Professional Record Standards Body

Better records for better care

Wearables and Sensors, Adoption at Scale

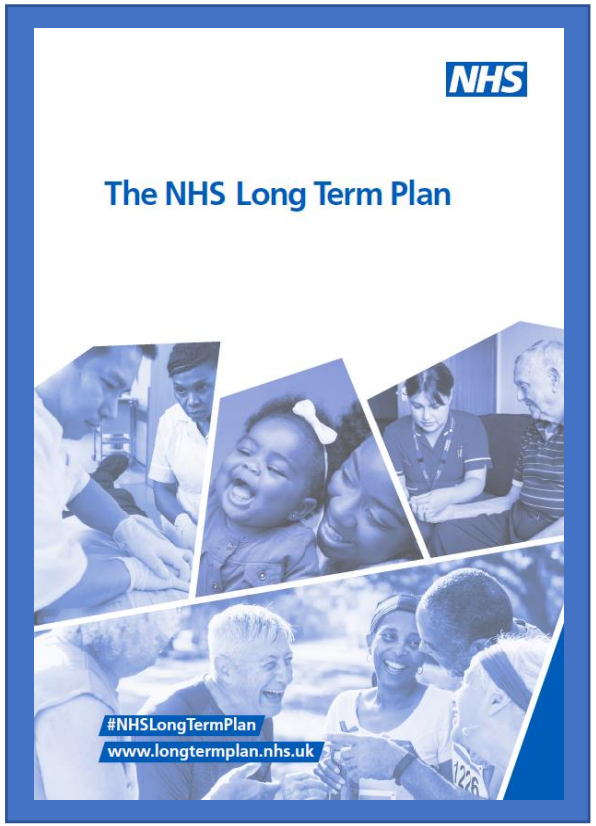
Ben McGough - Programme Lead, NHS England

Dr Iain Cranston - Consultant Physician, Portsmouth Hospitals NHS Trust

Dr Neel Basudev - GP Lambeth, Clinical Director Diabetes Health Innovation Network

Matt Guy - Parent Carer / Consultant Clinical Scientist, University Hospital Southampton NHS FT

Our commitment



"by 2020/21, all pregnant women with type 1 diabetes will be offered continuous glucose monitoring, helping to improve neonatal outcomes"

"ensure patients with type 1 diabetes benefit from life changing flash glucose monitors, ending the variation patients in some parts of the country are facing"

The story of Flash glucose monitors adoption

2015

Flash available to self fund

The FreeStyle Libre reader

The FreeStyle Libre sensor

2016

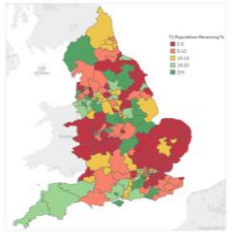
Impact RCT published
Realisation of the benefits

2017

DUK Fight for Flash Campaign
Flash available on NHS drug tariff
RMOC statement

2018

Postcode lottery in access



2019

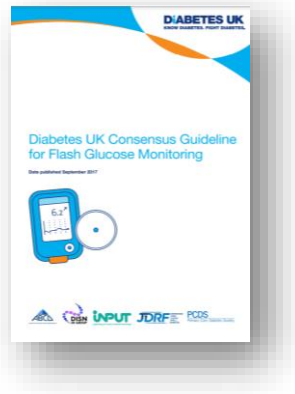
NHSE national criteria launched
DTN-UK online modules

Flash Glucose Monitoring: National Arrangements for Funding of Relevant Diabetes Patients

2021

?.

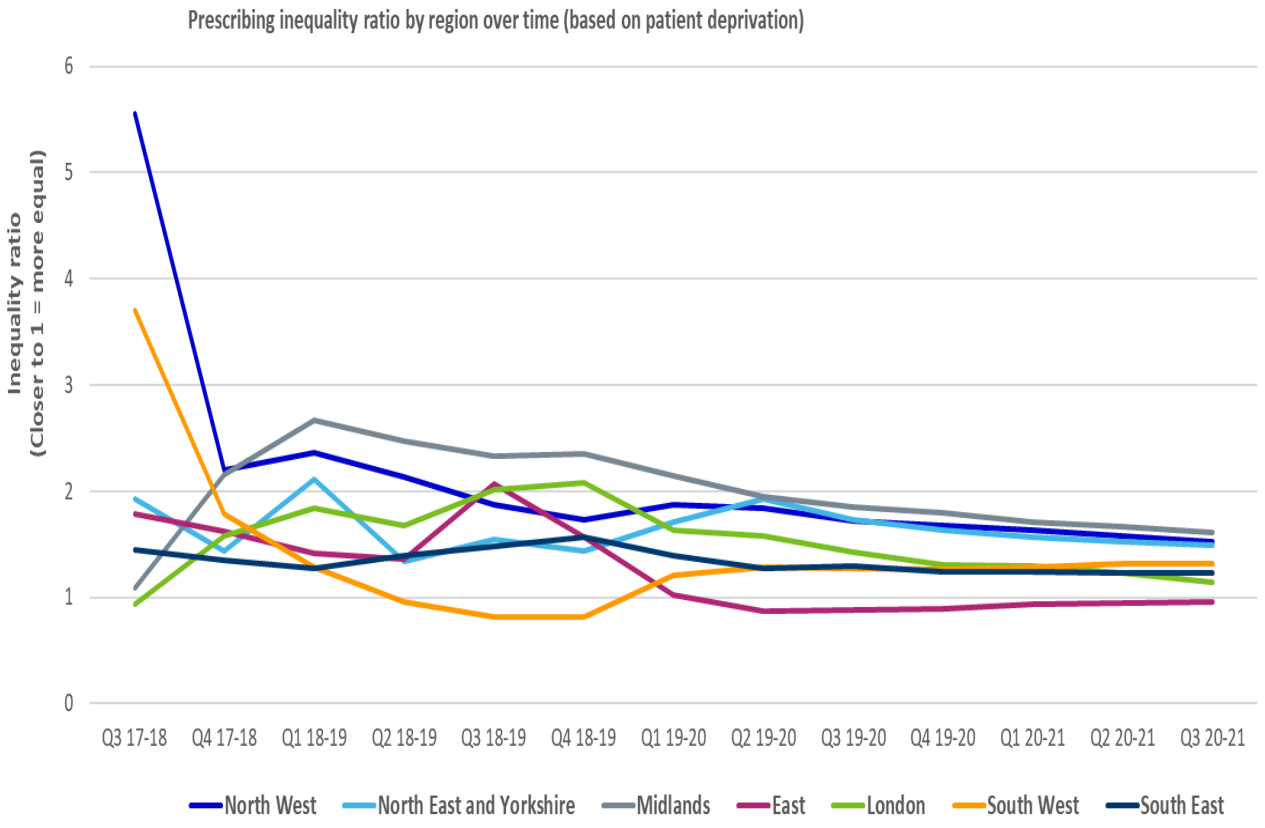
1/2 of T1DM population have access to Flash
ABCD audit data published



Equity of Access

- Inequality in prescribing across the IMD deciles has improved over the life of the programme.

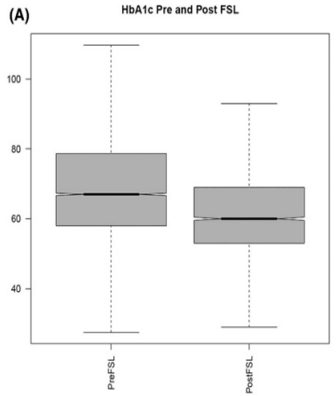
- More than 20% of eligible patients in every quintile benefitting from flash. In addition the ratio between the more affluent to least affluent benefiting has reduced in every region.



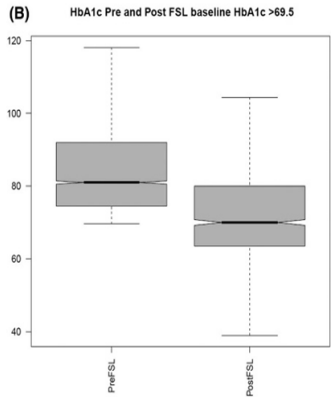
Impact

Distribution of HbA1c Change Pre- and Post-FSL Use in the ABCD Nationwide Audit of FSL

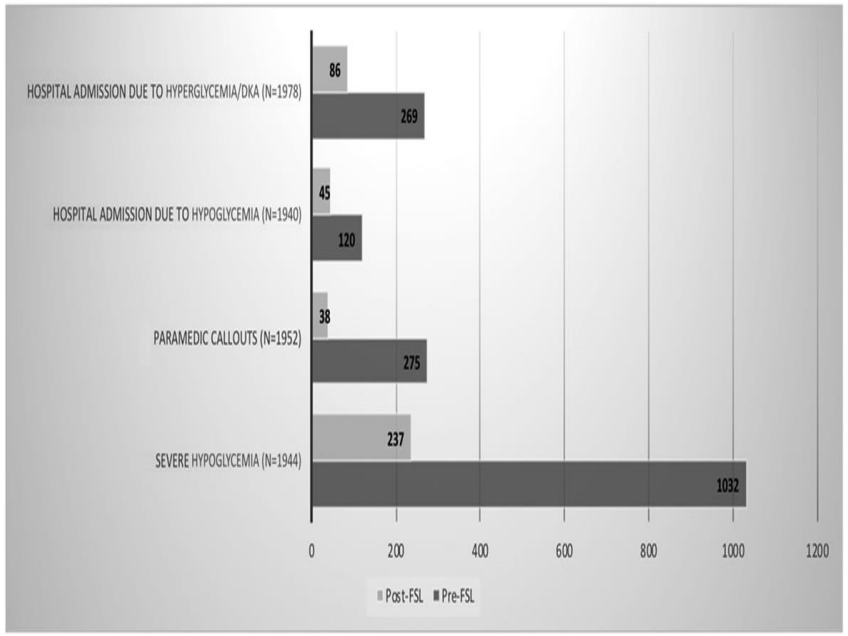
(A) study population



(B) Baseline HbA1c of ≥69.5 mmol/mol



The 12 months before and the 7.5 months of follow-up using FSL in the ABCD nationwide audit.



Harshal Deshmukh et al. Dia Care 2020;43:2153-2160

CGM in Pregnancy activity by region April – September 2021/22

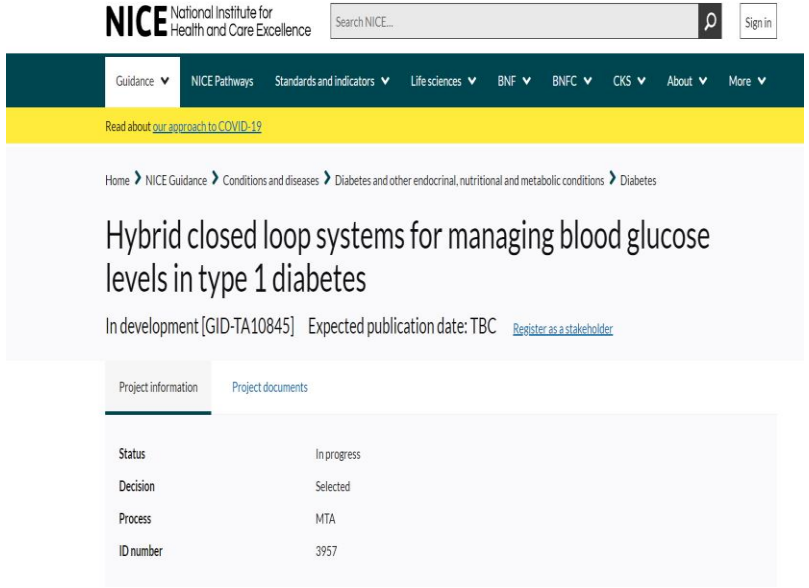
	Number of eligible patients	Number of patients offered CGM		Number of patients prescribed CGM		Number of patients who declined CGM	
Region	**n**	**n**	**%**	**n**	**%**	**n**	**%**
North West	92	71	77%	60	65%	11	12%
North East and Yorkshire	200	197	99%	136	68%	50	25%
Midlands	203	168	83%	135	67%	28	14%
East of England	170	134	79%	104	61%	23	14%
London	164	157	96%	127	77%	30	18%
South West	113	108	96%	77	68%	22	19%
South East	208	179	86%	128	62%	48	23%
England	**1,150**	**1,014**	**88%**	**767**	**67%**	**212**	**18%**

Notes

1. The difference in patients eligible and offered CGM is likely to be patients benefitting from CGM already and are funded through alternative means.

2. The number of patients prescribed and declined CGM may not always equal to the number offered. This is due to A number of factors including delays in prescribing and the possibility of miscarriages occurring between the offer and actual prescribing taking place.

Future development and widening access



Professional Record Standards Body

Better records for better care

Incorporating data from ‘wearables’ into routine clinical care: the view from the specialty diabetes clinic

Dr Iain Cranston
Portsmouth Hospitals University NHS Trust

DISCLOSURES / PERSONAL RESPONSIBILITIES

Professional Record Standards Body

- Dr Cranston has received research grants, speaker fees or consultation advisory fees from the following:
  - Eli Lilly, Boehringer-Ingelheim, NovoNordisk, Sanofi, Janssen, MSD, AstraZeneca,Napp, BMS, Roche Diagnostics, Johnson & Johnson, Animas, Abbott Diabetes Care, Takeda
- Dr Cranston is a share-holding director of the following Diabetes-related companies
  - Southern Diabetes Medical Services LLP
  - The AGP Clinical Academy Ltd

My areas of clinical specialism are:

- Type 1 Diabetes
- Impaired Hypoglycaemia Awareness
- Glucose monitoring technologies
- Insulin delivery systems

- Management of people with diabetes and advanced renal disease

PRSB's diabetes project

Developing:

· **A diabetes record standard**: for improving sharing of key information about a person's diabetes between professionals across primary, secondary, community and social care.

· **A self-management data standard**: for improving sharing of patient-reported information (or carer/parent) with professionals, including information from glucose monitoring and insulin delivery devices such as continuous glucose monitors and insulin pumps.

PRSB has consulted on the information requirements for these standards with people with diabetes, health and care professionals and systems and tech suppliers through a combination of focus groups, online workshops, surveys and discussions between September 2021 and February 2022 and are now finalising the standards. The PRSB will then seek endorsement of the standards.

