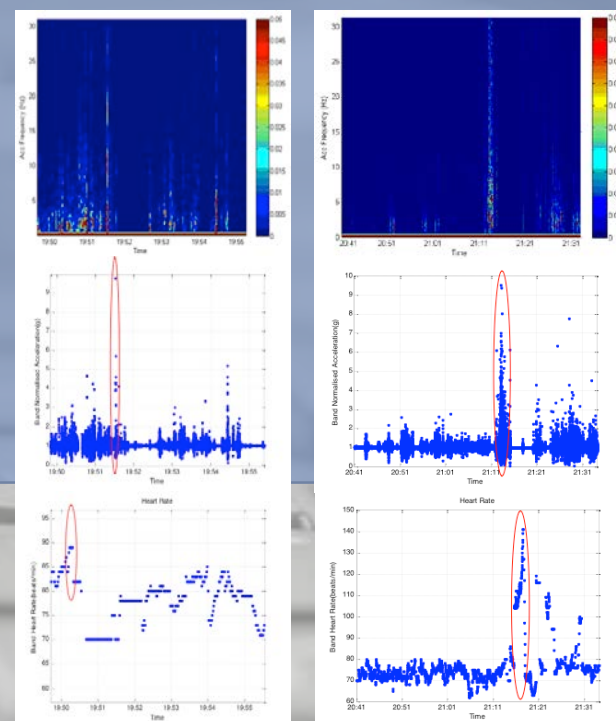
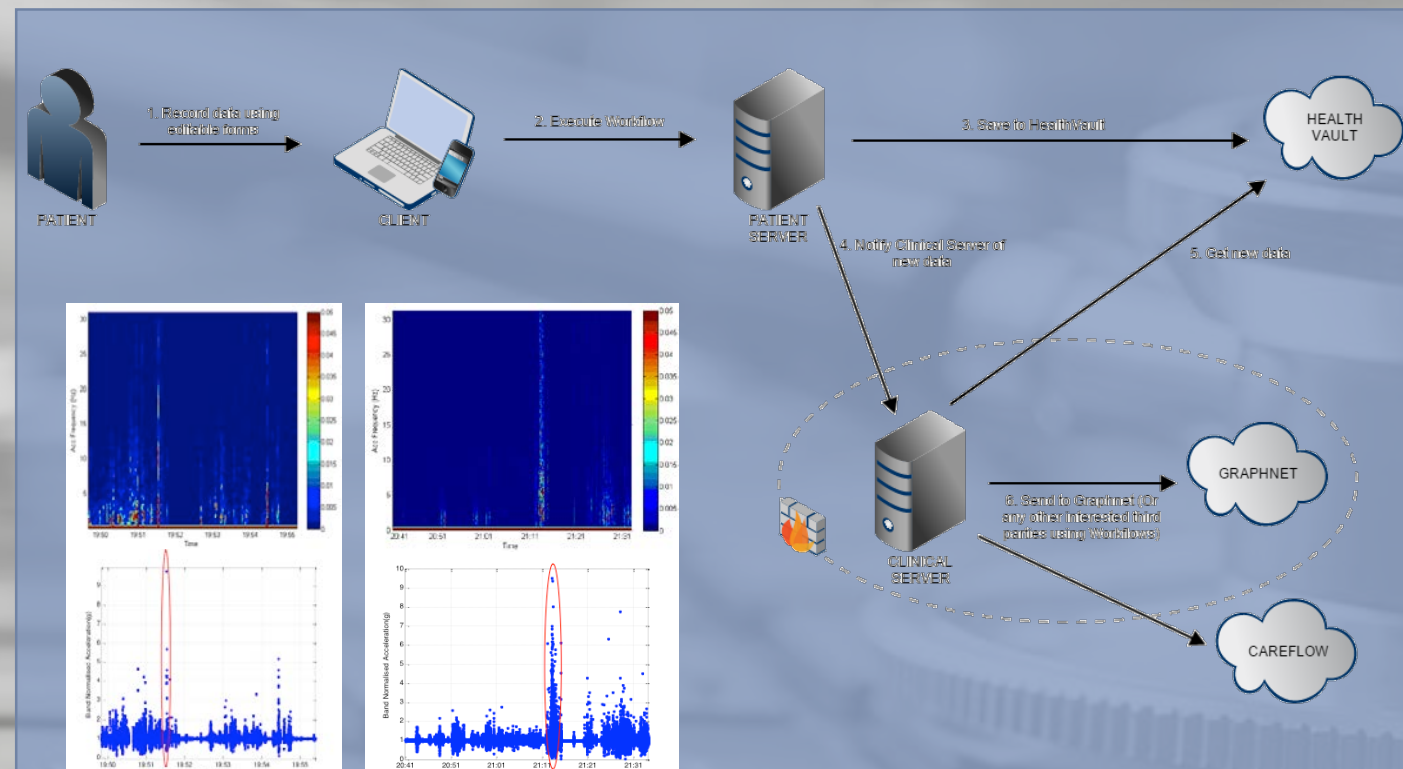
## Michael

