

# Supporting patient and technology driven diabetes care models – Lessons from DIY APS

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# Disclosures

- Non-promotional educational talks and educational advisory roles fees from
  - Roche, Medtronic, Dexcom, Novo Nordisk & MSD
- The slides and views expressed are my own

# Technology driven and patient led care models?

- Serious challenges for health care systems – solutions?

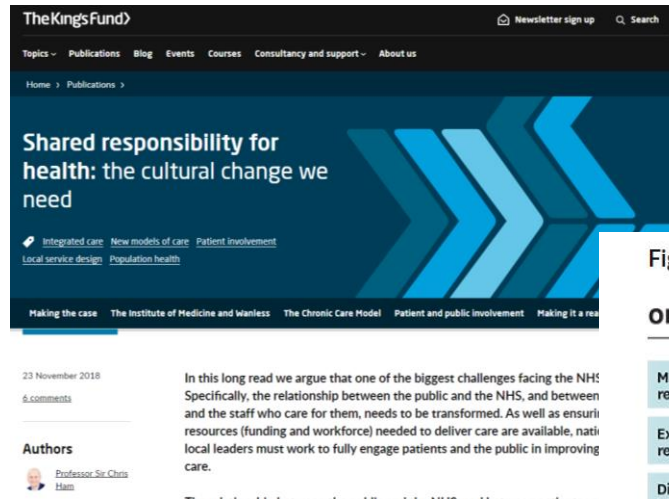


Figure 4 Old power values and new power values

OLD POWER VALUES	NEW POWER VALUES
Managerialism, institutionalism, representative governance	Informal, opt-in decision making; self-organization; networked governance
Exclusivity, competition, authority, resource consolidation	Open source collaboration, crowd wisdom, sharing
Discretion, confidentiality, separation between private and public spheres	Radical transparency
Professionalism, specialization	Do-it-ourselves, "maker culture"
Long-term affiliation and loyalty, less overall participation	Short-term, conditional affiliation; more overall participation

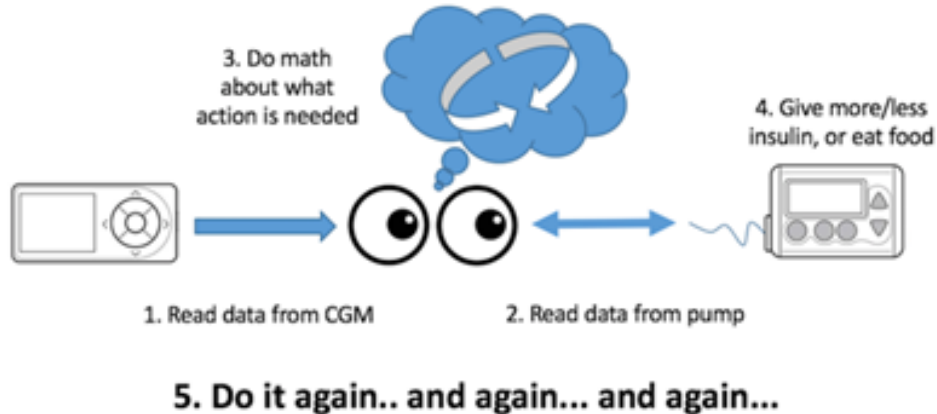
SOURCE JEREMY HEIMANS AND HENRY TIMMS

HBR.ORG

#DPC2019 @sugarydoc

# Why DIY APS?

## Manual diabetes:



**@DanaMLewis**

Figure taken with permission from Lewis D, Automated Insulin Delivery, ISBN 9781797763699,  
<https://www.artificialpancreasbook.com> Dana Lewis 2019