• DIABETES CONSULTATIONS INVOLVE MANY ELEMENTS

Professional Record Standards Body

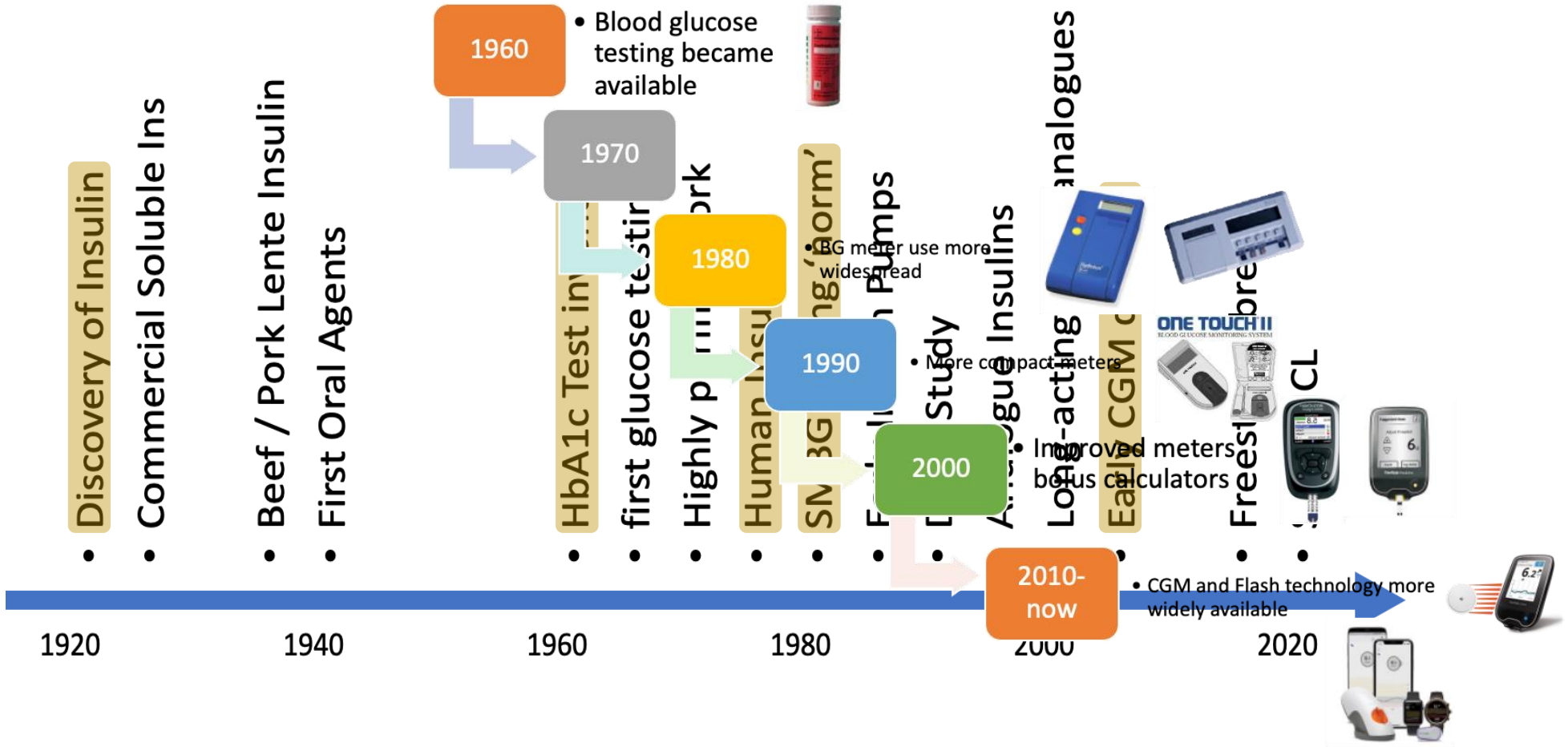
- Diagnosis
- Advice & Education
- Weight Management
- Lipid Management
- Blood Pressure Management
- Risk Assessment
- Reassurance & Support
- Glucose Management
- Complications Screening & Management
- Co-Morbidity & Acute Illness Care

99.98% of life is spent self-managing, 0.02% in HCP consultation

100 YEARS OF PROGRESS IN DIABETES CARE

Professional Record Standards Body

MILESTONES IN GLUCOSE MONITORING



TYPE 1 DIABETES IS THE MOST CHALLENGING OF CHRONIC DISEASES

Professional Record Standards Body

42 Factors That Affect BG

Food
- ↑↑ 1. Carbohydrate quantity
- →↑ 2. Carbohydrate type
- →↑ 3. Fat
- →↑ 4. Protein
- →↑ 5. Caffeine
- ↓↑ 6. Alcohol
- ↓↑ 7. Meal timing
- ↑ 8. Dehydration
- ? 9. Personal microbiome

Medication
- →↓ 10. Medication dose
- ↓↑ 11. Medication timing
- ↓↑ 12. Medication interactions
- ↑↑ 13. Steroid administration
- ↑ 14. Niacin (Vitamin B3)

Activity
- →↓ 15. Light exercise
- ↓↑ 16. High-intensity and moderate exercise
- →↓ 17. Level of fitness/training
- ↓↑ 18. Time of day
- ↓↑ 19. Food and insulin timing

Biological
- ↑ 20. Insufficient sleep
- ↑ 21. Stress and illness
- ↓ 22. Recent hypoglycemia
- →↑ 23. During-sleep blood sugars
- ↑ 24. Dawn phenomenon
- ↑ 25. Infusion set issues
- ↑ 26. Scar tissue and lipodystrophy
- ↓↓ 27. Intramuscular insulin delivery
- ↑ 28. Allergies
- ↑ 29. A higher glucose level
- ↓↑ 30. Periods (menstruation)
- ↑↑ 31. Puberty
- ↓ 32. Celiac disease
- ↑ 33. Smoking

Environmental
- ↑ 34. Expired insulin
- ↑ 35. Inaccurate BG reading
- ↓↑ 36. Outside temperature
- ↑ 37. Sunburn
- ? 38. Altitude

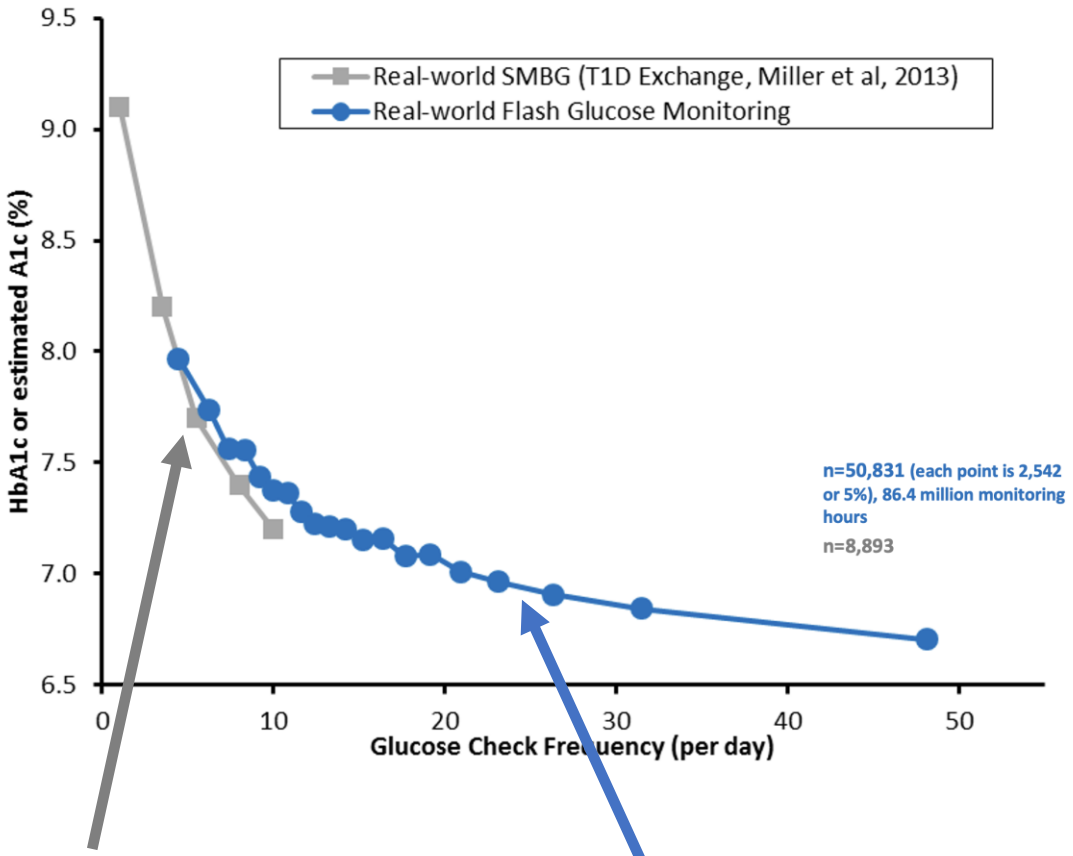
Behavioral & Decision Making
- ↓ 39. Frequency of glucose checks
- ↓↑ 40. Default options and choices
- ↓↑ 41. Decision-making biases
- ↓↑ 42. Family relationships and social pressures

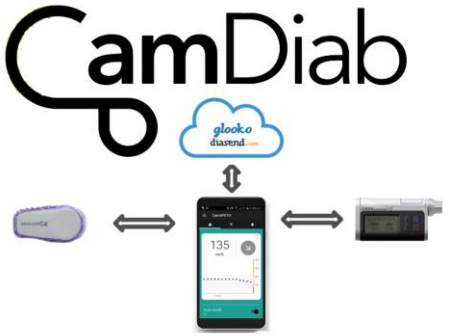
diaTribe

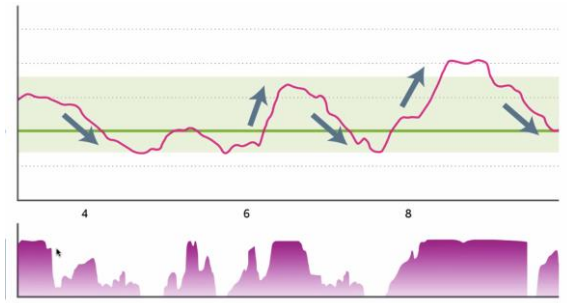
for which data management is a key to success

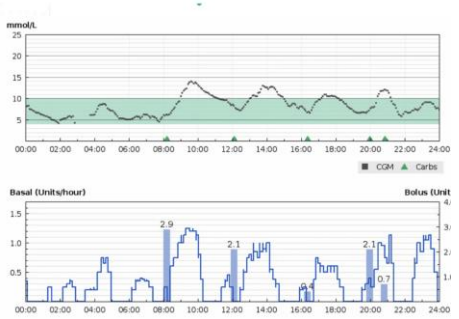
MORE DATA = BETTER OUTCOMES ("we have the technology")

Professional Record Standards Body









SMBG

isCGM

Hybrid Closed Loops

EFFECTIVE MANAGEMENT REQUIRES IN DEPTH UNDERSTANDING

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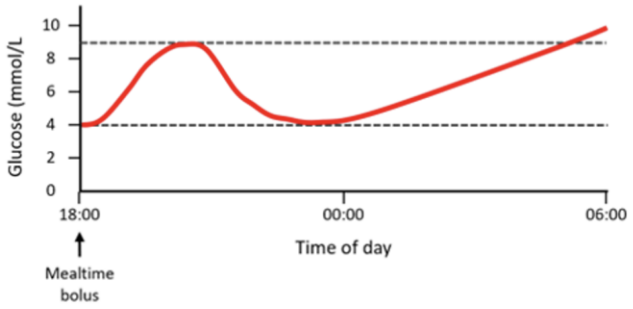
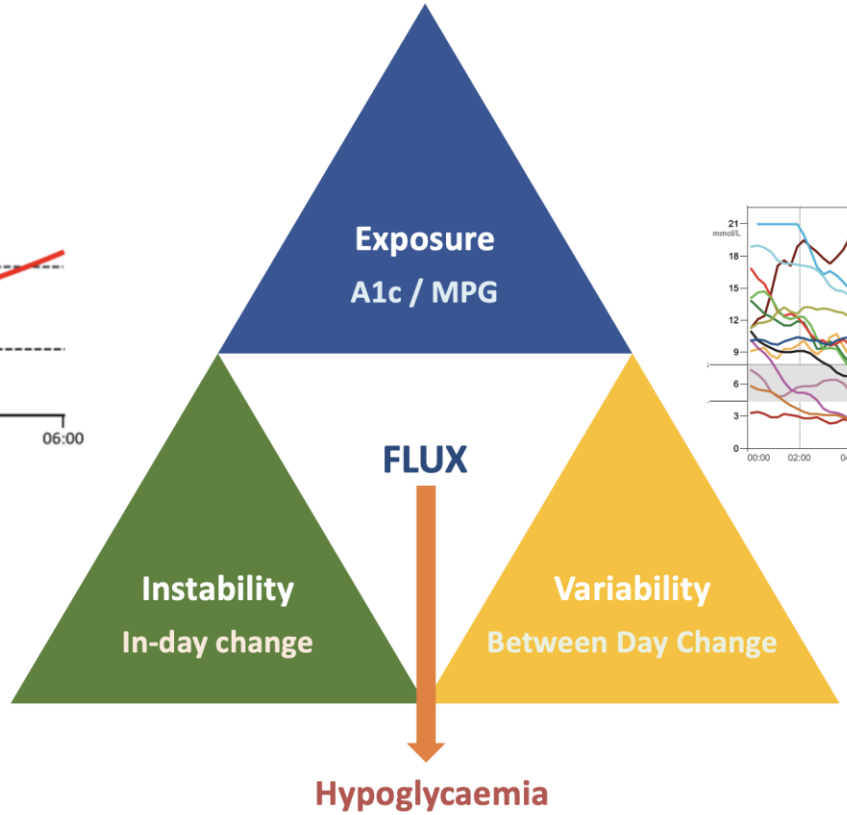
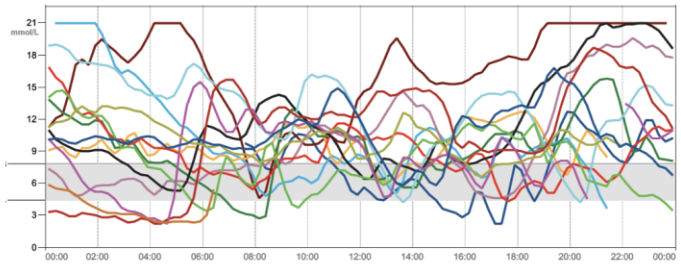
Simple measures such as HbA1c do **NOT** describe the issues which need to be addressed…