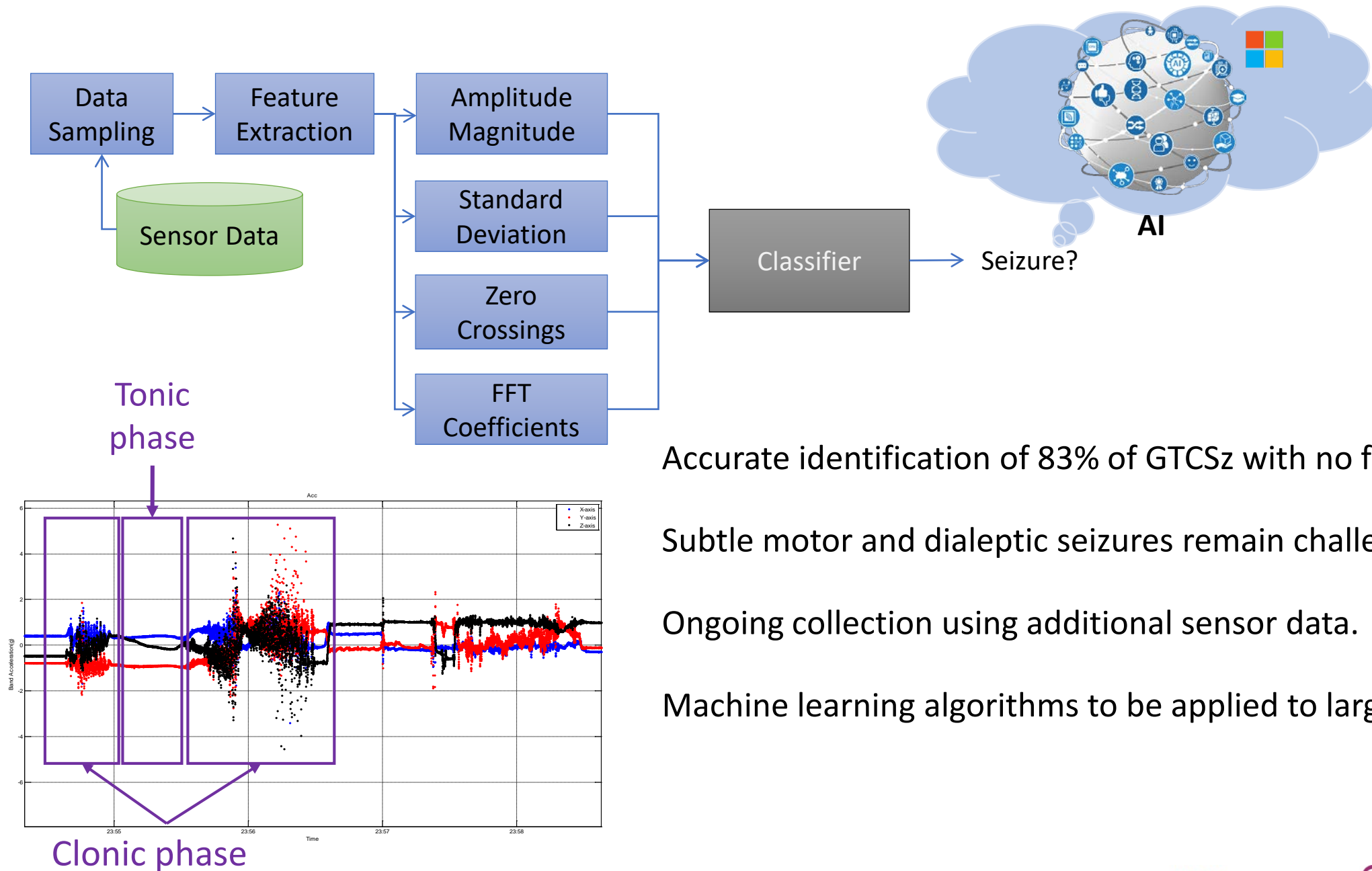
- Qualified engineer
- Early life normal
- RTA age 24 (TBI)
- Seizure onset age 30
- Witnessed GTCSz
- Increasing frequency despite Rx





