

ESM 1: The Use of Automated Insulin Delivery Around Physical Activity and Exercise in Type 1 Diabetes: A Position Statement of the European Association for the Study of Diabetes (EASD) and the International Society for Pediatric and Adolescent Diabetes (ISPAD)

Emerging Automated Insulin Delivery Technology for Type 1 Diabetes

Tidepool Loop

Tidepool Loop with the Sequel twist pump (Sequel Med Tech, Manchester, NH) has received FDA 510(k) clearance as an alternate controller enabled (ACE) infusion pump. They have announced partnership with Tidepool to bring the FDA-cleared Loop algorithm to market in the United States for people ≥ 6 years. The Tidepool Loop algorithm is the commercial version of the previously Open-Source Automated Insulin Delivery (OS-AID) Loop algorithm. It was studied in a prospective real-world observational study in 558 adults and children with type 1 diabetes who initiated Loop either on their own or with community-developed resources [1]. The Tidepool Loop algorithm is a hybrid closed-loop controller using model prediction that anticipates future glucose based on the effects of delivered insulin, user-entered CHO, and two methods of short-term adaptation called “glucose momentum” and “retrospective correction.” The CHO effects are derived from the insulin-to-carbohydrate (I:C) ratio and the insulin sensitivity factor (ISF), and the insulin effect is derived solely from the ISF. The algorithm then modulates basal insulin delivery to drive the sensor glucose value to a user specified target glucose. The algorithm also accounts for user-specified CHO absorption times. Users may set basal rates, I:C, ISF, target glucose, and insulin pharmacodynamic models. To date, no overt exercise studies have been performed on users of the Tidepool Loop algorithm and studies have not yet begun on the commercial build with the Sequel twist pump.

Data Sources, Searches, and Study Selection

Systematic reviews and meta-analyses were included as additional information for the use of AID technology. Reference lists from each relevant publication were screened to identify additional articles pertinent to the topic. Papers were grouped per theme by device and the lead authors reviewed the evidence. In this position statement, we discuss each commercially available AID system separately (listed in alphabetical order by company), and provide specific recommendations for each system, where possible. Although the recommendations presented in this position statement are based on research evidence, they are the opinions of the authors.

The level of evidence was set according to the Memorandum of Understanding (MOU) between EASD and the writing group of this position statement. Level of evidence is thus expressed as: Ia) evidence from meta-analysis of randomized controlled trials, Ib) evidence from at least one randomized controlled trial, IIa) evidence from at least one controlled study without randomization, IIb) evidence from at least one other type of quasi-experimental study, III) evidence from non-experimental descriptive studies, such as comparative studies, correlation studies, and case-control studies, IV) evidence from expert committee reports or opinions, or both. If recommendations are given within this position statement, the strength of those recommendations are expressed as: (A) directly based on category I evidence; (B) directly based on category II evidence or extrapolated recommendation from category I evidence; (C) directly based on category III evidence or extrapolated recommendation from category I or II evidence; (D) directly based on category IV evidence or extrapolated recommendation from category I, II, or III evidence date for scheduled review or expiry of the guidelines is given; (consensus D) clinical experience of respected authorities.

General Principles of AID, Physical Activity, and Exercise

Insulin on board (IOB) refers to the insulin that is still active in the body from a previous bolus dose [2]. In general, IOB is estimated based on the amount and type of insulin used, and the duration of insulin action; however, there are inconsistencies in how IOB is calculated and displayed on insulin pumps [3]. Moreover, some AID systems allow users to set the duration of insulin action (e.g., between 2-8 hours), which also influences how IOB is reported as well as the aggressiveness of insulin delivery [4]. A shorter duration of IOB (e.g., ≤ 3 hours) makes the AID algorithm more aggressive and is generally associated with higher TIR_{3.9-10.0} [5], but likely underrepresents “true” IOB based on the known duration of insulin action for rapid-acting insulin analogues [6]. Conversely, a longer duration of IOB (e.g., >3 hours) generally provides a more accurate IOB display but is associated with lower TIR_{3.9-10.0}. If there is IOB present at the onset of activity, there is a heightened risk of hypoglycaemia during activity, with higher IOB levels predicting greater hypoglycaemia risk [7–9]. Several strategies proposed in this position statement focus on reducing IOB at the onset of exercise (**Table 1**).

In addition, most AID systems have the option to temporarily set a higher glucose target value (or range) before PA&E, sometimes called the *exercise mode*, *activity mode*, *activity feature*, *physical activity mode*, or *temporary target*, but for simplicity, we use “higher glucose target” for this position statement (more details by each system provided below). Unless a specific AID system is being discussed, for consistency across all AID systems, the general term “higher glucose target” will be used throughout this joint EASD ISPAD position statement. In this position statement, when referring to standardized CGM metrics including glucose time in range (TIR; 3.9-10.0 mmol/L), time below range (TBR level 1 and 2; <3.9 and <3.0 mmol/L), and time above range (TAR level 1 and 2; >10.0 and >13.9 mmol/L), the following abbreviations are used throughout, unless otherwise specified: TIR_{3.9-10.0}, TBR _{<3.9} , TBR _{<3.0} , TAR _{>10.0} , and TAR _{>13.9} .

The suggested CHO amounts above include overlapping ranges since these provide general guidance that lack precision based on several factors such as blood glucose concentrations, IOB, bodyweight, etc. We recommend using absolute amounts of CHO to prevent hypoglycaemia, as this is generally an easier concept to follow during activity. However, based on previous consensus reports, bodyweight-relativized CHO treatments can be useful, especially for children and adolescents during PA&E (~0.2–0.5 g CHO/kg bodyweight) [10, 11]. Furthermore, the amount of CHO recommended to treat hypoglycaemia during PA&E may be lower with AID systems as compared to CSII and MDI therapy [12] **(D)**.