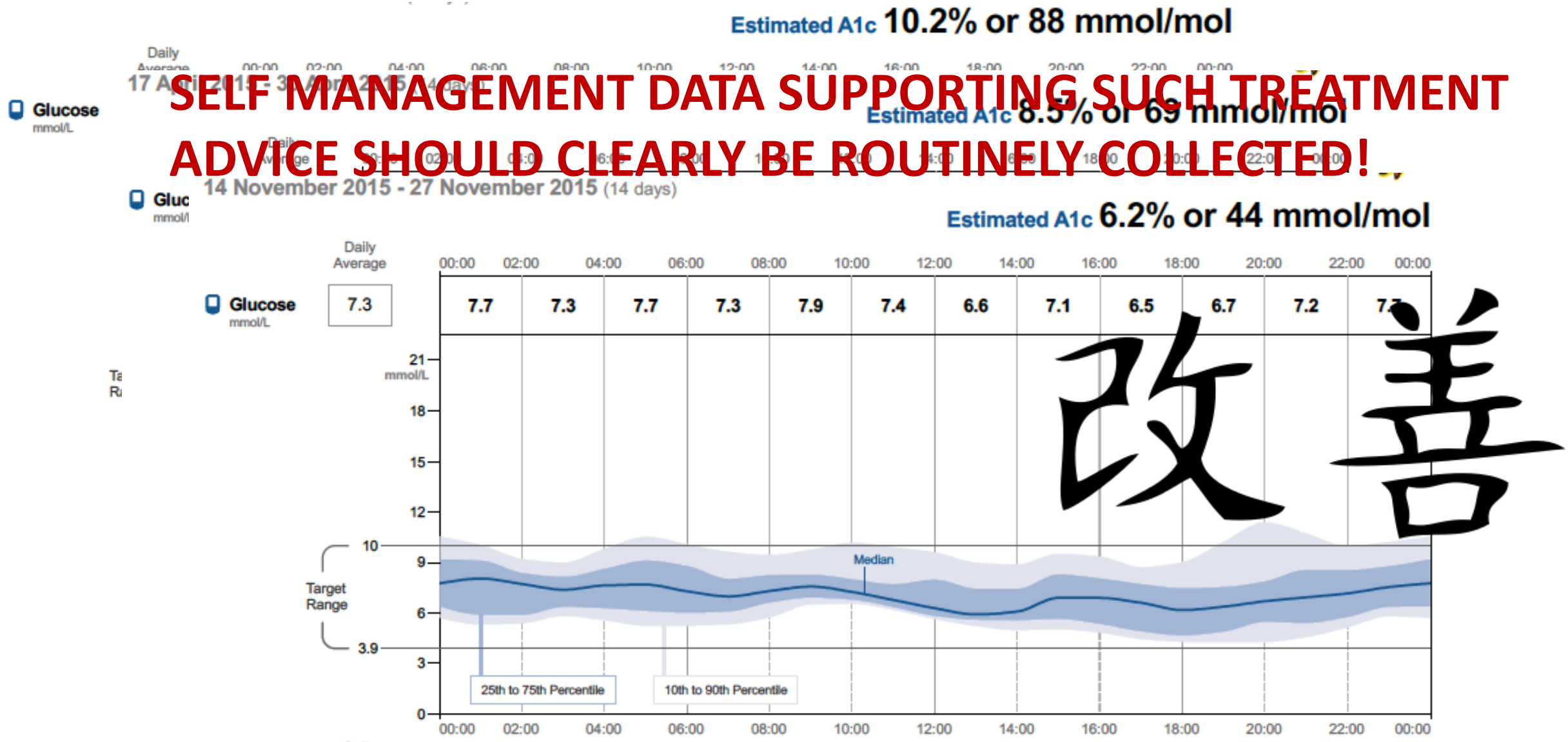


Successful consultation intervention requires therapy **individualisation** based on data review

DATA-DRIVEN INDIVIDUALISATION & “THE ART OF THE POSSIBLE”

Professional Record Standards Body

SELF MANAGEMENT DATA SUPPORTING SUCH TREATMENT ADVICE SHOULD CLEARLY BE ROUTINELY COLLECTED!



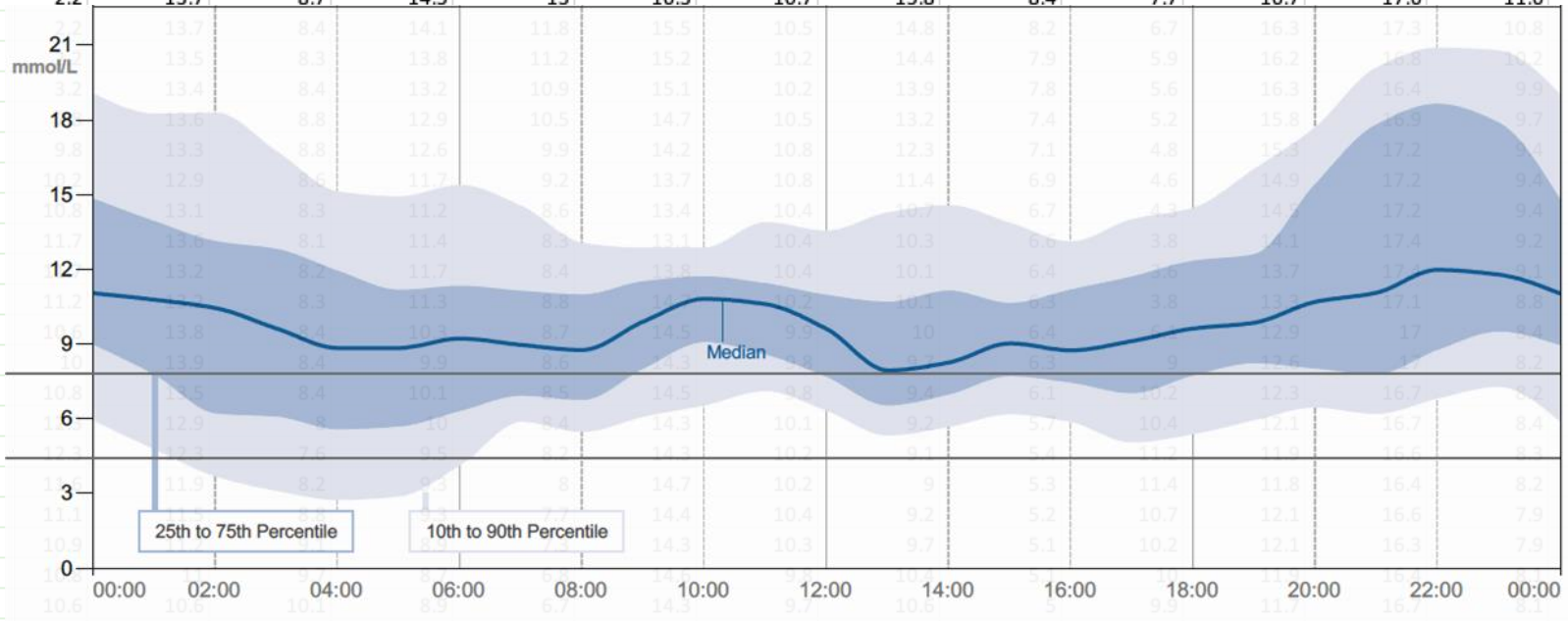
- BUT…

Routine collection of self-management data highlights some new issues which need to be aired / addressed.

• DATA CAN BE COMPLEX ! (new skills are required)

Professional Record Standards Body

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14	DAY 15
00:00:00		2.2	12.2	7.6	13.9	14.2	16.5	10.6	16.6	9.4	10.3	17.4	16.8	13	10.1
00:15:00		2.2	12.5	8.2	14.3	14.2	16.8	10.5	16.6	9.1	9.4	16.9	16.9	12.3	9.2
00:30:00		2.2	13.3	8.6	14.7	14.1	16.6	10.6	16.6	8.7	8.6	16.7	17.3	11.9	8.9
00:45:00		2.2	13.7	8.7	14.5	13	16.3	10.7	15.8	8.4	7.7	16.7	17.6	11.6	8.6
01:00:00															8.3
01:15:00															8.3
01:30:00															7.8
01:45:00															7.3
02:00:00															7
02:15:00															7
02:30:00															7.1
02:45:00															6.8
03:00:00															6.5
03:15:00															6.3
03:30:00															6.3
03:45:00															6.3
04:00:00															6.2
04:15:00															6.1
04:30:00															6.2
04:45:00															7.3
05:00:00															8.3
05:15:00															8.7
05:30:00															8.5
05:45:00															8.2
06:00:00		10.8	10.1	10.4	8.7	6.8	13.4	9.9	10.5	4.7	9.9	11.4	16.2	8.2	8.2
06:15:00		11.6	10.2	11.6	8.2	6.6	12.6	10.2	10.9	5.1	9.7	11.2	15.9	8.4	8.6
06:30:00		12.3	10.1	12.1	8.1	6.4	12.3	10.1	11.2	5.5	9.6	11	16.2	8.3	9.1
06:45:00		12.7	9.8	11.7	8.3	6.6	13.4	9.9	11.3	5.1	9.4	10.3	16.1	8.3	8.7



DATA RESPONSIBILITY / LIABILITY??

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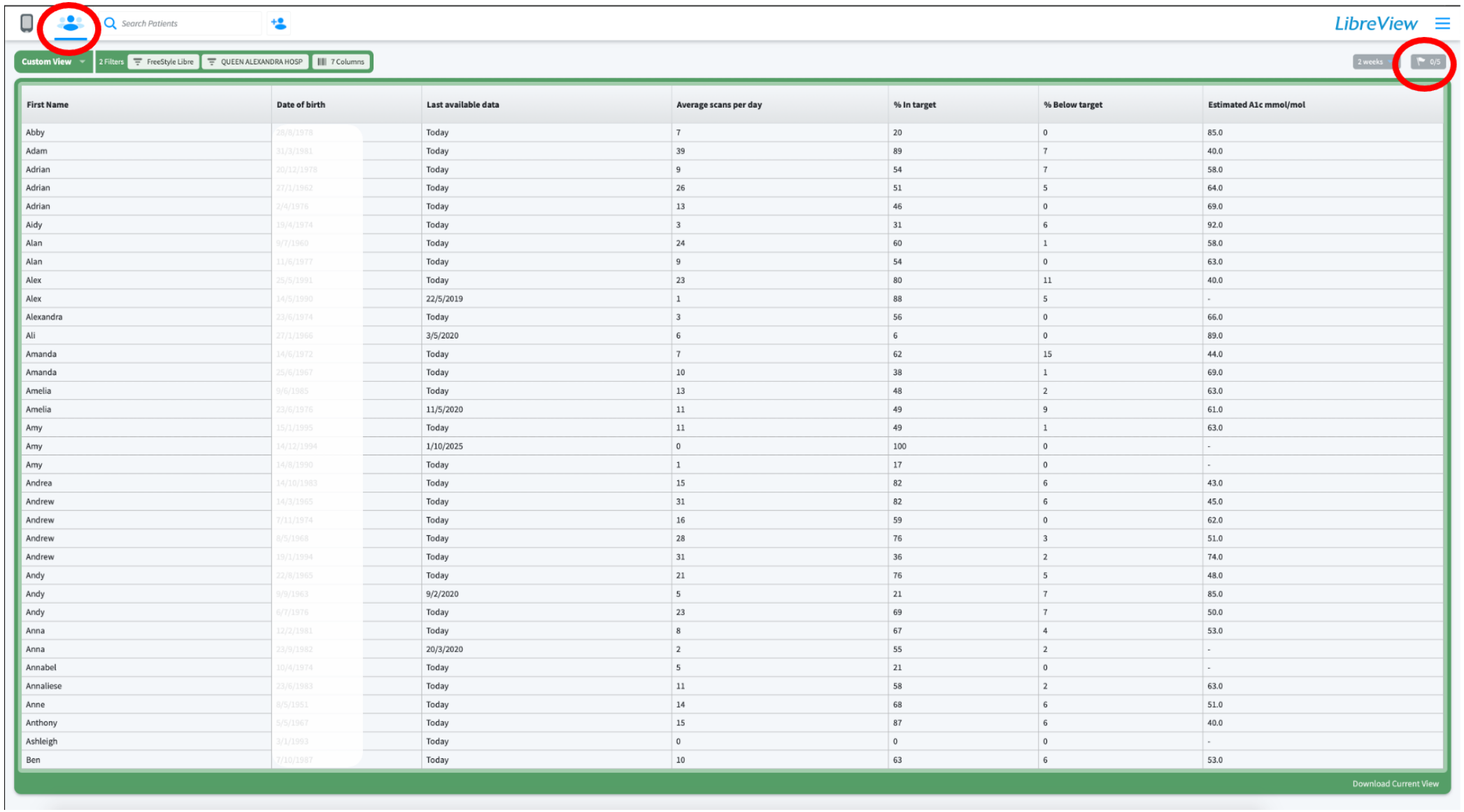


First Name	Date of birth	Last available data	Average scans per day	% In target	% Below target	Estimated A1c mmol/mol
Abby	28/8/1978	Today	7	20	0	85.0
Adam	31/3/1981	Today	39	89	7	40.0
Adrian	20/12/1978	Today	9	54	7	58.0
Adrian	27/1/1962	Today	26	51	5	64.0
Adrian	2/4/1976	Today	13	46	0	69.0
Aidy	19/4/1974	Today	3	31	6	92.0
Alan	9/7/1960	Today	24	60	1	58.0
Alan	11/6/1977	Today	9	54	0	63.0
Alex	25/5/1991	Today	23	80	11	40.0
Alex	14/5/1990	22/5/2019	1	88	5	-
Alexandra	23/6/1974	Today	3	56	0	66.0
Ali	27/1/1966	3/5/2020	6	6	0	89.0
Amanda	14/6/1972	Today	7	62	15	44.0
Amanda	25/6/1967	Today	10	38	1	69.0
Amelia	9/6/1985	Today	13	48	2	63.0
Amelia	23/6/1976	11/5/2020	11	49	9	61.0
Amy	15/1/1995	Today	11	49	1	63.0
Amy	14/12/1994	1/10/2025	0	100	0	-
Amy	14/8/1990	Today	1	17	0	-
Andrea	14/10/1983	Today	15	82	6	43.0
Andrew	14/3/1965	Today	31	82	6	45.0
Andrew	7/11/1974	Today	16	59	0	62.0
Andrew	8/5/1968	Today	28	76	3	51.0
Andrew	19/1/1994	Today	31	36	2	74.0
Andy	22/8/1965	Today	21	76	5	48.0
Andy	9/9/1963	9/2/2020	5	21	7	85.0
Andy	6/7/1976	Today	23	69	7	50.0
Anna	12/2/1981	Today	8	67	4	53.0
Anna	23/9/1982	20/3/2020	2	55	2	-
Annabel	10/4/1974	Today	5	21	0	-
Annaliese	23/6/1983	Today	11	58	2	63.0
Anne	8/5/1951	Today	14	68	6	51.0
Anthony	5/5/1967	Today	15	87	6	40.0
Ashleigh	3/1/1993	Today	0	0	0	-
Ben	7/10/1987	Today	10	63	6	53.0

Download Current View

DIGITAL POVERTY AND DIABETES WEARABLES

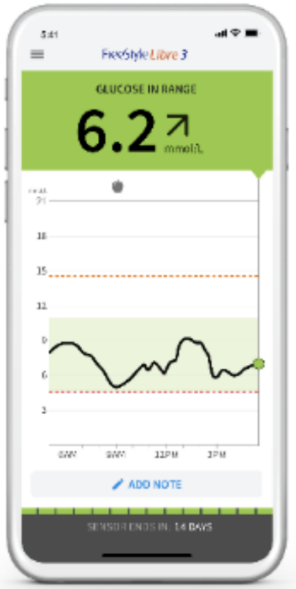
Professional Record Standards Body

How can I use the technology if I do not own a smartphone?