# Patient Facing components and data collection





Accurate identification of 83% of GTCSz with no false positives.

Subtle motor and dialeptic seizures remain challenging.

Ongoing collection using additional sensor data.

Machine learning algorithms to be applied to larger data sets.

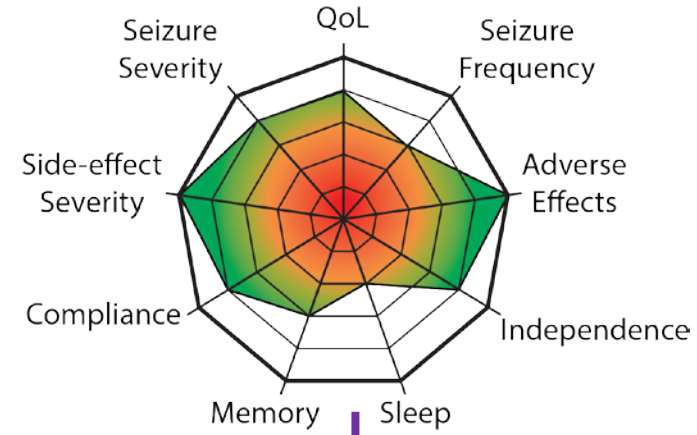
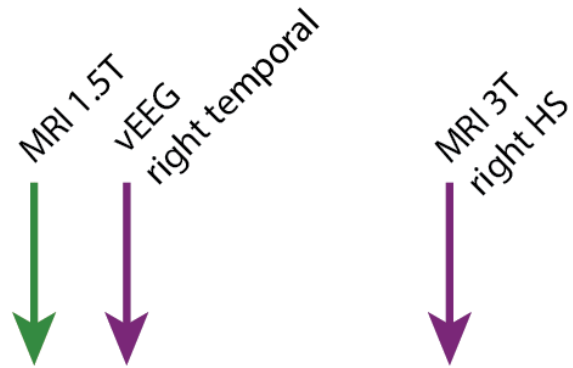


Month January										
	Date	Awake	Asleep	Time	Triggers	Notes				
Fri	1					Fell over Drifting shouting				
Sat	2	2C		11:51	HAD AURA	Trashing. Noises				
Sun	3		2B	01:43		Some movement got up				
Mon	4	2C		12:34	HAD AURA	Shouting Trashing fell in chair				
Tues	5					was in car Trashing				
Wed	6	2D		14:34	HAD AURA	Shouting lots of movement				
Thurs	7									
Fri	8									
Sat	9									
Sun	10	2D		12:34	<del>HAD</del> Not sure	lost long time fell a sleep				
Mon	11	2D		11:38	HAD AURA	was out shopping				
Tues	12	2D		03:37	was Sleep	Some movement				
Wed	13		2B							
Thurs	14	IN HOSPITAL??								
Fri	15									
Sat	16									
Sun	17									
Mon	18									
Tues	19	2D		6:11 AM	was a sleep	most worse one				
Wed	20	2D		11:59 AM	was a sleep	very long seizure				
Thurs	21	2C		11:58	was a sleep	last a few mins				
Fri	22	2C		11:49	was a sleep	last few mins some movement				
Sat	23									
Sun	24	2B		2:35 PM	was a sleep	Not much movement				
Mon	25	2D		11:44 AM	was a sleep	lots of movement				
Tue	26	2C				lots of movement				
Wed	27	2D			HAD AURA	Lots of Trashing				
Thurs	28	2C		23:56	was watching TV	Lots of movement				
Fri	29	2B		3:15 AM	was Sleep	lots of movement shouting				
Sat	30									
Sun	31		2B	3:35 AM	was Sleep	lost few moments				
Total		21								