Other Considerations for Physical Activity and Exercise

Current consensus guidelines on PA&E self-management may not be ideal for females with type 1 diabetes, as much of the research to date has been conducted on males [13]. However, some recent studies have focused on incorporating more data from females exclusively [14] and a more equal sex distribution [15]. There may be gender-related differences in PA&E preferences, reasons for being physically active, and strategies used to mitigate dysglycaemia with activity [16]. Moreover, glycaemia in individuals with type 1 diabetes is known to be affected by the menstrual cycle [17, 18], which may have further implications on glucose levels during and after activity [19]. For example, glycaemia and insulin needs may be higher in the late luteal phase (last week before menses) relative to the follicular phase [19]. This relative hyperinsulinaemia could set the stage for a greater drop in glycaemia during exercise in the late luteal phase when glucose transport is also independent of insulin [19]. Similarly, it has been observed that insulin needs tend to decrease during the menopause transition [20], yet how these changes affect the required glucose targets for safe exercise has yet to be determined [21]. More research is needed

to understand the influence of sex and menstrual phase on glycaemia before, during, and after PA&E.

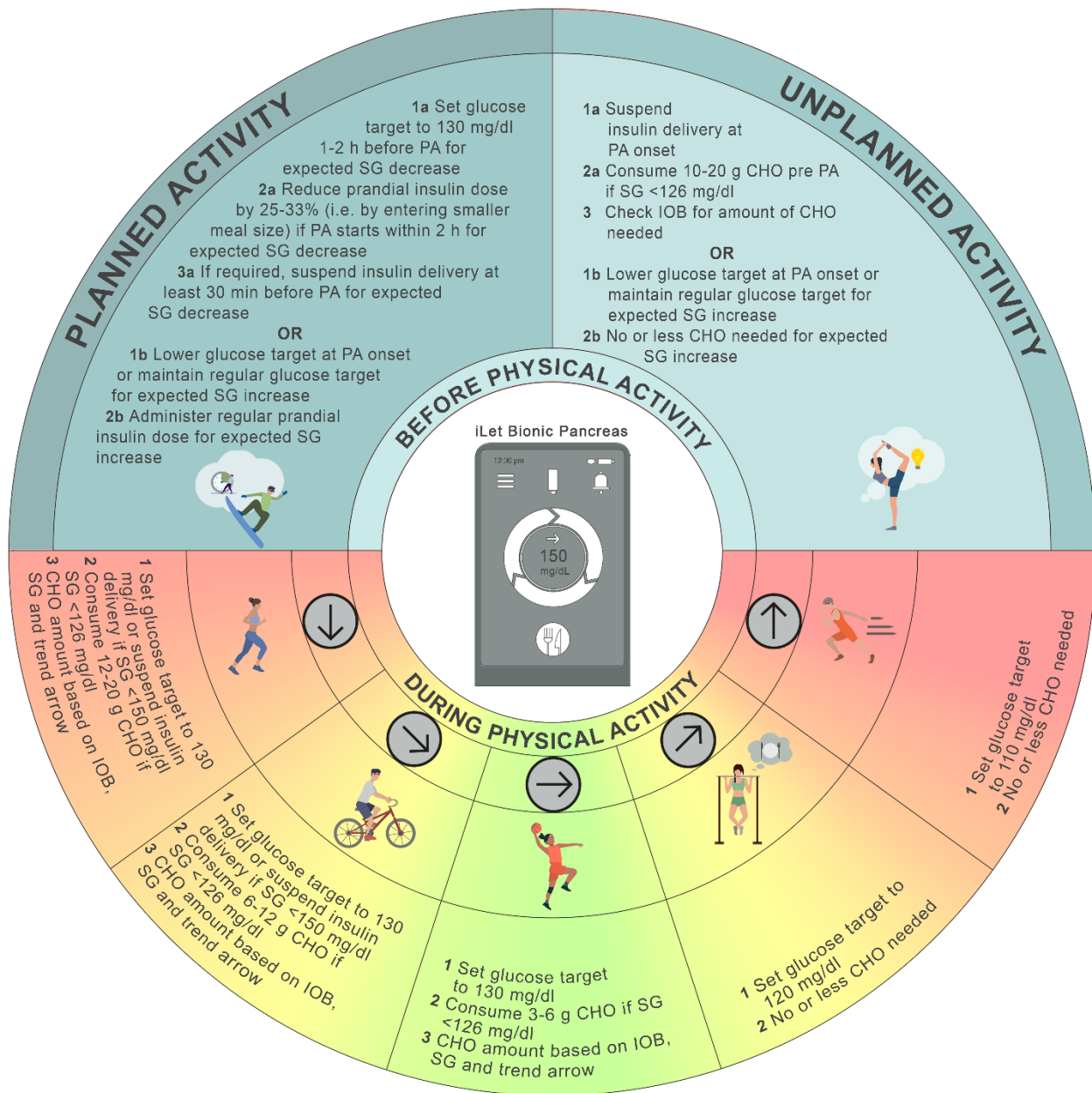
Another consideration is that many forms of PA&E may include a competitive element. For some individuals engaging in group or individual competitive events, managing glycaemia is much more difficult, regardless of insulin modality. Perhaps because of stress hormones or other factors, a fear of dysglycaemia may also impact performance [22]. The challenge can be further amplified by the need for CHO to fuel for optimizing PA&E performance. In one large paediatric study, competitive events were associated with higher glucose levels (or less of a drop in glucose during an activity) compared to non-competitive events [23].

A major challenge with AID systems is the inconsistency in insulin levels before and during PA&E due to automated algorithmic adjustments. Users might follow the same pre-exercise routine but start their exercise with varying insulin levels, leading to differing glucose responses. In contrast, with MDI or OL pump therapy, IOB remains relatively consistent, enabling a somewhat more predictable glycaemic response, making it easier to learn and follow a successful plan. In some instances, experienced exercisers with proven routines may choose to switch to manual mode before PA&E, then reactivate the AID algorithm post-exercise to optimize glycaemic outcomes. When considering this approach, it is important to adjust the manual basal rate accordingly and ensure that basal rates are accurate, especially for youth with type 1 diabetes. In addition, other adjunctive agents such as SGLT2 inhibitors and GLP-1 receptor analogues tend to lower insulin requirements in type 1 diabetes but may increase the risk of diabetic ketoacidosis (DKA) [24], however, their impact with PA&E is currently unknown.