Sensor Kit
- Sensor applicator
- Product insert

One piece applicator

Sensor



FreeStyle Libre 3 App[1]

LibreLinkUp[2]

LibreView[3]

DATA-SHARING / INTEROPERABILITY AND SECURITY

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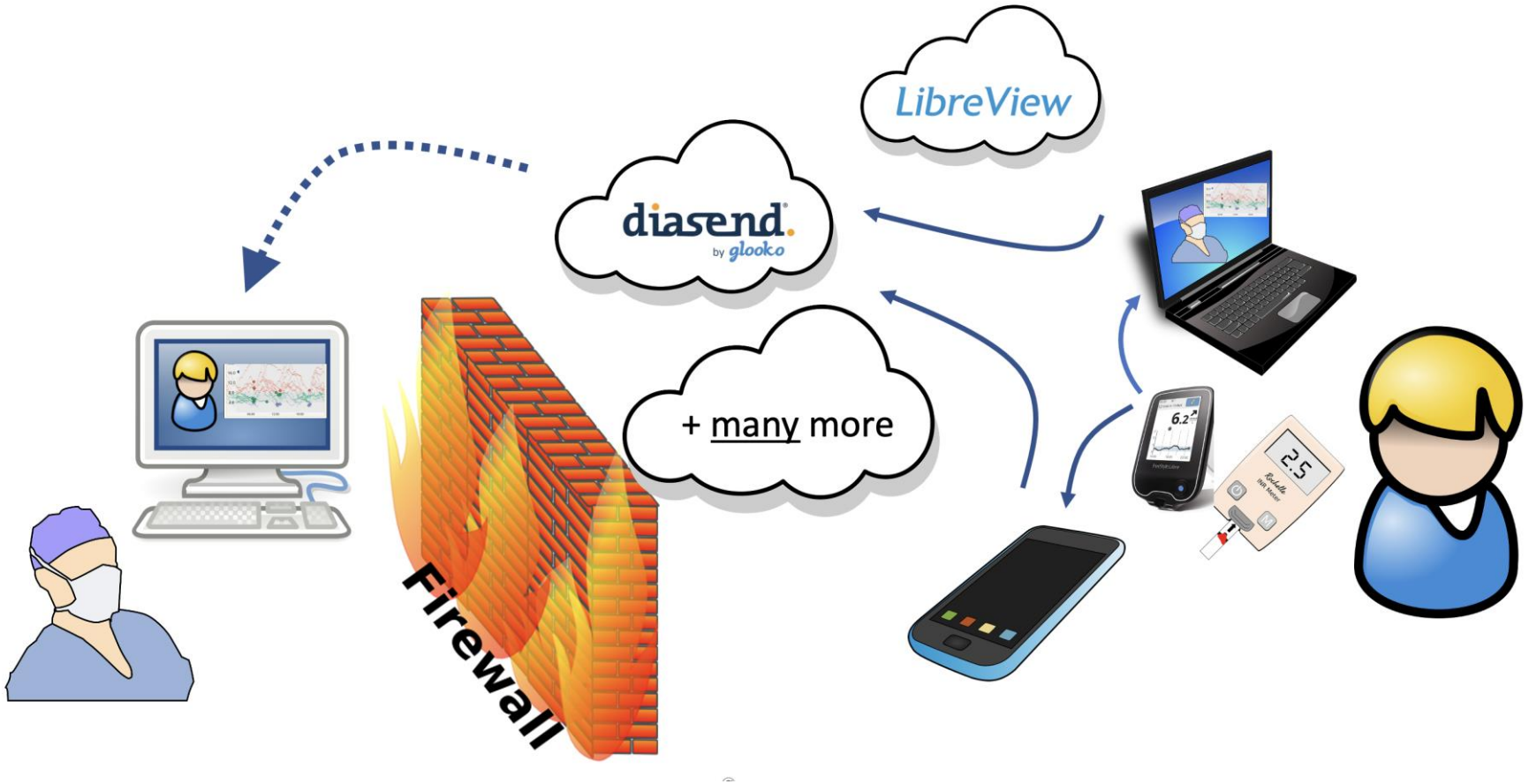


Professional Record Standards Body

Professional Record Standards Body

Better records for better care

How can wearable technology support diabetes management in primary care?

Dr Neel Basudev

GP Lambeth, Clinical Director Diabetes Health Innovation Network

DISCLOSURES

Professional Record Standards Body

Speaker honoraria from the following:

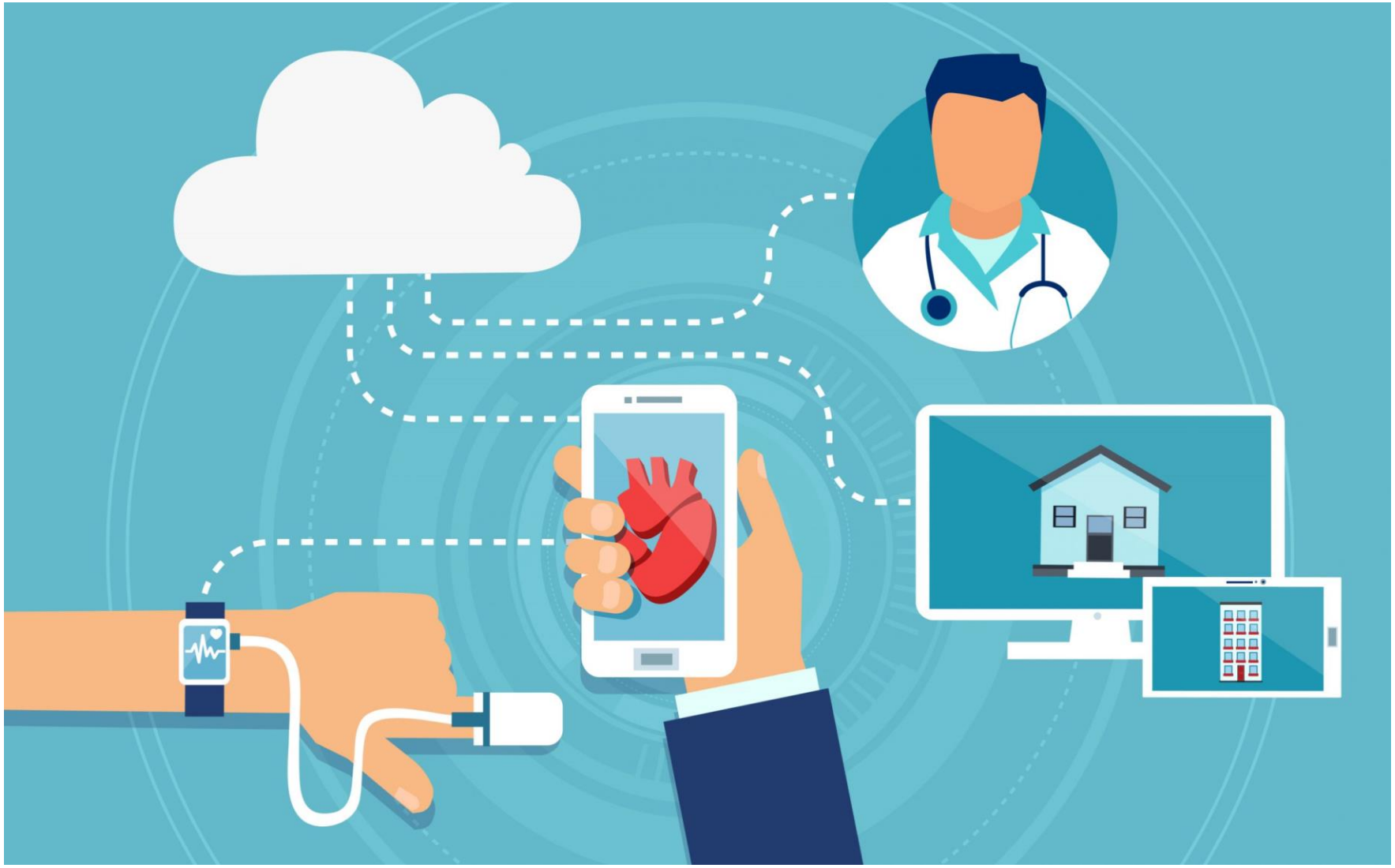
NAPP, Sanofi, Novo Nordisk, Eli Lily, Merck, Astra Zeneca, Takeda

Educational support from the following:

Novo Nordisk, Sanofi, Boehringer-ingelheim

IS THIS WHAT YOU ARE THINKING?

PRSB Professional Record Standards Body



DIABETES CONSULTATION

Professional Record Standards Body

The care and support planning pathway

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DATA CLASSIFICATION

Professional Record Standards Body

- **Metric**
  - Is this an objective number?
- **Non- metric**
  - Is this a subjective thought?
- **Validated**
  - Is this from an accredited device?
- **Unvalidated**
  - Is this from a personal device?

BI-DIRECTIONAL REAL TIME DATA MOVEMENT

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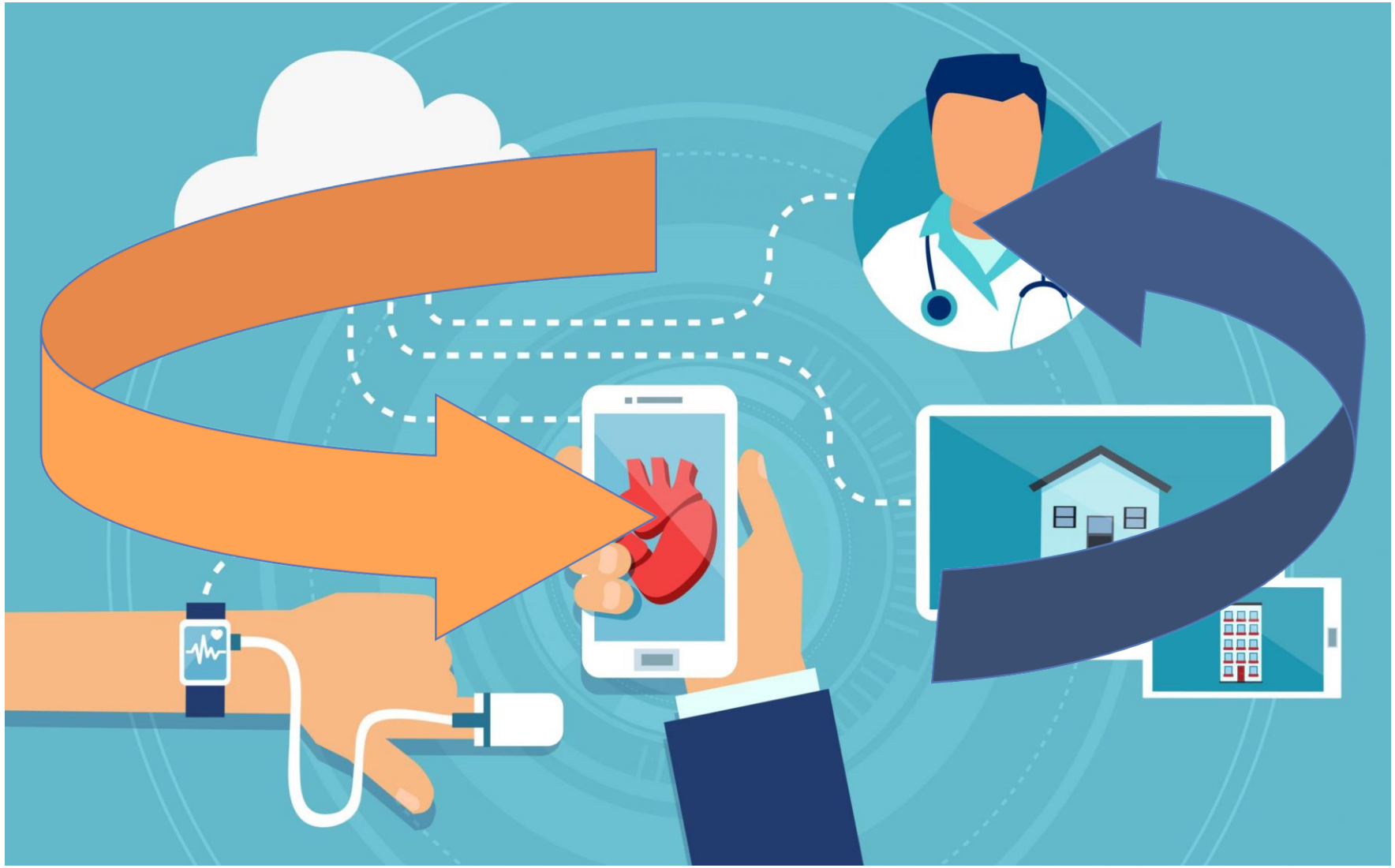