# Why DIY APS?

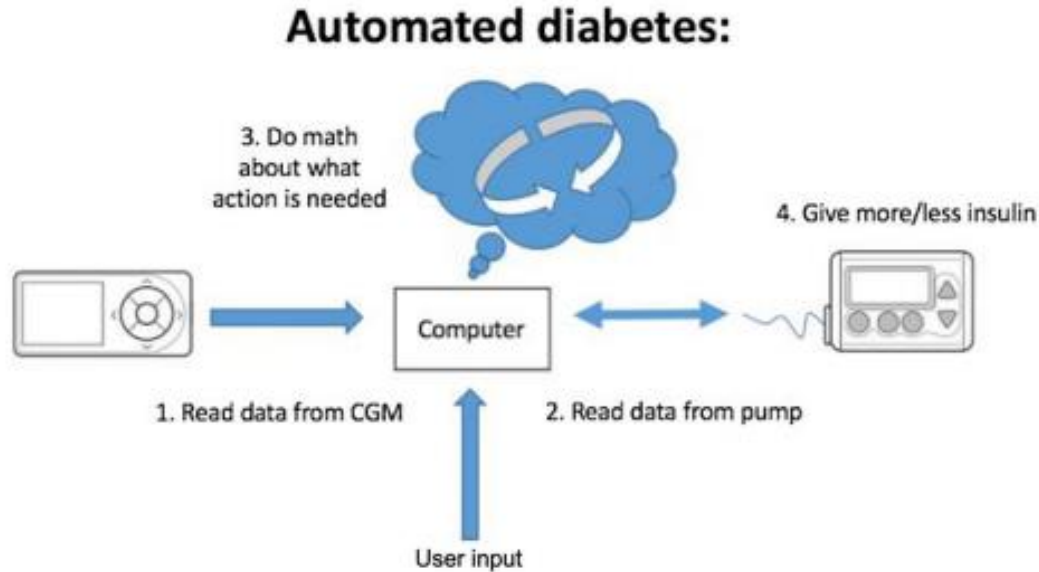


Figure adapted with permission from Lewis D, Automated Insulin Delivery, ISBN 9781797763699,  
<https://www.artificialpancreasbook.com> Dana Lewis 2019 and taken from  
Marshall, Holloway, Korner, Woodman, Brackenridge, Hussain, Diabetes Ther. 2019

# Why DIY APS?

- Evidence?

- 24 publications relating to DIY APS or related aspects
- Mostly data from self-reported outcomes
- Data from these studies highlight that compared to conventional methods, DIY APS can offer:

- Increased time in range
- Reduced glucose variability
- Reduced episodes of hypoglycaemia
- Less reliance on accuracy of carbohydrate counting
- Improved overnight control
- **Reduced mental burden**



# Why DIY APS? - Clinical experience

- Constraints in commercially approved systems

Aleppo, Webb, Endocr Pract 2018

- Experience of DIY APS in clinical situations including:

- Intensive or prolonged exercise
- Pregnancy
- Young infants
- Steroid treatment
- Surgery
- Fasting

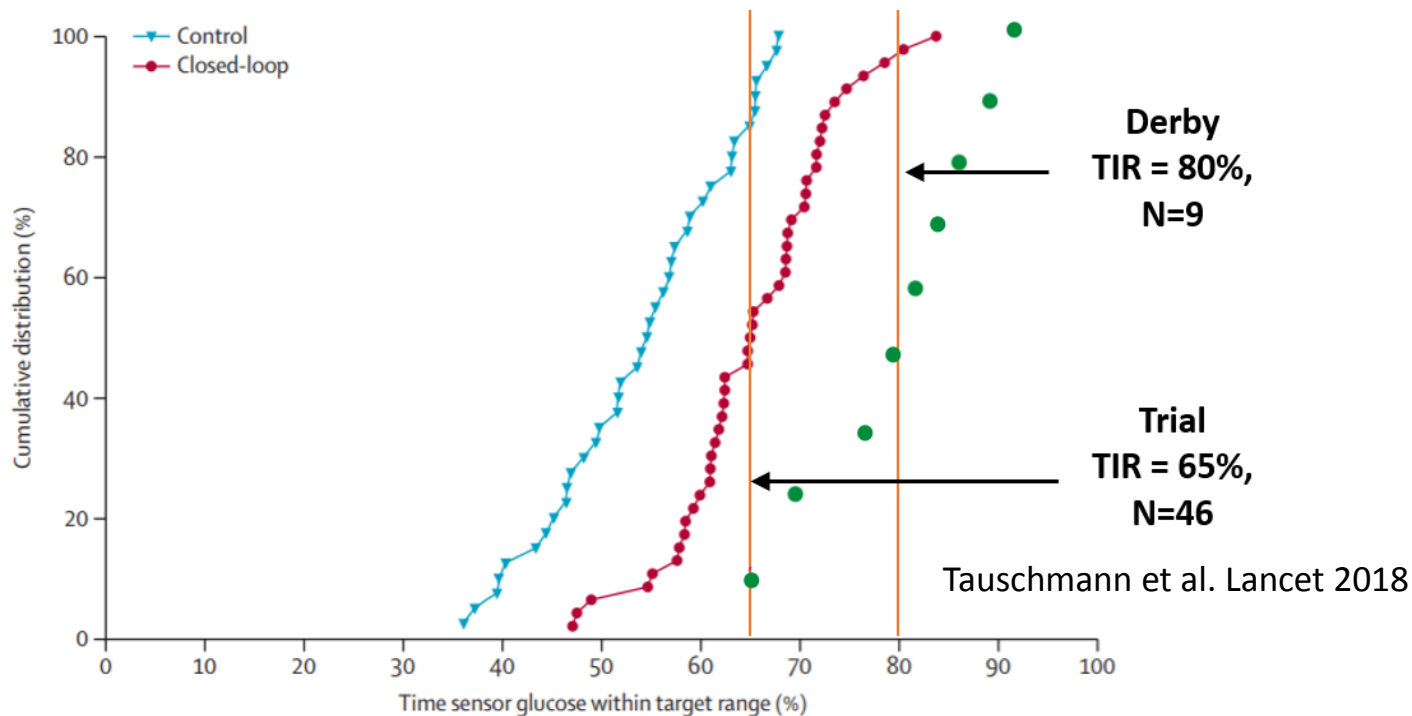


Marshall, Holloway, Korner, Woodman, Brackenridge, Hussain, Diabetes Ther 2019

Jennings, Hussain JDST (under review)