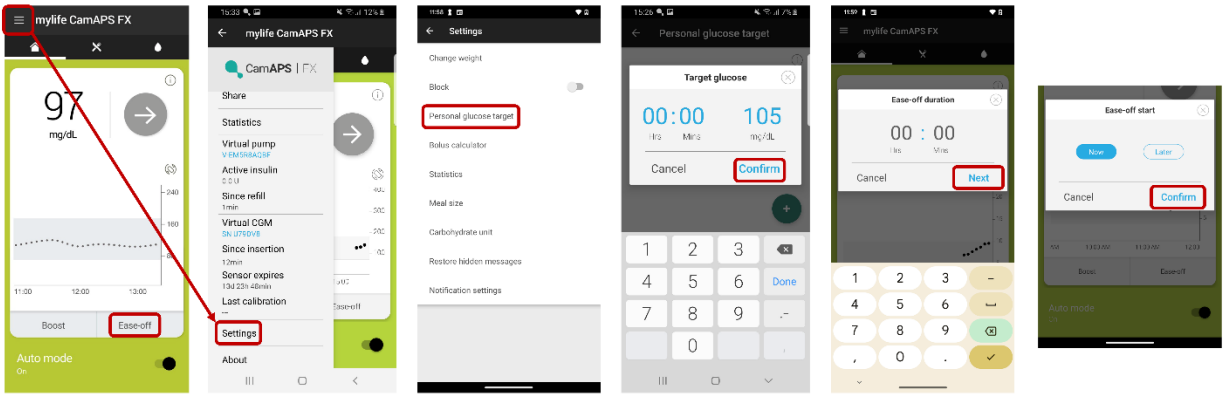
Additional figures

Exercise intensity and mode					
	Postprandial, continuous, sustained, prolonged, aerobic exercise; low stress hormone response	Mixed activity; individual and team sports	Overnight fasted, burst, explosive, competitive, anaerobic exercise; high stress hormone response		
Average glucose response to exercise	↓	↘	→	↗	↑
Exogenous insulin requirements around exercise	↓	↘	→	↗	↑
Carbohydrate intake requirements around exercise	↑	↗	→	↘	↓

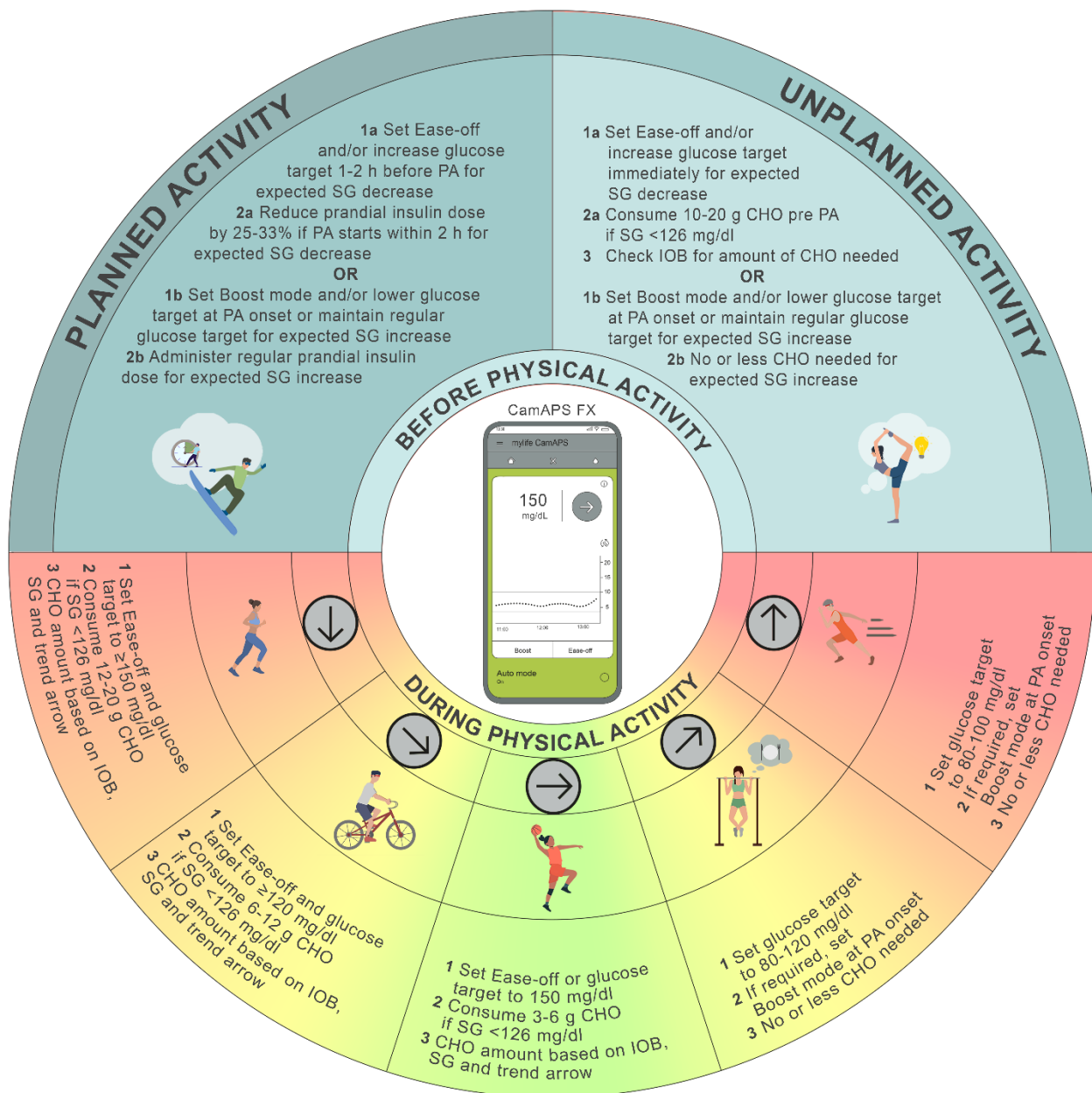
ESM Fig. 1: This figure provides a general overview of glucose trends and exogenous insulin and carbohydrate intake requirements in response to PA in people with type 1 diabetes and does not completely reflect the variability that may exist within and between each individual and in different PA types. The average glucose responses to exercise (top row) are highly variable based on several factors including insulin on board, baseline glucose, glucose rate of change, time of day, fitness level, prandial state, fasted state and menstrual cycle phase. People with type 1 diabetes should understand their individual responses to different types of activity and in different settings (e.g. morning vs afternoon, practice vs competition). Strategies can then be individualised based on their average glucose responses. No one PA can be associated with one glucose trend; however, activities shown in the upper left panel tend to result in the glucose trends in the first two columns; activities shown in the upper right panel tend to result in the glucose trends in the last two columns; and activities shown in the middle panel can result in the glucose trends in the middle three columns. When considering an increase in insulin dose around PA, this should be discussed with the healthcare professional and care team, as only a few studies have investigated higher insulin doses for exercise