THE CORNERSTONES OF A DIGITAL FUTURE

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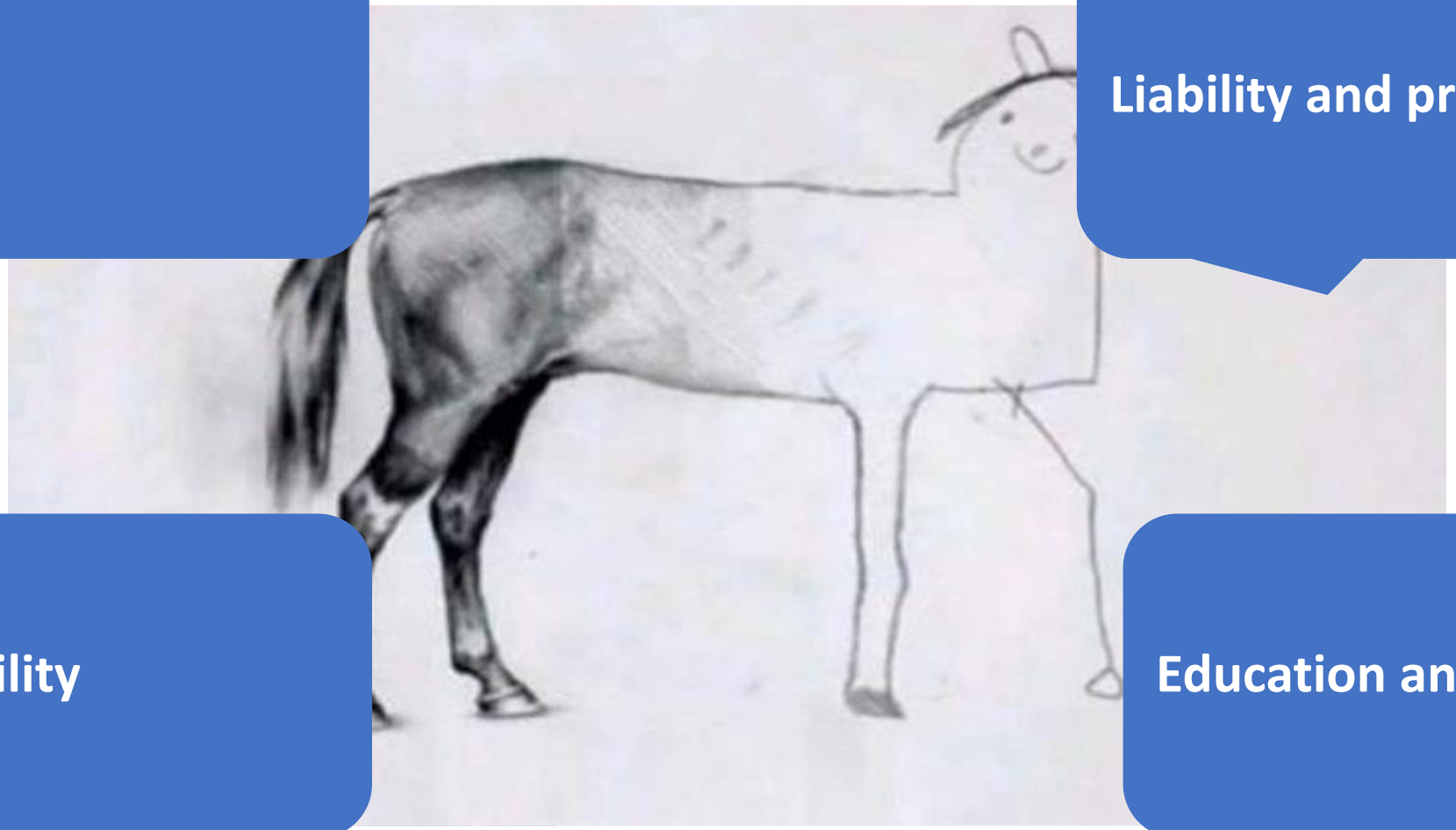
Standards

Liability and provenance



Interoperability

Education and support

Professional Record Standards Body

Better records for better care

Connecting Patients and Carers to Their Data: Driving Digital Healthcare with Wearables

Dr Matthew Guy
Consultant Clinical Scientist
University Hospital Southampton NHS Foundation Trust

Professional Record Standards Body

Better records for better care

Connecting Patients and Carers to Their Data: Driving Digital Healthcare with Wearables

Dr Matthew Guy
Consultant Clinical Scientist, Parent
University Hospital Southampton NHS Foundation Trust

Professional Record Standards Body

Better records for better care

Connecting Patients and Carers to Their Data: Driving Digital Healthcare with Wearables

Dr Matthew Guy
Consultant Clinical Scientist, Parent and Carer
University Hospital Southampton NHS Foundation Trust

THE START

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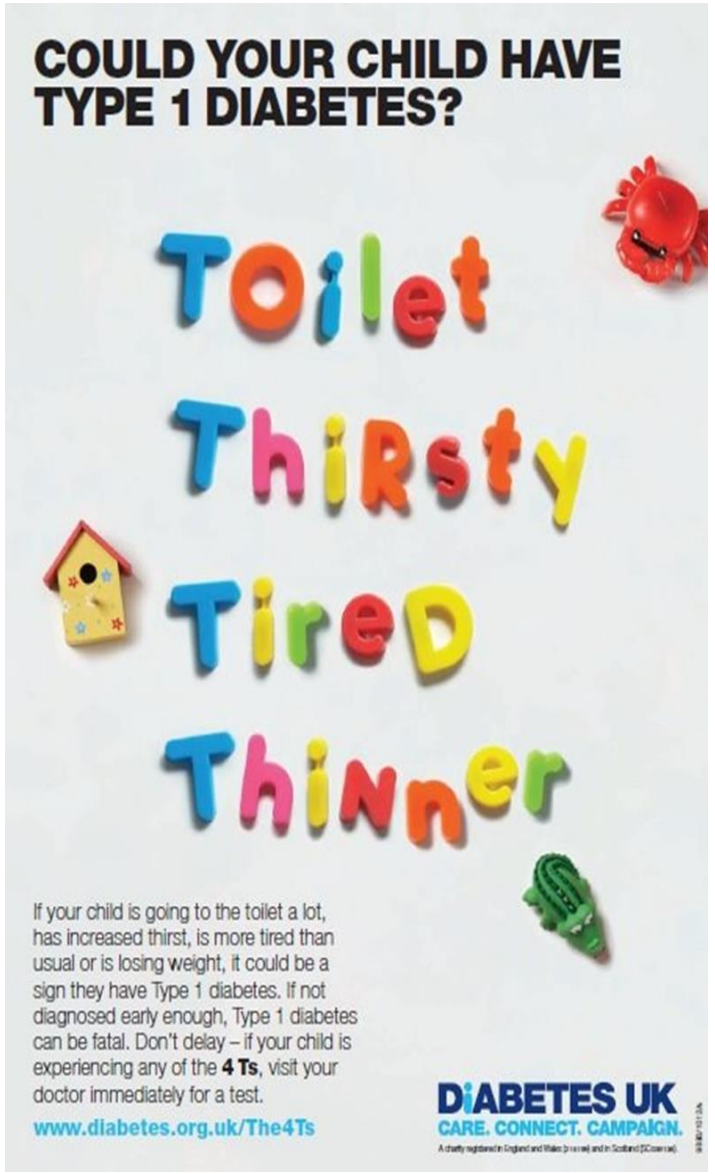
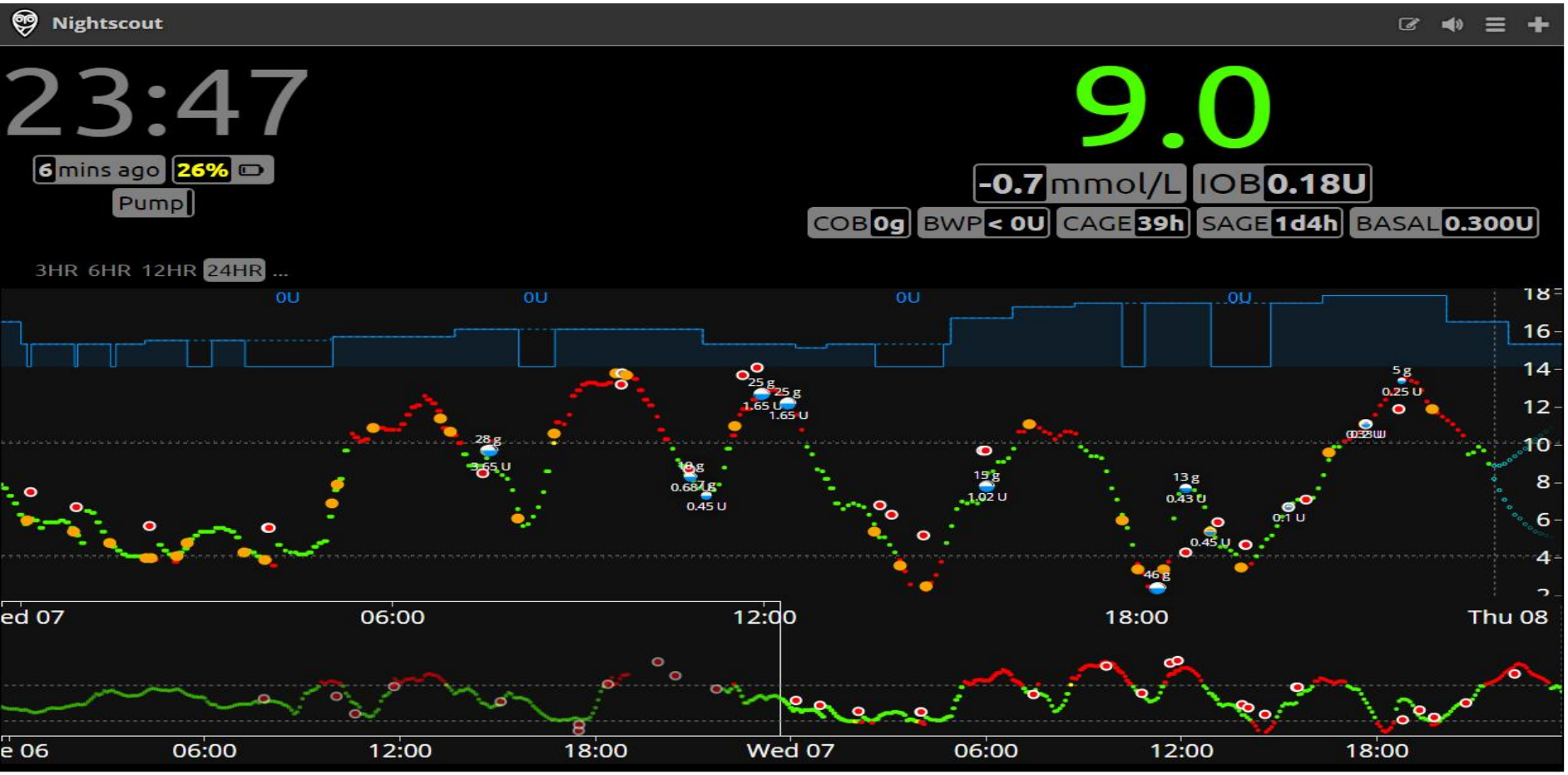
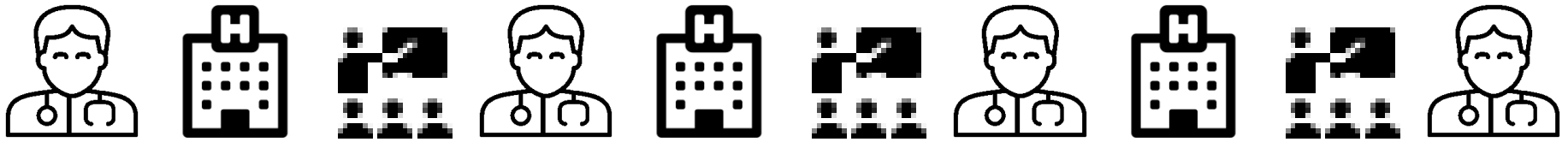