- Previous head injury
- LOC whilst driving
- Witnessed 2°GTCSz
- MRI – normal at 1.5T
- vEEG – right temporal focus
- Started on medication
  - Timing of changes?
  - Current dose?
  - Adherence?
  - Side effects - skin



## Investigation

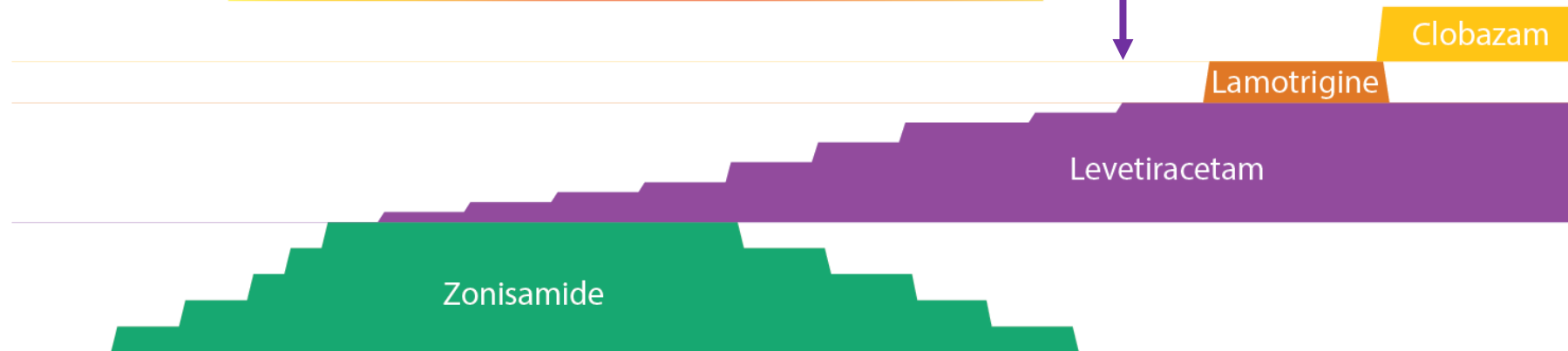


## Side effects



Migraine

## Medication

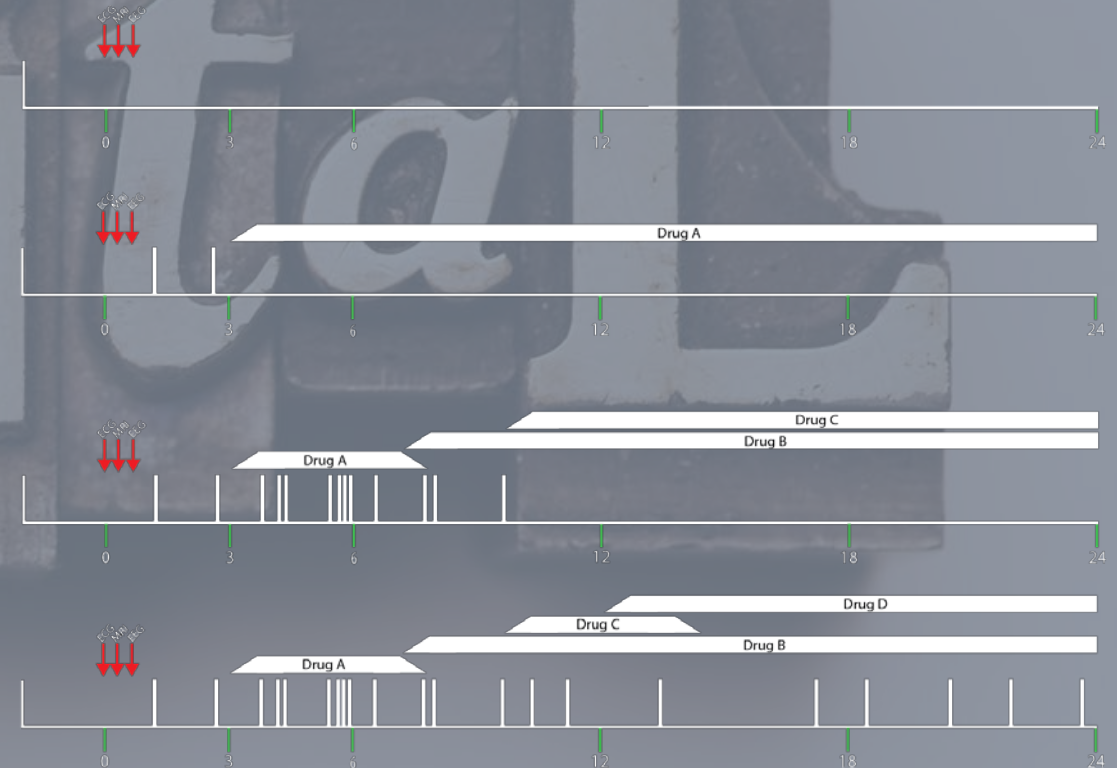