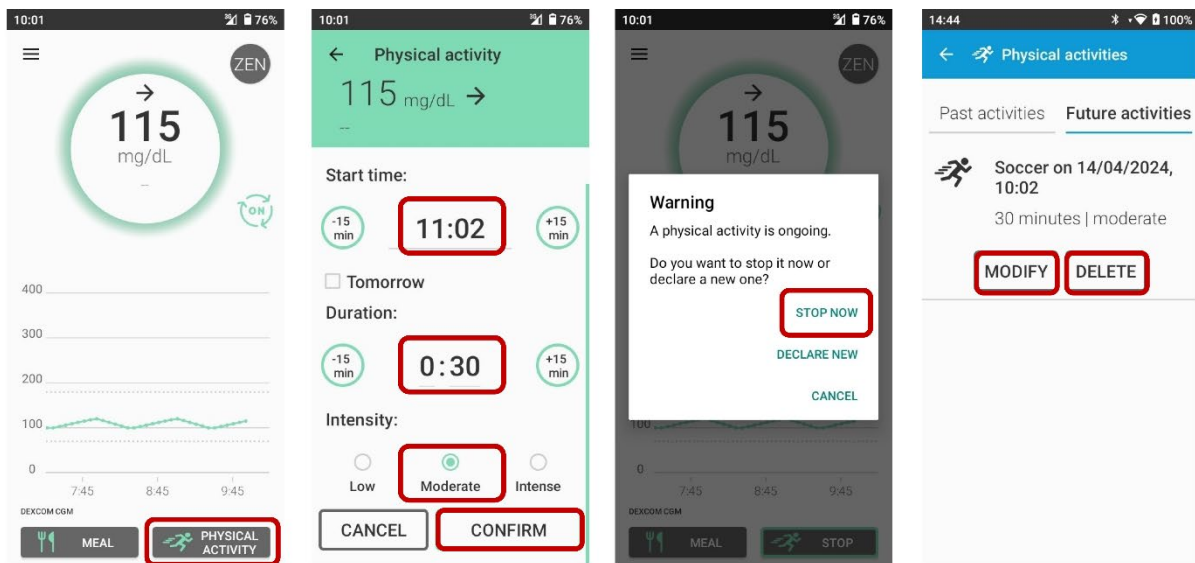
ESM Fig. 2: Recommendations for use of the iLet Bionic Pancreas system to manage glucose outcomes during PA. Consider insulin delivery suspension with or without disconnecting the iLet system 30 min prior to activity to help mitigate hypoglycaemia risk. If ingesting undeclared CHO and disconnecting the iLet before activity, ensure that the device is already suspended and disconnected prior to CHO ingestion. The prandial bolus insulin dose can be reduced only by 'underestimating' CHO (i.e. entering a smaller meal size). SG, sensor glucose. Glucose values: 110 mg/dl = 6.1 mmol/l, 120 mg/dl = 6.7 mmol/l, 126 mg/dl = 7.0 mmol/l, 130 mg/dl = 7.2 mmol/l, 150 mg/dl = 8.3 mmol/l