THE POWER OF NOW

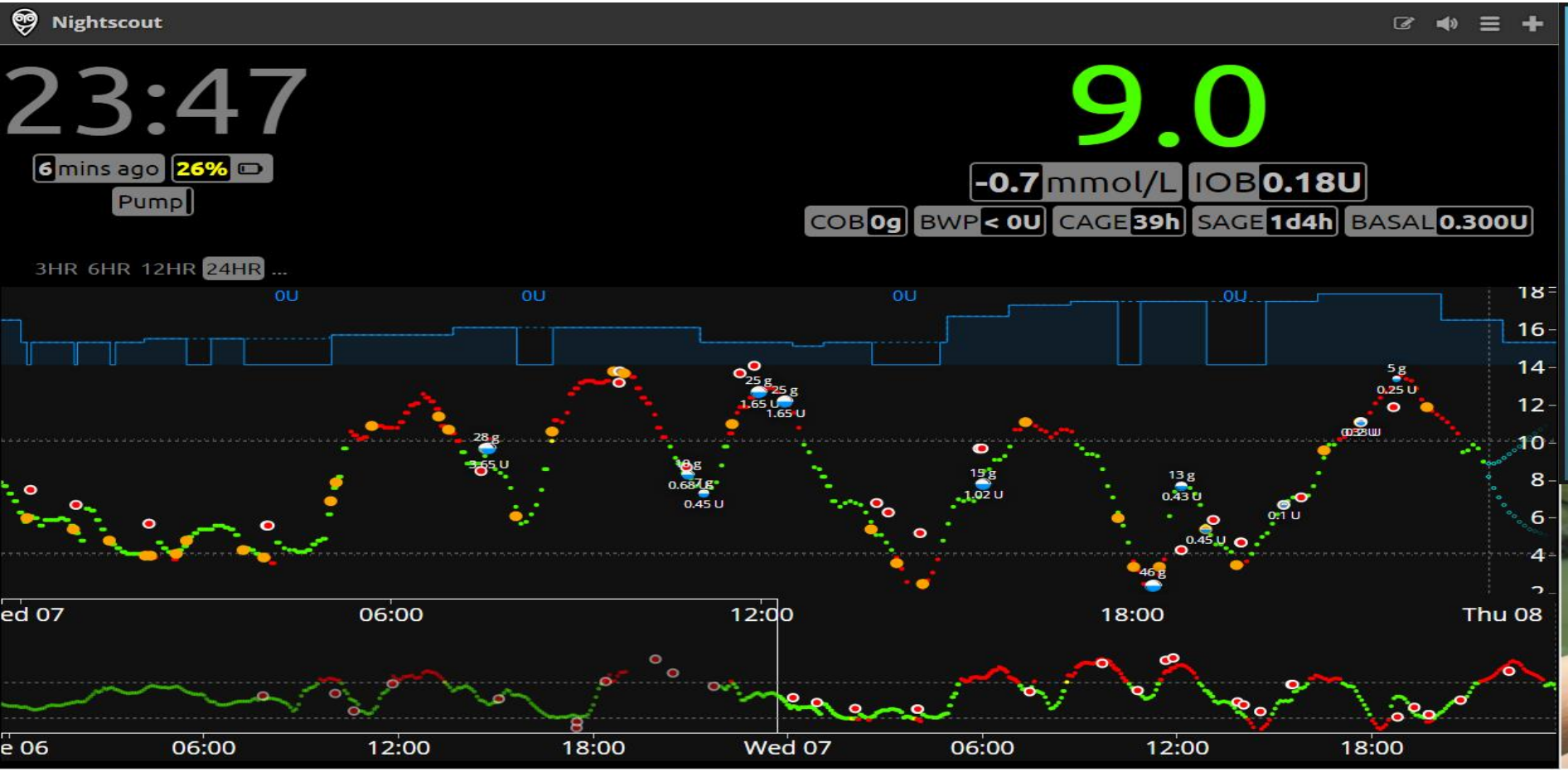
Professional Record Standards Body

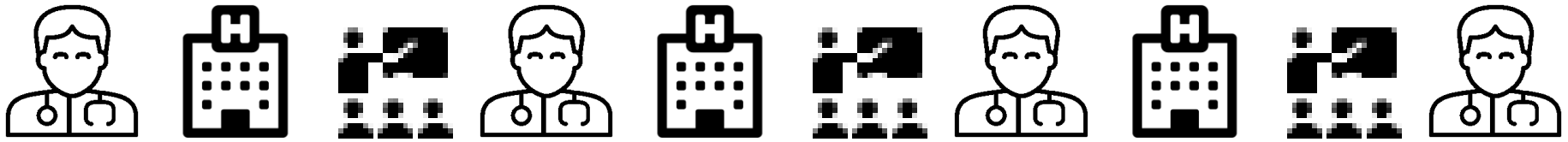




THE POWER OF NOW

Professional Record Standards Body





DIFFERENT SHAPES AND SIZES

Professional Record Standards Body

Wearables and their data will be used and needed in many different ways, e.g.:

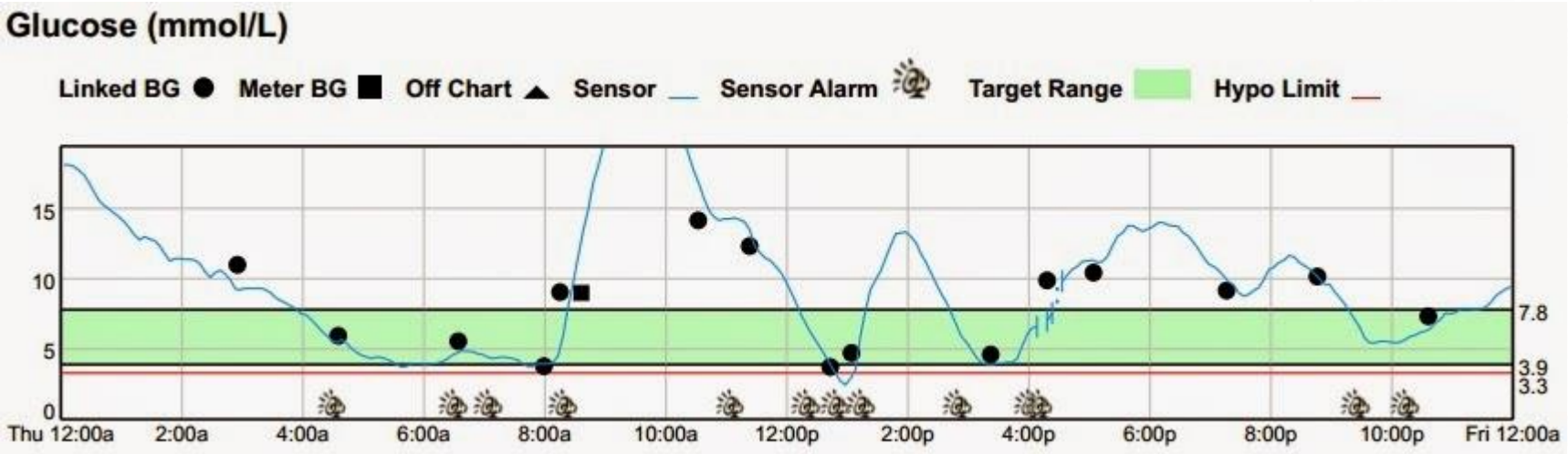
- 1-1, directly supporting a patient, real-time
- 1-Many, supporting patients and carers
- 1-Clinic, enabling HCP support

There may be times when CGM only data is sufficient and others when the context of insulin delivery, carbs consumed and even activity data is required

There will be patients that have

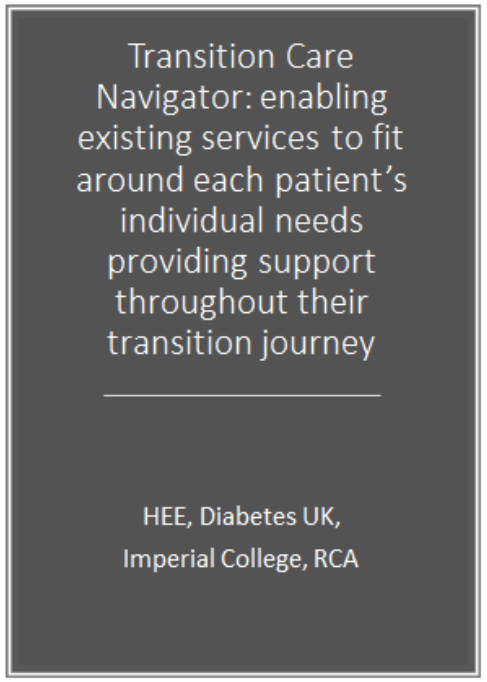
- No access to smartphones or watches
- No (reliable) internet
- No perceived need or desire for remote monitoring

Same devices, delivering different needs and meeting different expectation



DIFFERENT SHAPES AND SIZES

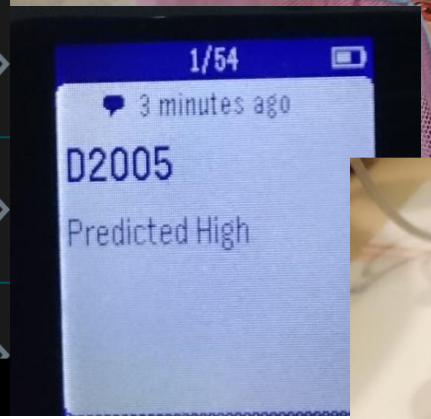
Professional Record Standards Body



Health Education England
NHS Southern Health NHS Foundation Trust
NHS University Hospital Southampton NHS Foundation Trust
Southampton Children's Hospital
University of Bristol
Digital Health and Care
University of Southampton
iT innovation
Diabetes UK Know Diabetes. Fight Diabetes.
Imperial College London
Royal College of Art Postgraduate Art & Design
The Health Foundation Q
UKRI Trustworthy Autonomous Systems Hub

CLOSING THE GAPS

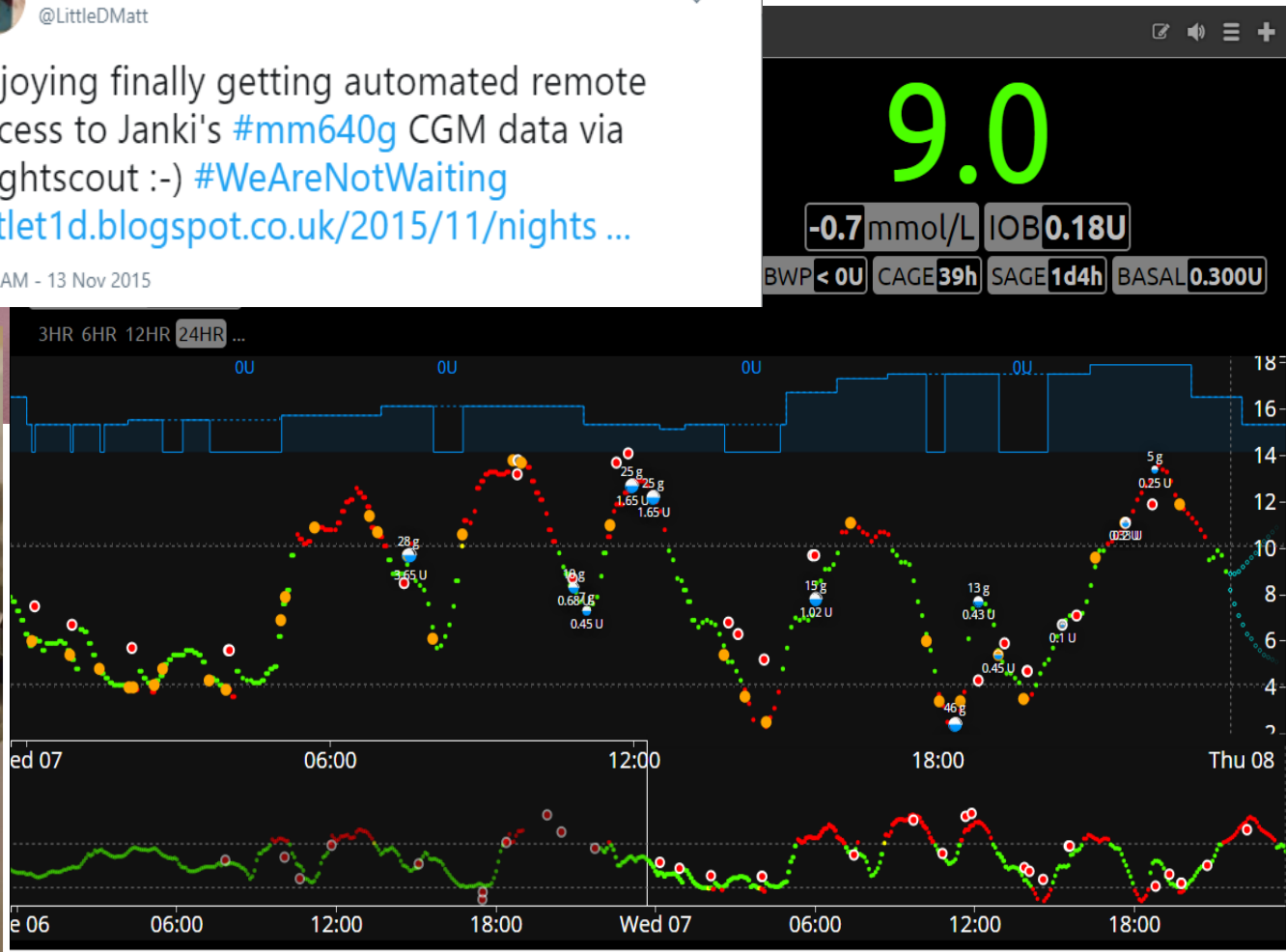
Professional Record Standards Body



LittleD
@LittleDMatt

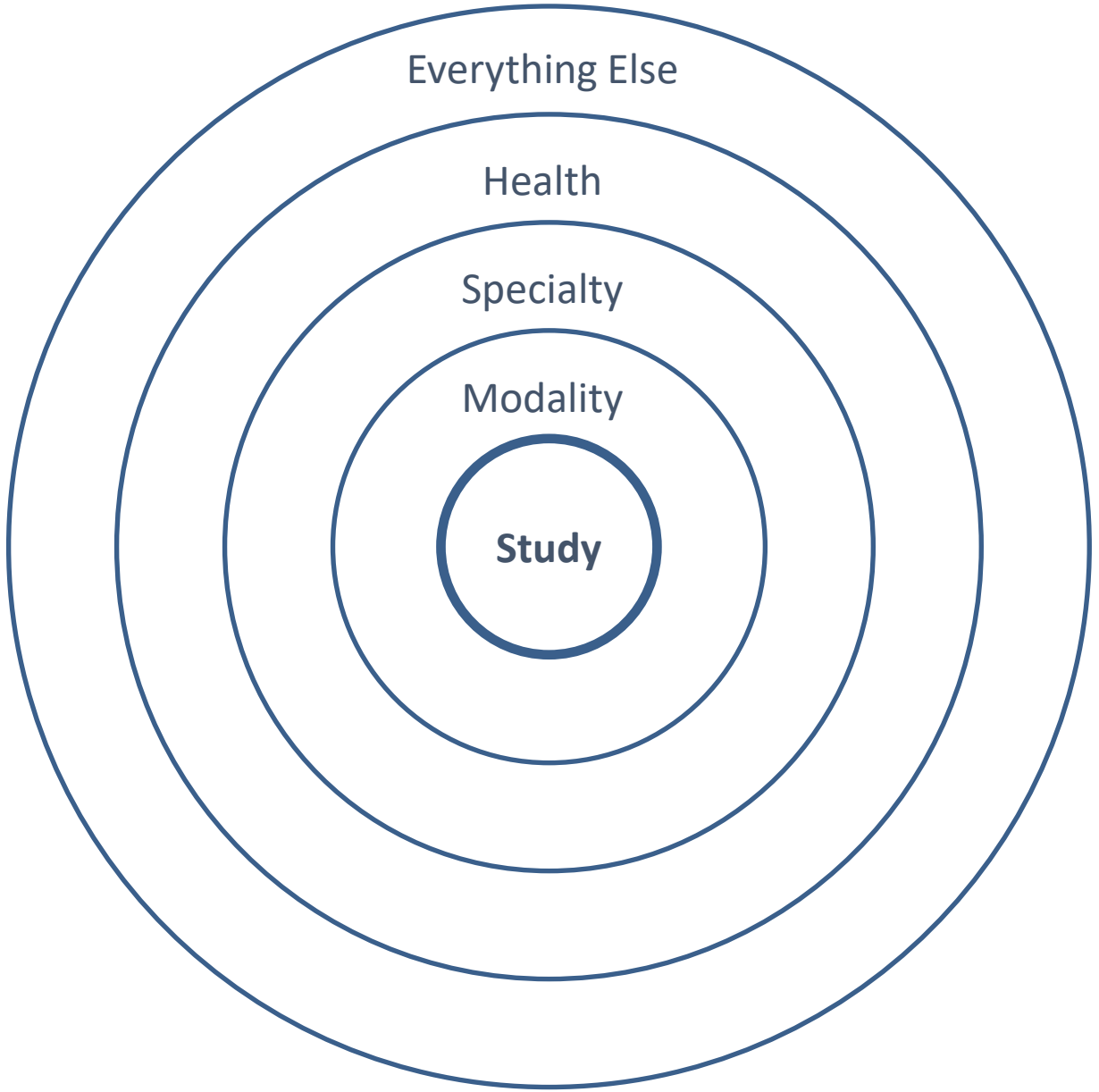
Enjoying finally getting automated remote access to Janki's #mm640g CGM data via Nightscout :-) #WeAreNotWaiting littlet1d.blogspot.co.uk/2015/11/nights ...