#DPC2019 @sugarydoc

# Why DIY APS? - Clinical experience

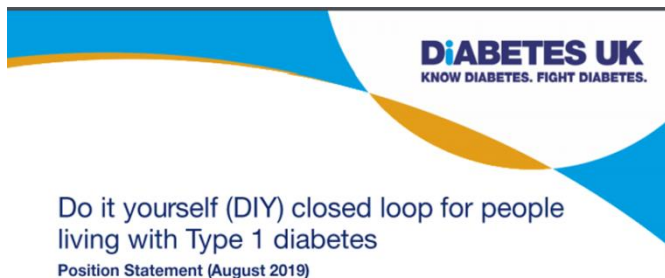


Slide and data courtesy of Dr. Emma Wilmot, Derby



# Ethical legal and regulatory constraints

Consensus from various statements produced on DIY technology use for HCPs



TYPE 1 DIABETES DIY TECHNOLOGY

JDRF UK POSITION STATEMENT

February 2019



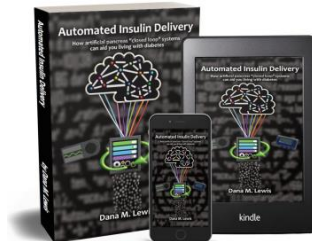
**Steno Diabetes Center  
Copenhagen**

Issues	Guidance for Healthcare professionals
Prescribing	Not regulated and not medically approved
	Cannot prescribe, promote, initiate or recommend
	Must only recommend authorised technology
Discussing	Should discuss if discussion raised by person with diabetes or carer, especially risks and medically unregulated status
Supporting	Respect the right of individuals to choose how they wish to manage their or their dependant's diabetes
	Continue to support and provide regulated devices (pump, CGM, flash GM) if meet criteria even if patient intends to pursue DIY
	Cannot help with procurement of medical equipment other than approved systems
	Can help with evaluation of glucose values and insulin dosing via information from DIY platforms but may not provide advice on DIY settings
	Cannot refer to unregulated information sources
	Should direct PWD to online DIY technology communities for advice
Documenting	Ensure clear documentation of discussions with patients or carers, especially discussions regarding risks and unregulated status of DIY technologies

# Implications for healthcare systems?

- HCP Training and awareness

Learning about Looping

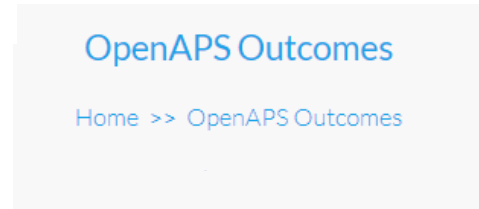


- Implications for HCPs
  - HCP role – facilitating and supporting
  - Increased initial training with less need for ongoing patient-HCP interaction
    - Responsive DIY Community support
  - More time to focus on other concerns during clinic visits

“Read the docs” – For Clinicians

# Systemic changes needed

- Current paradigm can not support patient and technology driven models
  - Research and research models
  - Reporting mechanisms & data registries
  - Regulatory processes



ABCD DIY Audit



Tidepool Loop

Tidepool has kicked off a project to build and support an FDA-regulated version of Loop, to be available in the US App Store, intended to work with commercially available insulin pumps and CGMs. You can learn more about this project in this blog post.

Tidepool will launch with support for a future version of the Tidepool® System, a future Bluetooth-enabled Medtronic pump (see Medtronic and the Diabetes UK CGM).

Please do not use this if you do not get updates on Tidepool Loop as it may cause harm.

Note: Tidepool Loop is currently under development. It is not available for marketing or sale.



- Other big issues:
  - **Simplification and wider applicability?**
  - **Access to technologies for type 1 diabetes**

# Automated diabetes – ~~the future?~~



**The present: Hybrid closed loop DIY artificial pancreas systems are here  
>1569 users world wide (OpenAPS Outcomes)**

# Acknowledgements

- Diabetes and Endocrinology team at Guy's and St Thomas
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- DIY community and users
  - Dana Lewis, Alasdair McLay