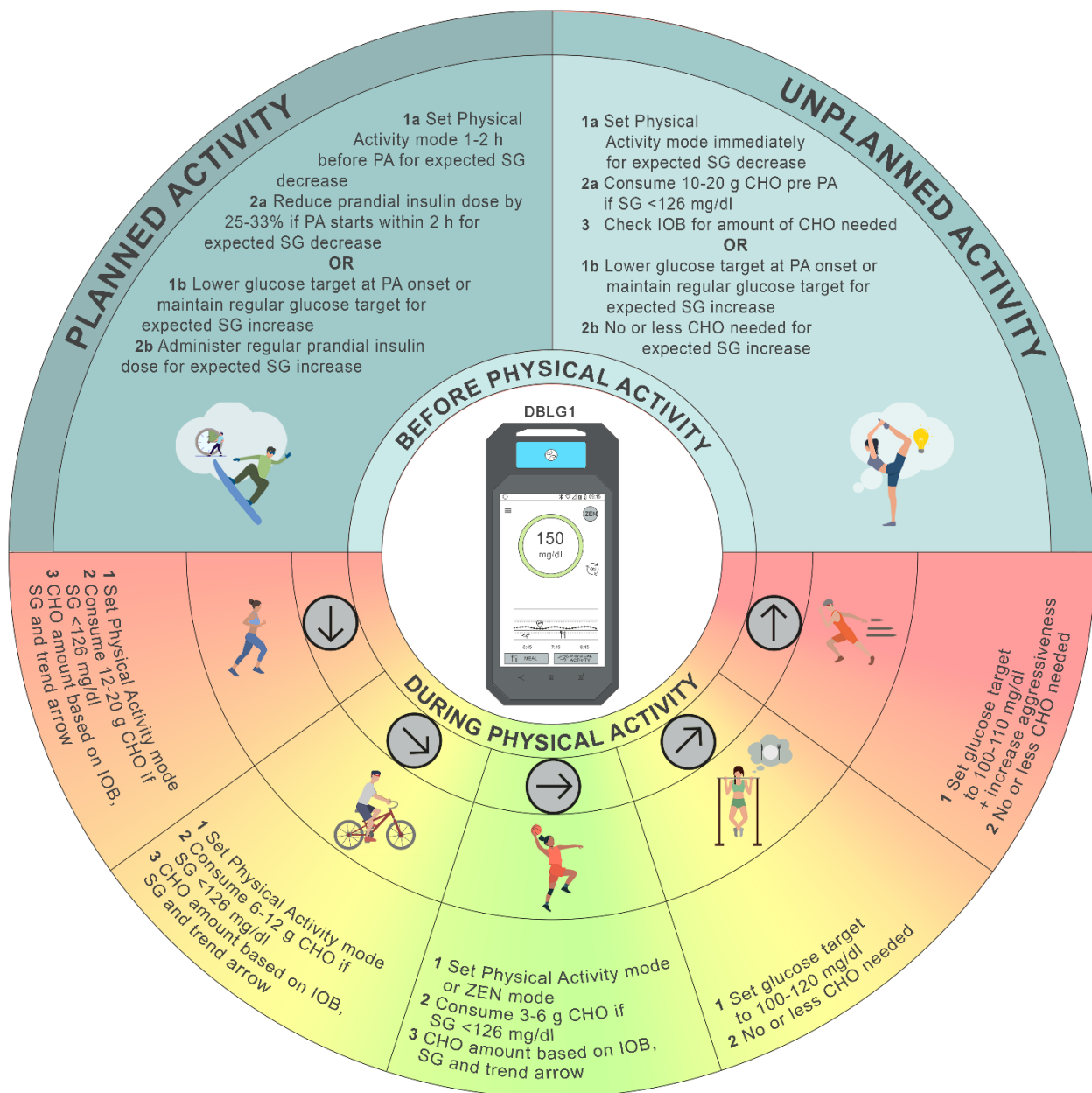
ESM Fig. 3: Illustration of how to set a new personal glucose target and how to set the Ease-off (now or later) mode when using the mylife CamAPS FX system



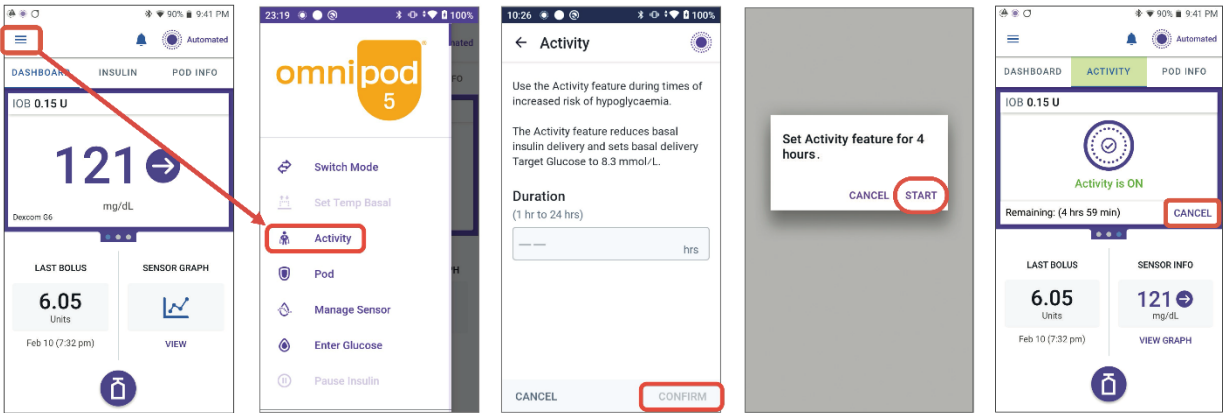
ESM Fig. 4: Recommendations for use of the mylife CamAPS FX system to manage glucose outcomes during PA. Insulin delivery suspension with or without disconnection for prolonged periods (up to 120 min) may be required under some circumstances (e.g. swimming, diving, contact sports), although it is generally not recommended for most activities. SG, sensor glucose. Glucose values: 80 mg/dl = 4.4 mmol/l, 100 mg/dl = 5.6 mmol/l, 120 mg/dl = 6.7 mmol/l, 126 mg/dl = 7.0 mmol/l, 150 mg/dl = 8.3 mmol/l