3:26 AM - 13 Nov 2015



REMOVING BARRIERS

Professional Record Standards Body



REMOVING BARRIERS

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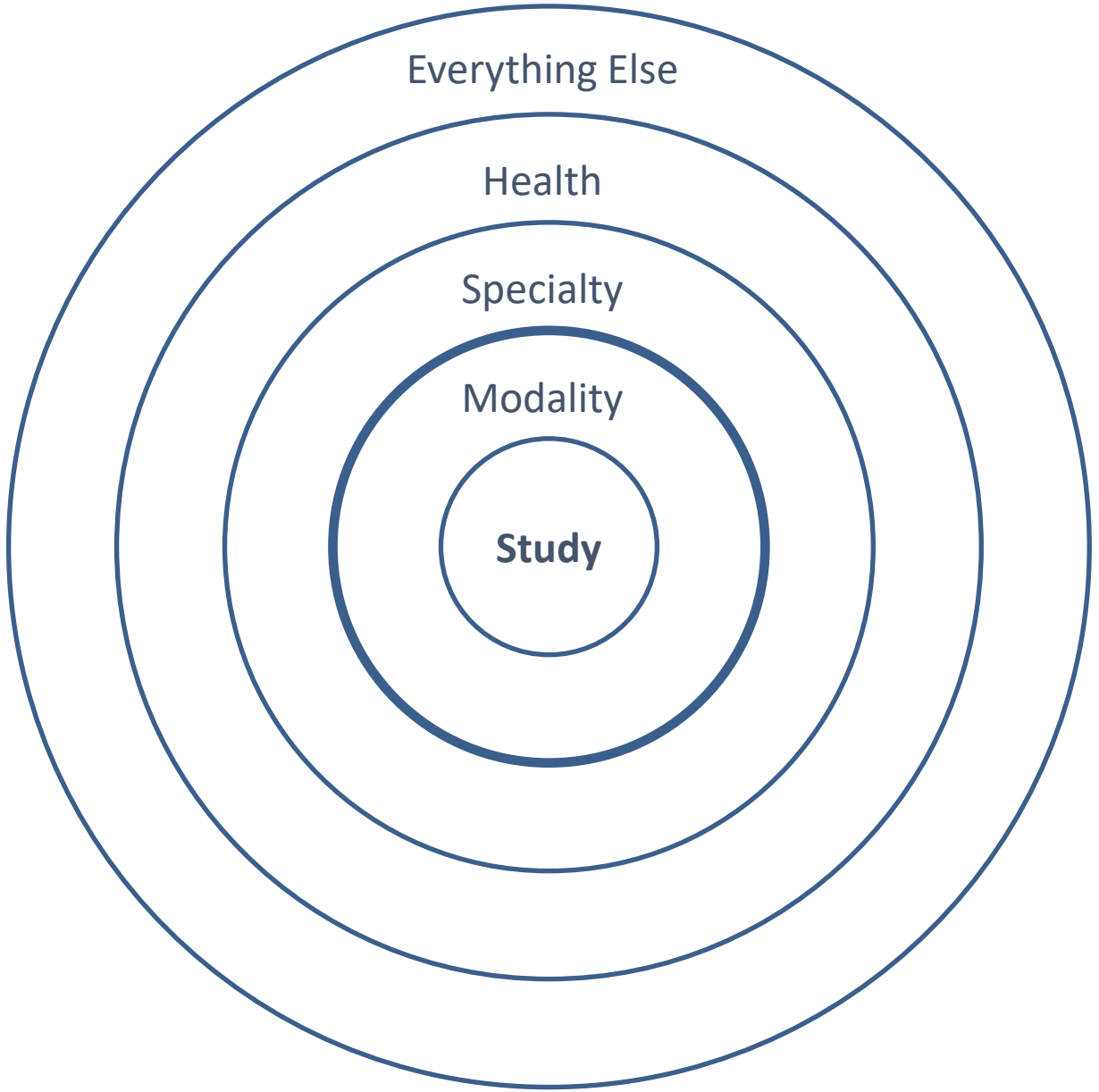

REMOVING BARRIERS

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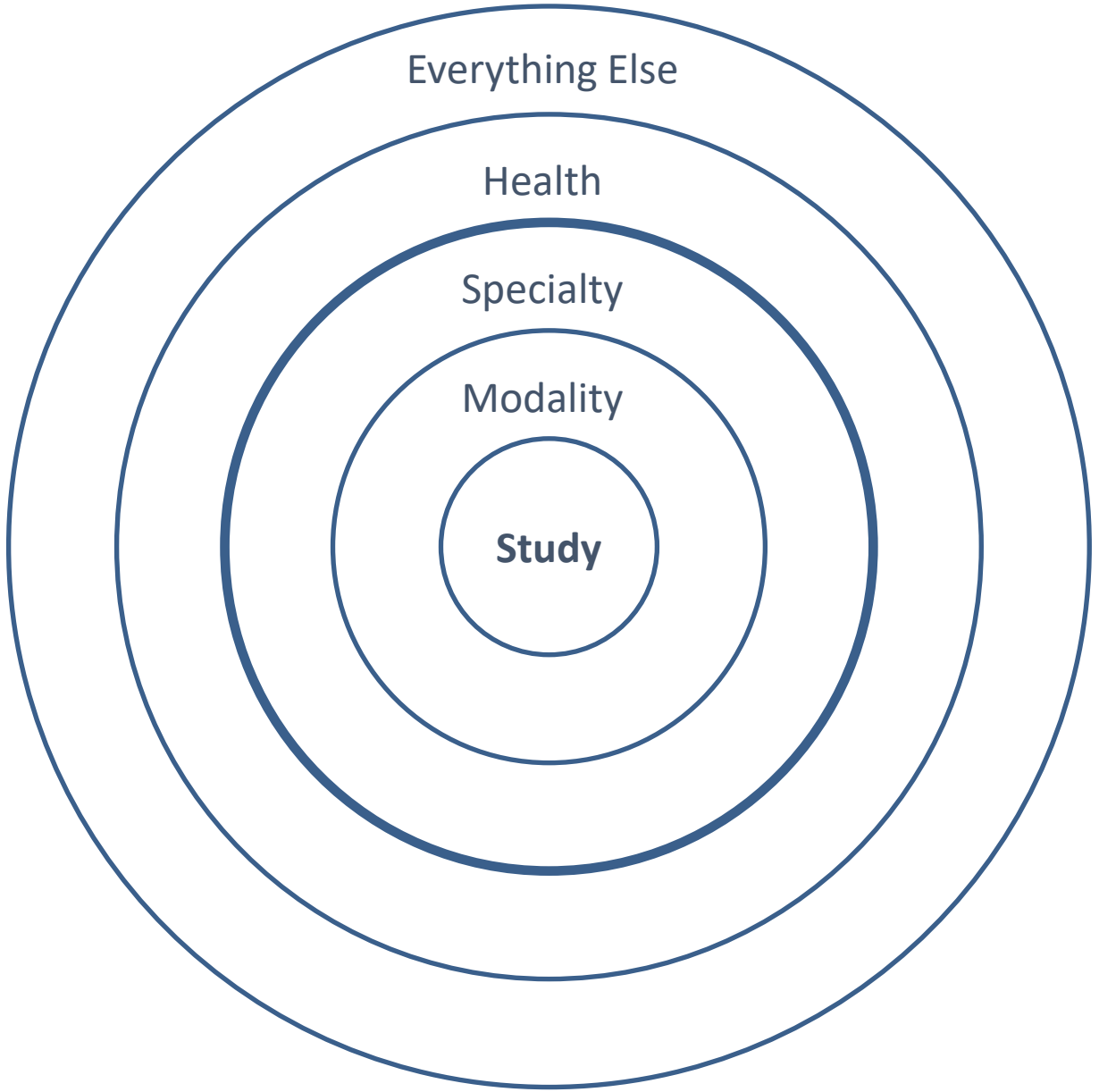

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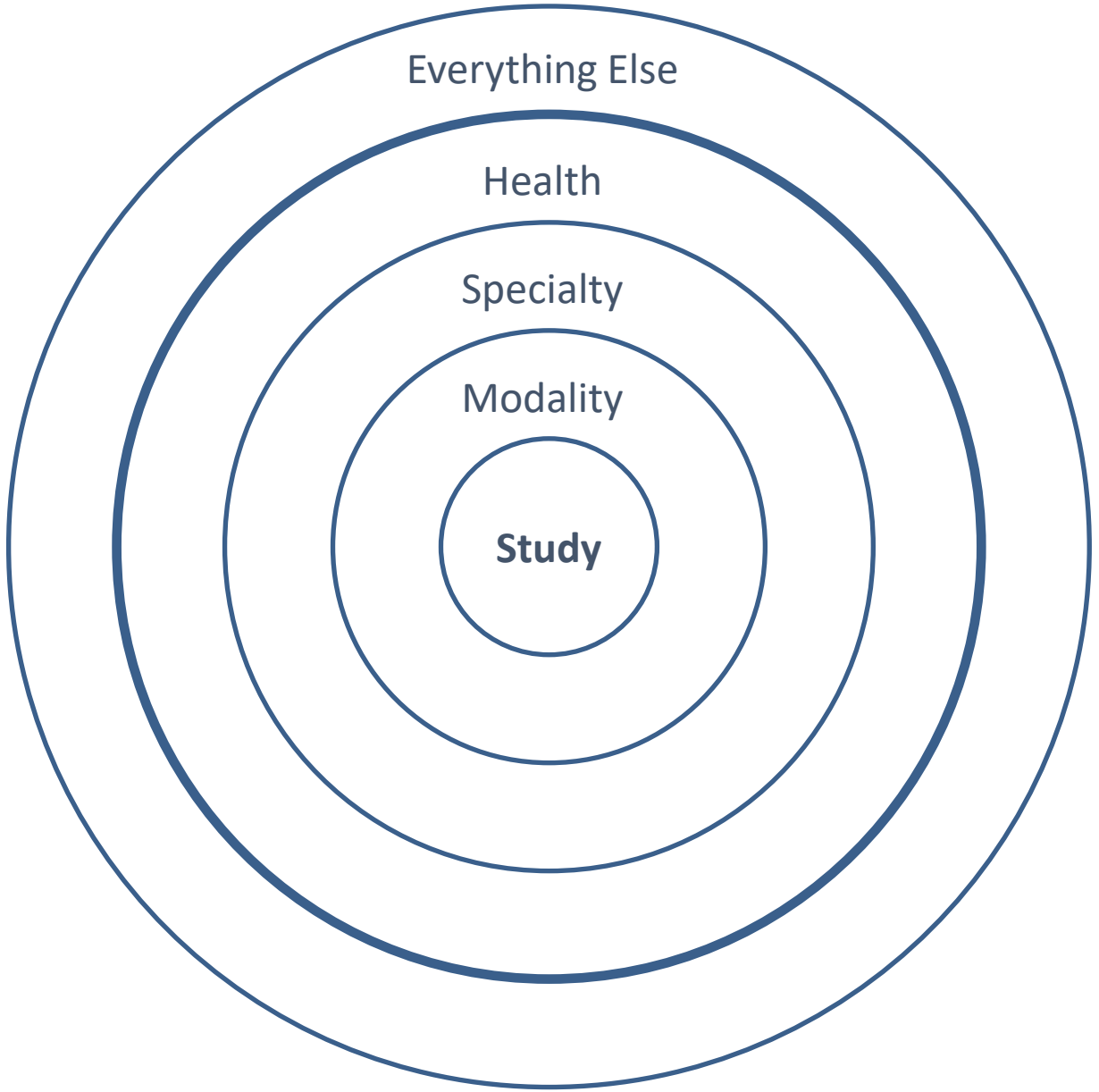
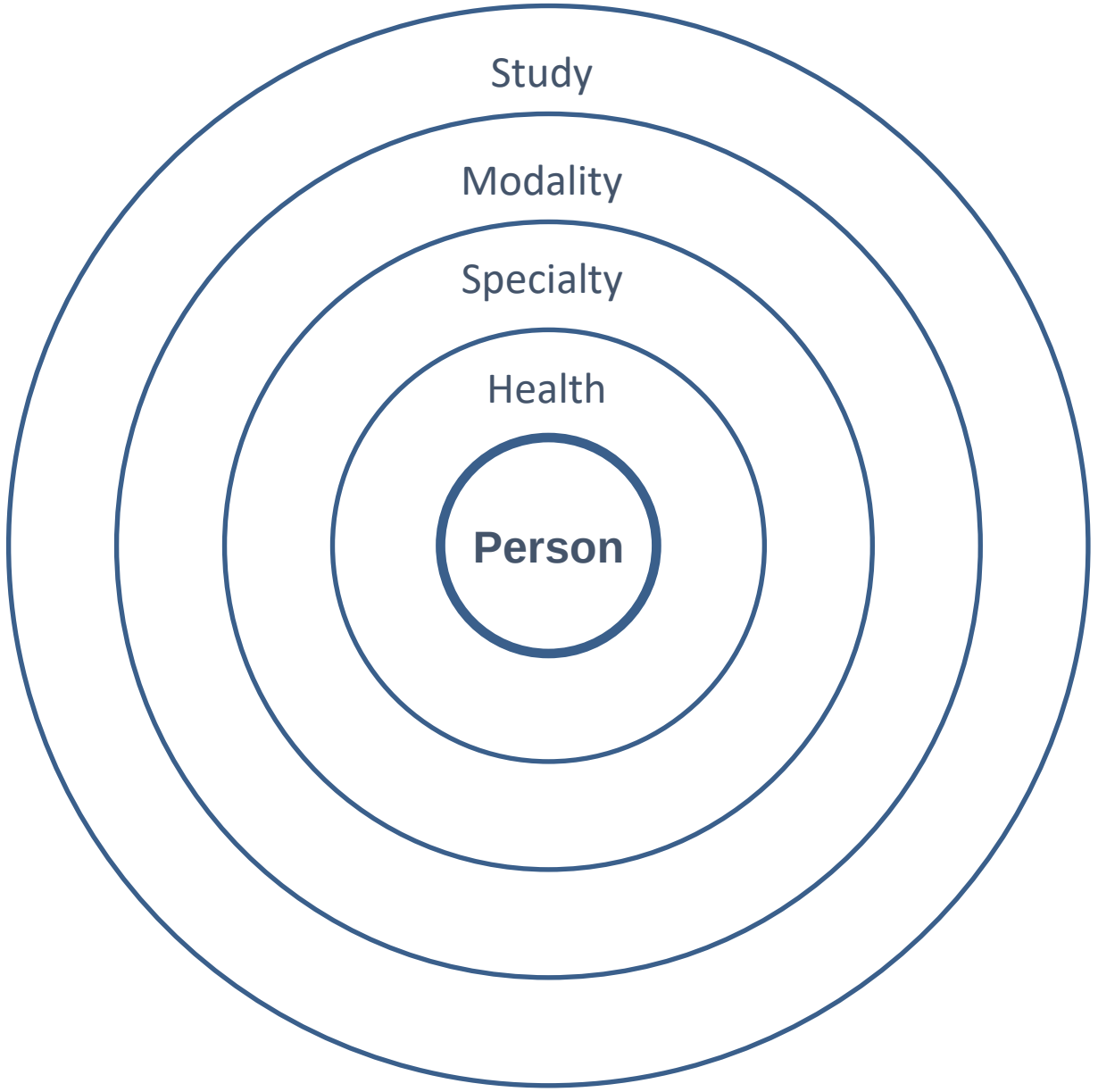