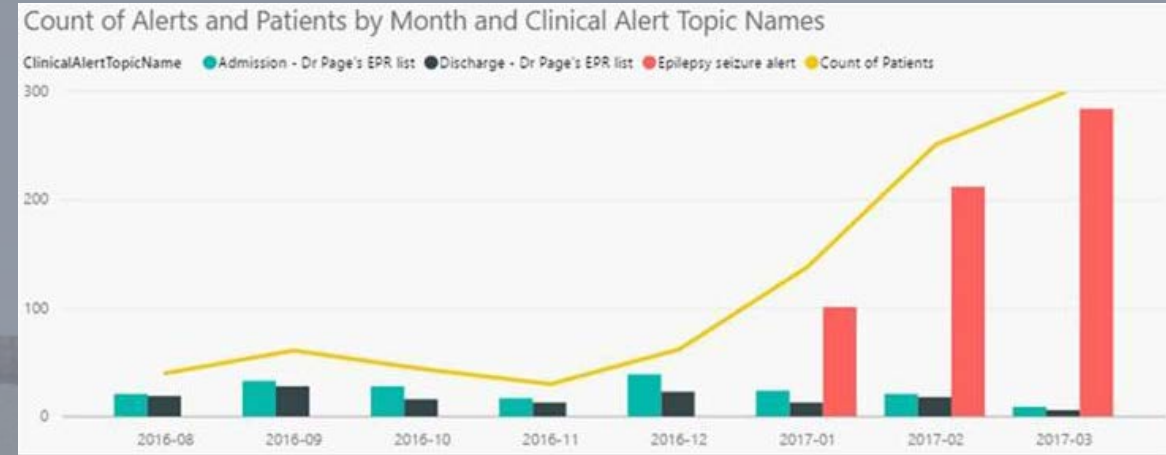


## Seizures



# Clinical Benefits:

- Co-contributed record
- Improve seizure freedom to  $\geq 70\%$
- Real-time response to patient need
- Reduce epilepsy related deaths
- Clinical conversations documented live in record
- Flexible follow-up on basis of need
- Secure text/telephone/Skype at point of need
- Facilitates safe self-management of LTCs