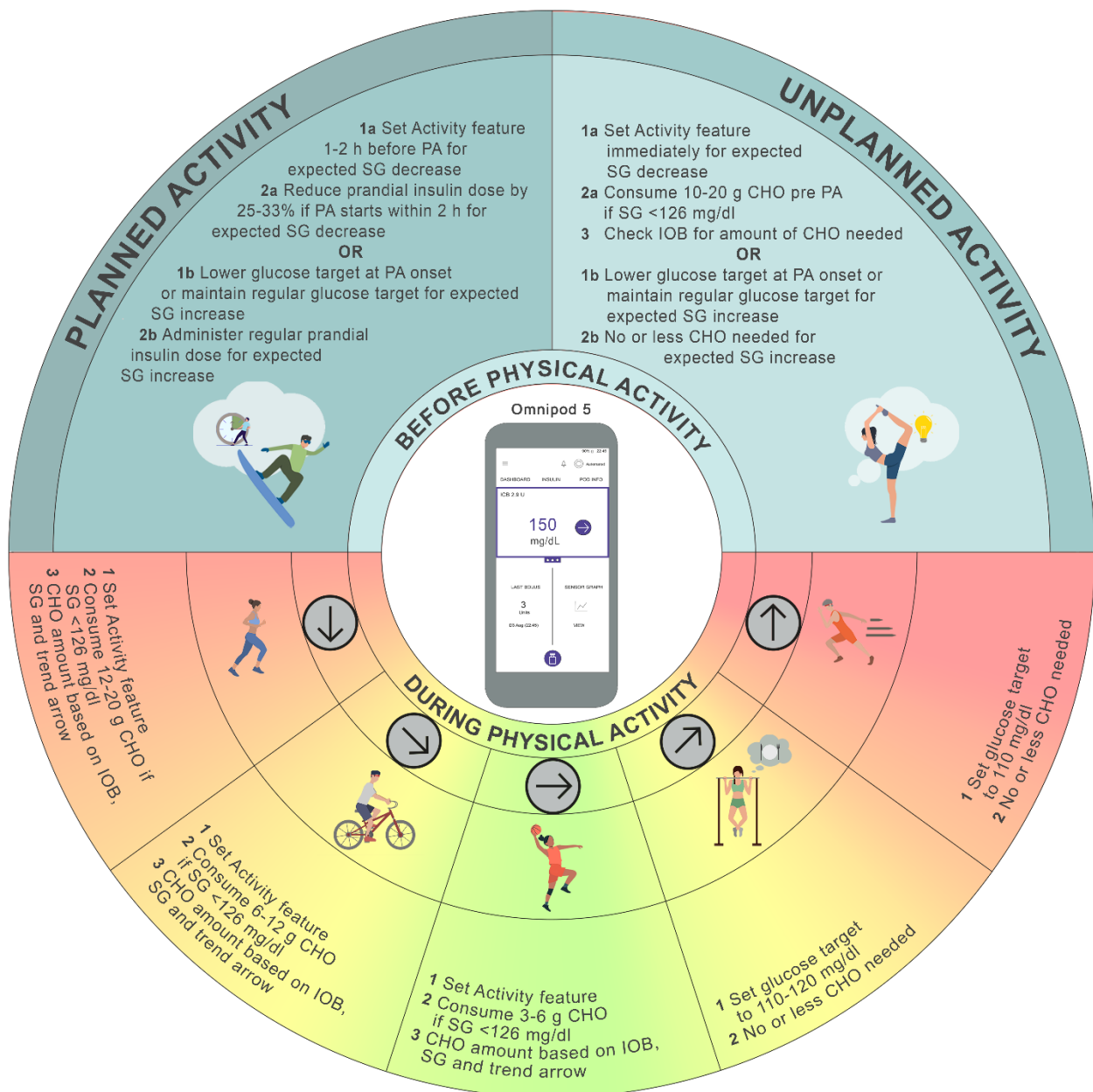
ESM Fig. 5: Illustration of how to start, stop and modify/delete the Physical Activity mode in the DBLG1 system



ESM Fig. 6: Recommendations for use of the DBLG1 system to manage glucose outcomes during PA. Insulin delivery suspension with or without disconnection for prolonged periods (up to 120 min) may be required under some circumstances (e.g. swimming, diving, contact sports), although it is generally not recommended for most activities, as several of these strategies cannot be implemented and/or require modification. SG, sensor glucose. Glucose values: 100 mg/dl = 5.6 mmol/l, 110 mg/dl = 6.1 mmol/l, 120 mg/dl = 6.7 mmol/l, 126 mg/dl = 7.0 mmol/l



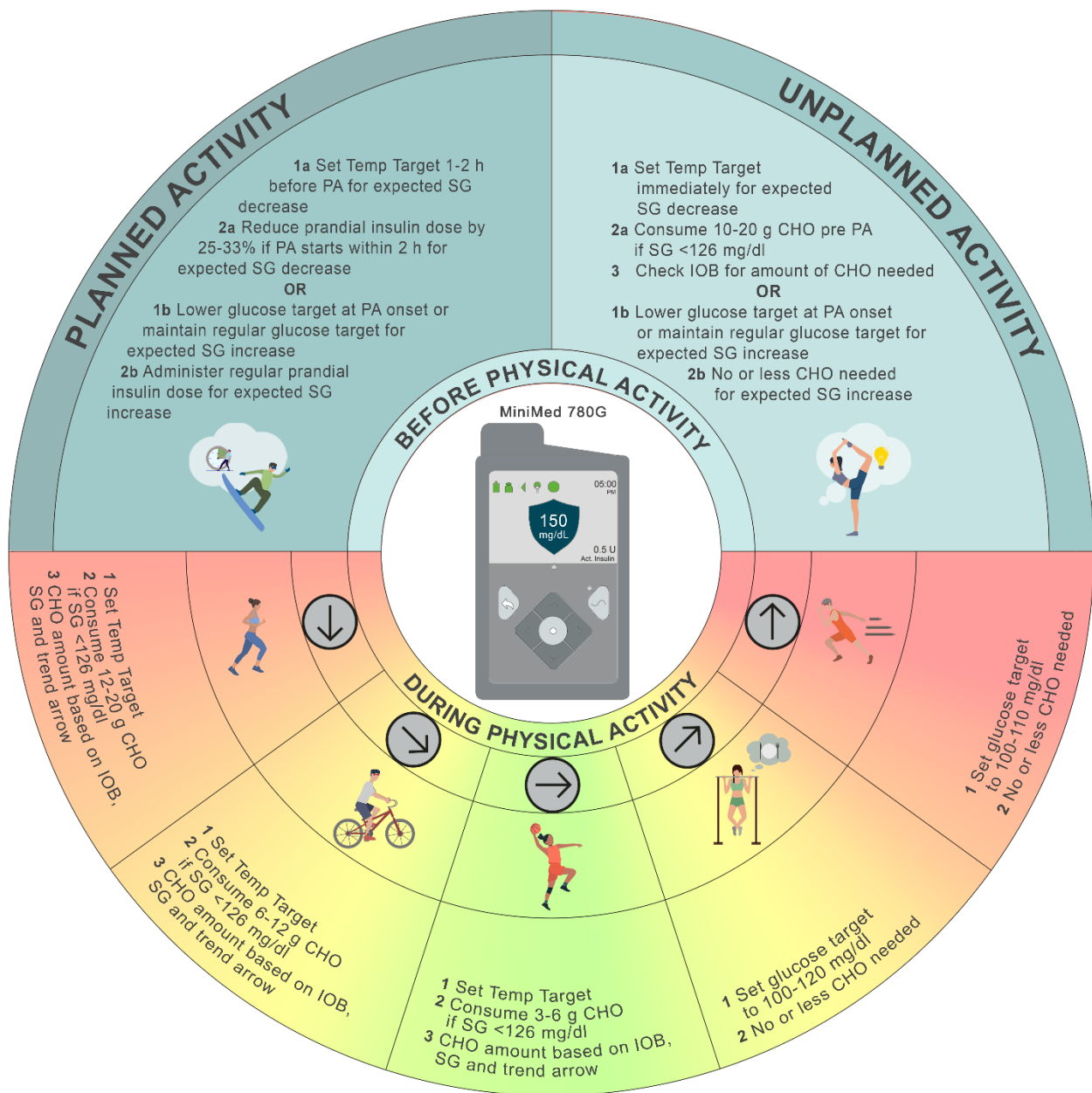
ESM Fig. 7: Illustration of how to set and cancel the Activity feature on the Omnipod 5 system



