

New Devices What's on the Horizon?





	Medtronic 640G/670*	Omnipod patch pump	Tandem t:slim X2*	Roche Insight	Dana Diabecare R	Medtrum A6 Touchcare*	Kaleido patch pump
Pump features					DAMAnuncant//S	MOTRIN MOTRIN	
Weight	96 g	25 g	112 g	122 g	62 g	21.5 g	19 g
Basal increment	0.025 U (0.025-35)	0.05 U (0.05-30)	0.001 U (0.001-15)	0.01 U (0.02-25)	0.01 U (0.04-16)	0.05 U (0.05-10)	0.05 U (0.05-5)
Basal rate/d	48	24 @ 30 min	16	24	24	48	24
Basal profiles	8	7	6	5	4	5	7
Basal pulse	10m (0.2-60)	0.05 u pulse	5 min	3 min	4 min	?	?0.05u pulse
BG target	Range: target correct	Single target + threshold	Single target	Range: mid correct		Range: ?mid correct	30 min steps up to 3 h
Bolus increments	0.1 U (max 75)	0.05 U (max 30)	0.01 U (max 25)	0.05 U (max 50)	0.05 U (max 80)	0.05 U (max 25)	0.05 U (max 20)
Occlusion alarm @1.0u/h	2-3.8 h	1.5-5.5 h	< 2 h** **2 u/h	2.2 h	?	< 3 h	15 min
Insulin volume	300 u	200 u	300 u	160 u	300 u	200 u	200 u

Commercial development of the closed loop





Closed loop in suboptimally controlled T1



Figure 2: Sensor glucose

Median (IQR) concentrations in the closed-loop group (red line and shaded area; n=46) and the control group (blue line and shaded area; n=40) are shown. Dashed lines indicate the target glucose range (3.9–10.0 mmol/L).



Figure 3: Cumulative distribution of percentage of time that sensor glucose was within the target range (ie, 3-9–10-0 mmol/L) over 12-week intervention phase by treatment group

HbA1c reduction 0.36% greater p < 0.0001

Closed loop in noncritical in-patients







Closed loop in in-patients on nutritional support



Figure 2: Sensor glucose concentration and insulin delivery profiles

 (Å) Sensor glucose concentration during closed-loop and control interventions from midnight to midnight (lines indicate median, shaded areas indicate IQRs). The glucose target range is 5:6–10:0 mmol/L.
 (B) Algorithm-directed insulin delivery during closed-loop intervention (line indicates median, shaded area indicates IQR).

King's College Hospital





Macronutrient effects on BG control in Closed Loop







Pt driven Healthcare



#wearenotwaiting
#OpenAPS
#nightscout







	Guardian Connect	640G Smart Guard	DexCom G6 Mobile	Freestyle Libre	Eversense	Medtrum
				Recycluse		
Sensor life	6 days		10 days	14 days	180 days	7-14 days
Alarms	Multiple		1 high, low and trend	None	Multiple	Multiple
Predictive	Yes		Yes	N/A	Yes	Yes
Trends	Yes		Yes	N/A	Yes	Yes
Rate change	Yes		Yes	N/A	Yes	Yes
Calibration	12 hourly		None	None	x4 at 2-12 h then12 hourly	12 hourly
MARD	9.64%		9.0%	9.7%	8.8%	9.1%



Connected pens



King's College Hospital NHS Foundation Trust



Bolus advisor apps



My sugr



Acucheck connect



Case-Based Reasoning for Insulin Bolus Advice: Evaluation of Case Parameters in a Six-Week Pilot Study







Dr Pratik Choudhary, KCL



Apps using Artificial intelligence to adjust doses.





King's College Hospital NHS Foundation Trust





Clinitech's labpatch concept Technology

LabPatch is executed in the form of a chip-on-a-Band-Aid, powered by a coin battery. It operates on the principle that interstitial fluid (ISF) carries most of the same biomarkers that are in blood plasma. Like an implanted biomedical chip, this unique device can monitor critical health parameters – but without implantation surgery or the issue of biofouling. LabPatch will typically be worn under the upper arm. Its performance is imperceptible to the wearer, and there is no skin evidence of the fluid access.





"a chip on a Band-Aid, which monitors the body's interstitial fluid, communicating results wirelessly"



Fluoresence based sensors..







Smart tattoos measuring glucose levels present in sweat



King's College Hospital







SMART INSULIN automatically responds to changing blood glucose levels.





Company Name	Key Company Information			
	 Smart Insulin Type: Pill form of smart insulin: MK-2640 Development Stage: First to human trials; trial failed in 2016 Additional Note: First to human testing; trial failed. 			
	 Smart Insulin Type: Smart Insulin type not specified Development Stage: Animal testing Additional Note: Also developing "Smart Glucagon" gel to replace glucagon pens JDRF and Sanofi Funded 			
Thermalin	Smart Insulin Type: not specified Development Stage: Lab testing JDRF, Sanofi and Helmsley funded			
Glycostasis, Inc. Lilly	Smart Insulin Type: not specified Development Stage: Lab testing Additional Note: Eli Lilly acquired Glycostasis, Inc. in 2016			
Gubra	Smart Insulin Type: not specified Development Stage: Lab testing JDRF funded			
UNIVERSITY OF UTAH	Smart Insulin Type: Adhesive patch Development Stage: Animal testing JDRF and Sanofi funded			
MONASH University	Smart Insulin Type: Adhesive patch Development Stage: Animal testing JDRF and Sanofi funded			
	Smart Insulin Type: Adhesive patch Development Stage: Animal testing JDRF and Sanofi funded			
Calibr	Smart Insulin Type: Adhesive patch Development Stage: Animal testing JDRF funded			
UNIVERSITY ^{OF} BIRMINGHAM	 Smart Insulin Type: Gel pen Development Stage: Animal testing JDRF and Sanofi funded 			
THE UNIVERSITY OF QUEENSLAND	 Smart Insulin Type: Nano-implant Development Stage: Large animal testing 			
NT novo nordisk ziylo	 Smart Insulin Type: Not specified Development Stage: Animal testing Additional Note: Novo Nordisk acquire Ziylo in 2018 			
Sensulin	Smart Insulin Type: Gel Pen Development Stage: Large animal testing			

Summary



- There has been a big change in attitude
- How to keep up with the speed of change in technology?
- Choice of technology and how to best use it is important
- Showing benefits in A1c remains key to maintaining access..
- Closed loop is the only way we can get a majority of patients to under 7%
 → the next few years are going to be fun..
- When the systems work to make decisions → that's when we really start to reduce the burden of diabetes
- We need to adapt our own learning and our health systems to maximise the benefit – what we are doing now isn't good enough