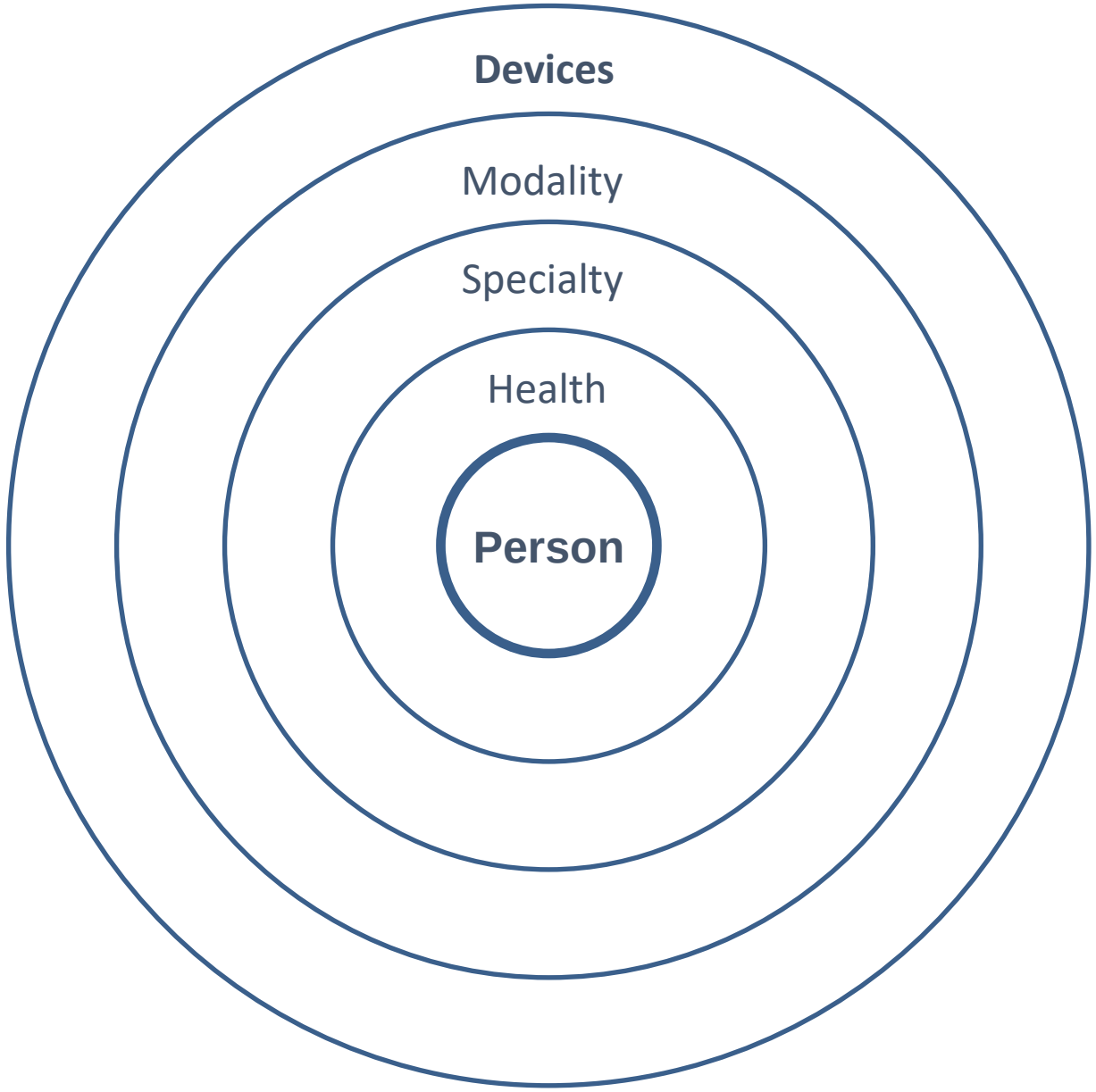
PATIENTS DRIVE DIGITAL

Professional Record Standards Body



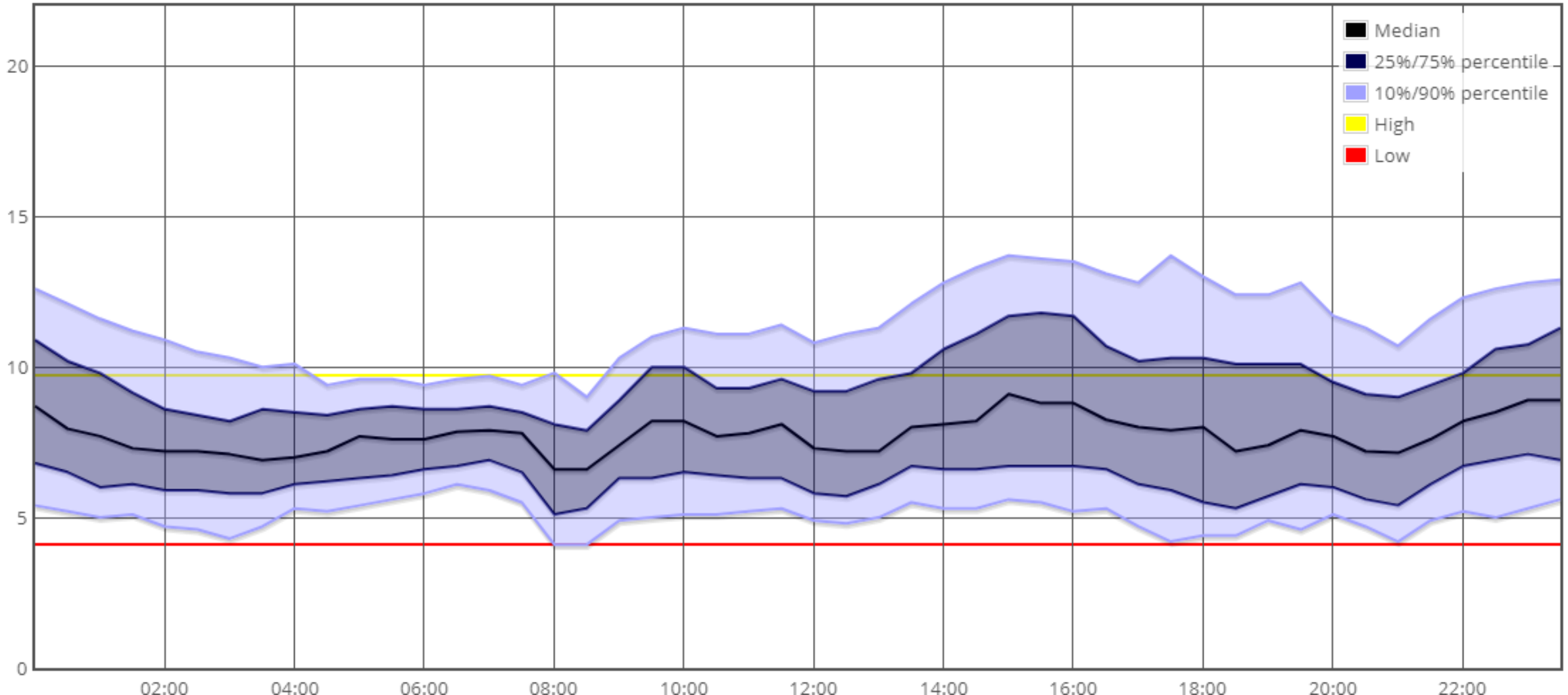
PATIENTS DRIVE DIGITAL

Professional Record Standards Body



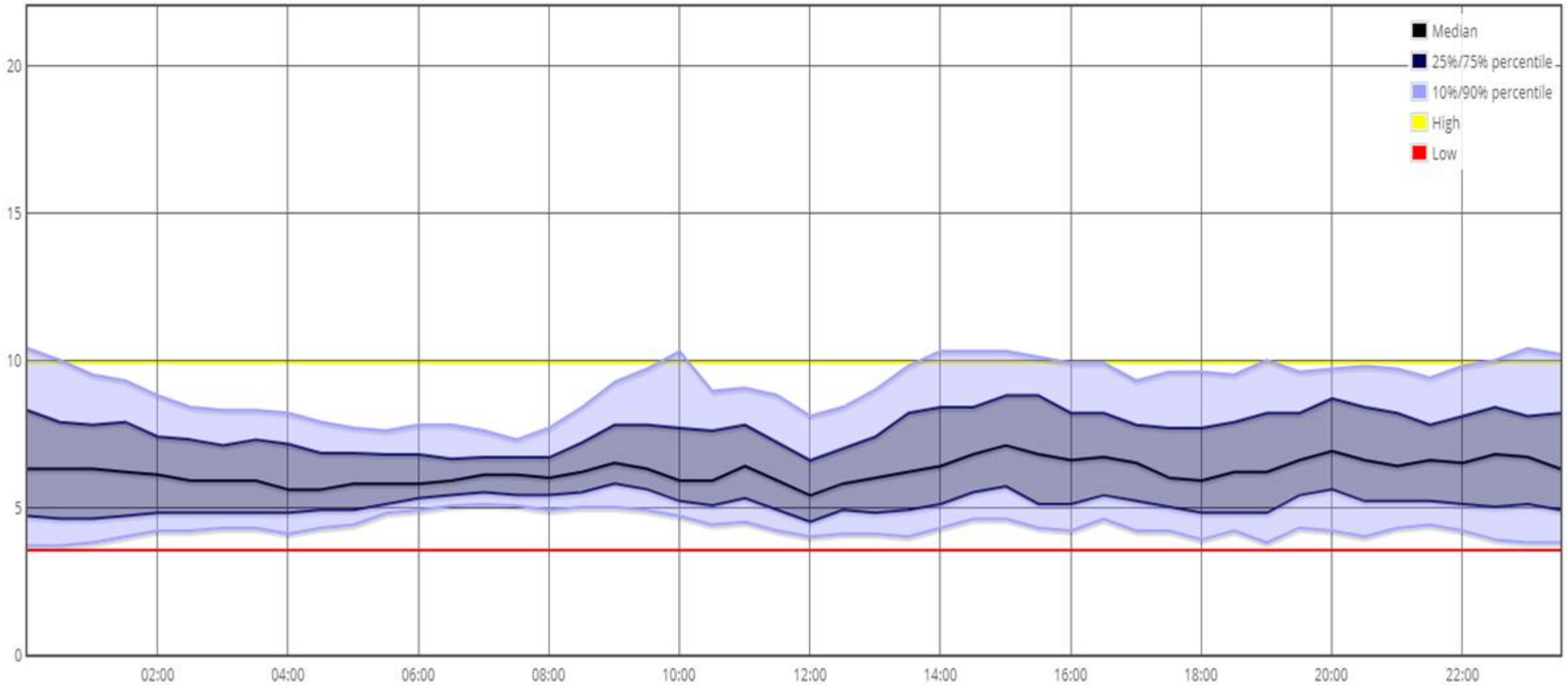
Professional Record Standards Body

Glucose Percentile report



PRSB Professional Record Standards Body

Glucose Percentile report



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Nightscout Foundation
Lane Desborough, Tom Collins, Weston Nordgren, Ben West

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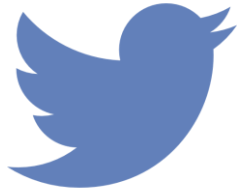

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For more information, contact our project leads Sarah Jackson and James Critchlow on info@theprsb.org

Better records for better care