ESM Fig. 8: Recommendations for use of the Omnipod 5 system to manage glucose outcomes during PA. SG, sensor glucose. Glucose values: 110 mg/dl = 6.1 mmol/l, 120 mg/dl = 6.7 mmol/l, 126 mg/dl = 7.0 mmol/l



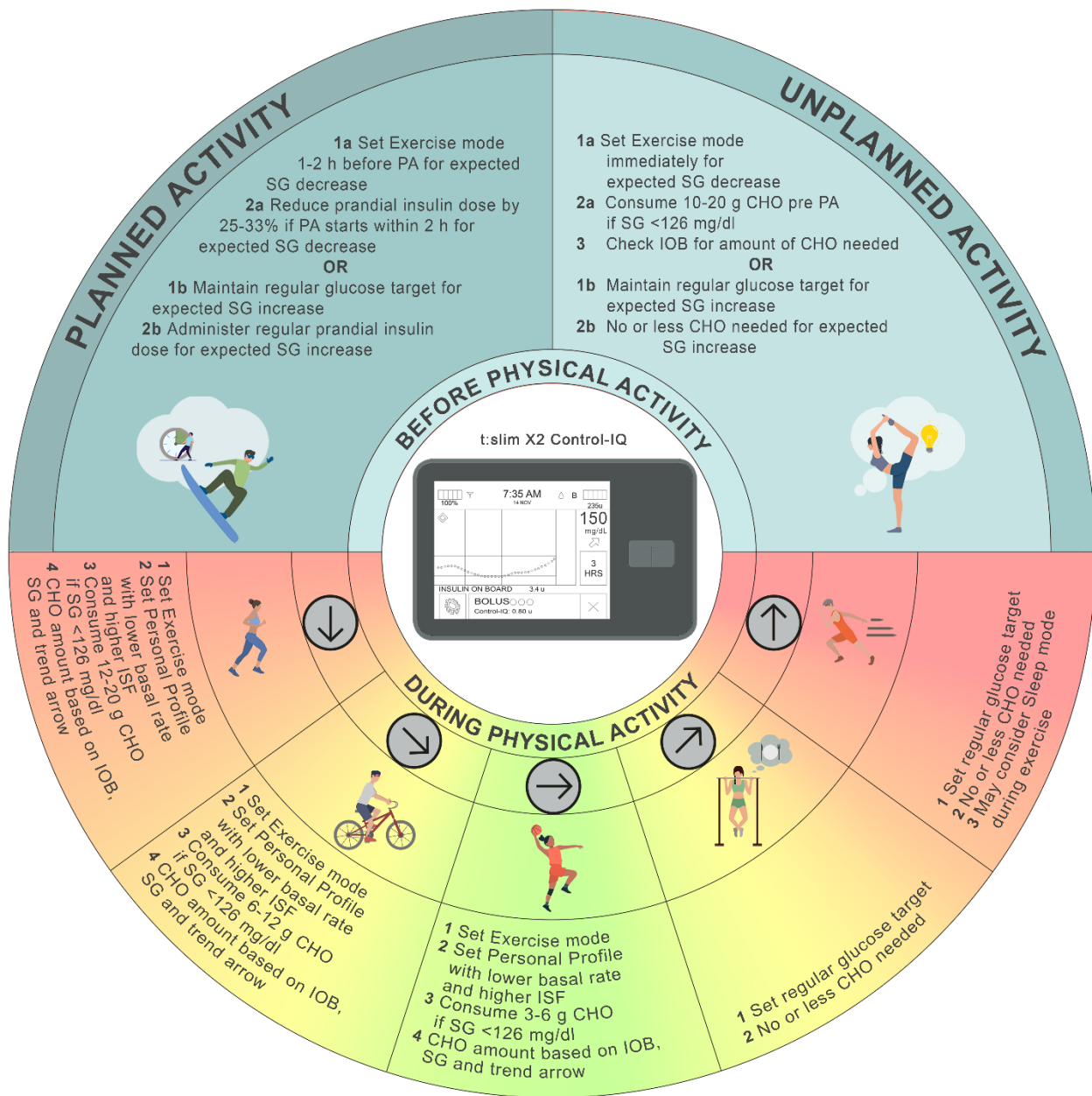
ESM Fig. 9: Illustration of how to set and cancel the Temp Target on the MiniMed 780G system



ESM Fig. 10: Recommendations for use of the MiniMed 780G system to manage glucose outcomes during PA. Insulin delivery suspension with or without disconnection for prolonged periods (up to 120 min) may be required under some circumstances (e.g. swimming, diving, contact sports), although it is generally not recommended for most activities, as several of these strategies cannot be implemented and/or require modification. SG, sensor glucose. Glucose values: 100 mg/dl = 5.6 mmol/l, 110 mg/dl = 6.1 mmol/l, 120 mg/dl = 6.7 mmol/l, 126 mg/dl = 7.0 mmol/l



ESM Fig. 11: Illustration of how to set the Exercise mode on the t:slim X2 Control-IQ system



ESM Fig. 12: Recommendations for use of the t:slim X2 Control-IQ system to manage glucose outcomes during PA. Consider adding a minimal manual bolus dose (e.g. 0.05 U) close to the onset of exercise to block the system from administering auto-correction doses for the next 60 min. Insulin delivery suspension with or without disconnection for prolonged periods (up to 120 min) may be required under some circumstances (e.g. swimming, diving, contact sports), although it is generally not recommended for most activities, as several of these strategies cannot be implemented and/or require modification. SG, sensor glucose. Glucose value: 126 mg/dl = 7.0 mmol/l; ISF, insulin sensitivity factor

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ESM 3: Systematic search strategy: The Use of Automated Insulin Delivery (AID) Around Physical Activity and Exercise in Type 1 Diabetes: A Position Statement of the European Association for the Study of Diabetes (EASD) and the International Society for Pediatric and Adolescent Diabetes (ISPAD). Date last search was performed: 08.06.2024.