# Financial Benefits

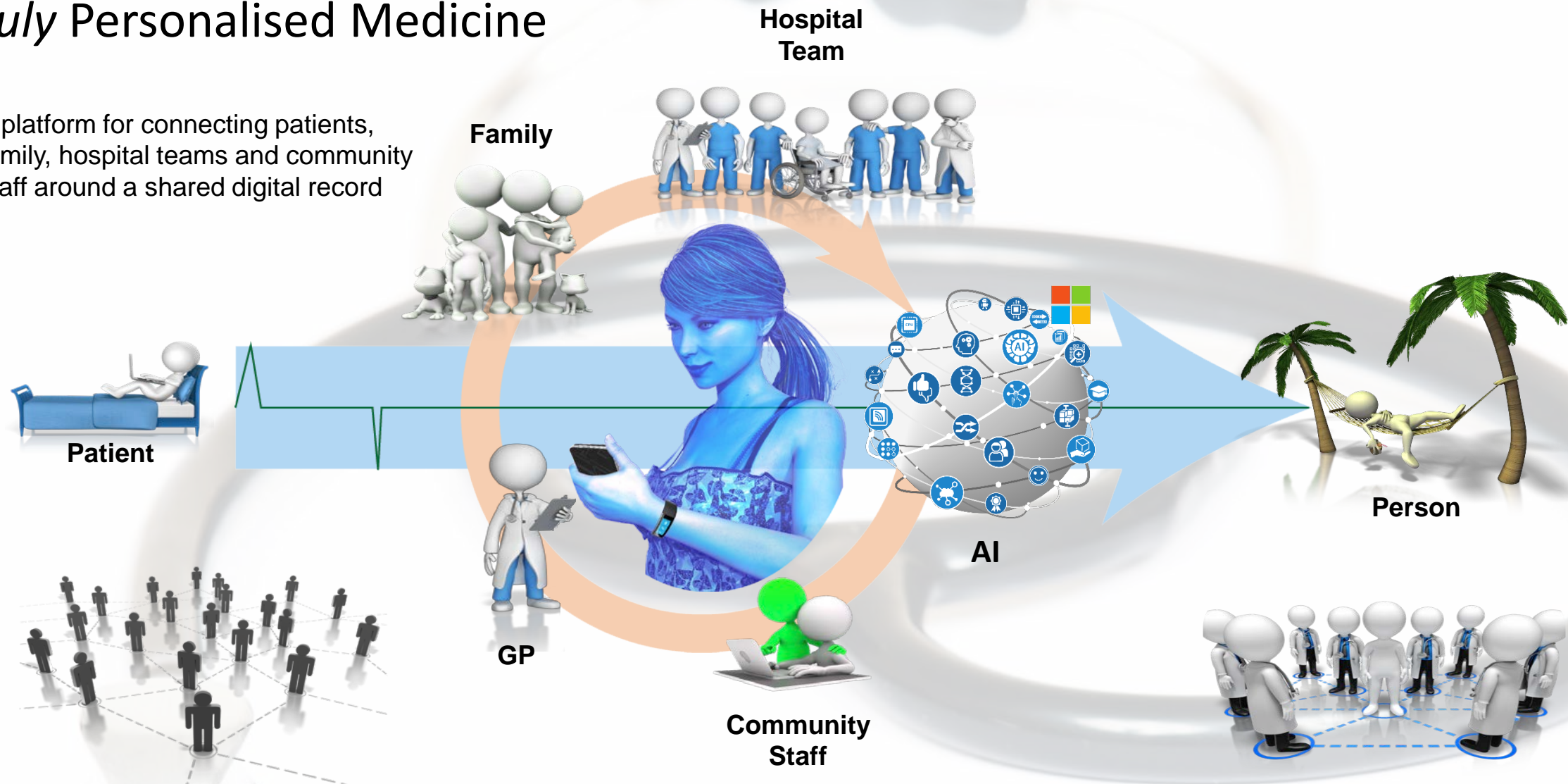
- 5% ↓ ED attendances = £13k
- 5% ↓ Epilepsy admissions = £37k
- 5% ↓ Epilepsy OPAs = £21k
- 5% ↓ Epilepsy DNA's = £2k
- Recurring saving > £80k pa



... transferable technology to other LTCs

# Truly Personalised Medicine

A platform for connecting patients, family, hospital teams and community staff around a shared digital record



Information from patients and a network of trusted, **close social contacts...**

... using **smartphones and wearable technology** to record and track seizure incidents, and with contextual information...

... a channel for healthcare practitioners to communicate to the patient, friends and family



A hand holding a smartphone with a digital brain overlay. The brain is composed of a network of white dots connected by thin lines, with some dots highlighted in blue and yellow. The background is a blurred image of a person in a white lab coat.

“The aim of medicine is to prevent disease and prolong life,  
the ideal of medicine is to eliminate the need of a physician.”

*William Mayo (1861-1939)*