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Search	Actions	Details	Query	Results	Time
			diabet* [tw])))) OR ((Bionics [mh] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR (("synthetic pancreas" [tw] AND (insulin [tw] OR diabet* [tw])))) OR ("artificial endocrine pancreas" [tw] AND (insulin [tw] OR diabet* [tw])))) OR ("artificial endocrine pancreas" [tw] AND (insulin [tw] OR diabet* [tw])))) OR ((artificial beta cell* [tw] OR artificial b cell* [tw] OR artificial b-cell* [tw])) OR ((closed- loop* [tw] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR ("closed loop** AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR ("bioartificial pancreas" [tw] OR "bio-artificial pancreas" [tw])) AND (((((((insulin pump [tw])) OR (insulin delivery system* [tw])) OR (insulin [tw])) OR (Infusion Pumps, Implantable [mh])) OR (Insulin Infusion System [mh])) OR (continuous subcutaneous insulin infusion [tw])) OR ((csii [tw])) AND (((((((glucose [tw] AND (sensor* [tw] OR sensing*)) OR ("sensed glucose" [tw])) OR ((CGM [tw])) OR ((CGMS [tw])) OR ((RTCGM [tw])) OR ((RTCGMS [tw])) OR ((ICGM [tw])) AND (((((((Exercise [mh])) OR (Resistance Training [mh])) OR ((High-Intensity Interval Training [mh])) OR ((high-intensity training [tw])) OR ((high intensity training [tw])) OR ((physical activity [tw])) Filters: Full text, English Sort by: Most Recent		
#44	...		Search: (((((((((((((((diabetes mellitus, type 1 [mh])) OR ((type 1 diabetes mellitus [tw])) OR ((type 1 diabetes [tw])) OR ("type i" diabetes mellitus [tw])) OR ("type-i" diabetes mellitus [tw])) OR ("insulin-dependent" diabet* [tw])) OR ((Artificial pancreas [mh])) OR (Bioartificial Organs [mh] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR ((Bionics [mh] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR ("synthetic pancreas" [tw] AND (insulin [tw] OR diabet* [tw])))) OR ("artificial endocrine pancreas" [tw] AND (insulin [tw] OR diabet* [tw])))) OR ("artificial endocrine pancreas" [tw] AND (insulin [tw] OR diabet* [tw])))) OR ((artificial beta cell* [tw] OR artificial b cell* [tw] OR artificial b-cell* [tw])) OR ((closed- loop* [tw] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR ("closed loop** AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR ("bioartificial pancreas" [tw] OR "bio-artificial pancreas" [tw])) AND (((((((insulin pump [tw])) OR (insulin delivery system* [tw])) OR (insulin [tw])) OR (Infusion Pumps, Implantable [mh])) OR (Insulin Infusion System [mh])) OR (continuous subcutaneous insulin infusion [tw])) OR ((csii [tw])) AND (((((((glucose [tw] AND (sensor* [tw] OR sensing*)) OR ("sensed glucose" [tw])) OR ((CGM [tw])) OR ((CGMS [tw])) OR ((RTCGM [tw])) OR ((RTCGMS [tw])) OR ((ICGM [tw])) AND (((((((Exercise [mh])) OR (Resistance Training [mh])) OR ((High-Intensity Interval Training [mh])) OR ((high-intensity training [tw])) OR ((high intensity training [tw])) OR ((physical activity [tw])) Filters: Full text Sort by: Most Recent	156	09:08:19
#43	...		Search: (((((((((((((((diabetes mellitus, type 1 [mh])) OR ((type 1 diabetes mellitus [tw])) OR ((type 1 diabetes [tw])) OR ("type i" diabetes mellitus [tw])) OR ("type-i" diabetes mellitus [tw])) OR ("insulin-dependent" diabet* [tw])) OR ((Artificial pancreas [mh])) OR (Bioartificial Organs [mh] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR ((Bionics [mh] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR ("synthetic pancreas" [tw] AND (insulin [tw] OR diabet* [tw])))) OR ("artificial endocrine pancreas" [tw] AND (insulin [tw] OR diabet* [tw])))) OR ("artificial endocrine pancreas" [tw] AND (insulin [tw] OR diabet* [tw])))) OR ((artificial beta cell* [tw] OR artificial b cell* [tw] OR artificial b-cell* [tw])) OR ((closed- loop* [tw] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR ("closed loop** AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR ("bioartificial pancreas" [tw] OR "bio-artificial pancreas" [tw])) AND (((((((insulin pump [tw])) OR (insulin delivery system* [tw])) OR (insulin [tw])) OR (Infusion Pumps, Implantable [mh])) OR (Insulin Infusion System [mh])) OR (continuous subcutaneous insulin infusion [tw])) OR ((csii [tw])) AND (((((((glucose [tw] AND (sensor* [tw] OR sensing*)) OR ("sensed glucose" [tw])) OR ((CGM [tw])) OR ((CGMS [tw])) OR ((RTCGM [tw])) OR ((RTCGMS [tw])) OR ((ICGM [tw])) AND (((((((Exercise [mh])) OR (Resistance Training [mh])) OR ((High-Intensity Interval Training [mh])) OR ((high-intensity training [tw])) OR ((high intensity training [tw])) OR ((physical activity [tw]))	163	09:08:13

Search	Actions	Details	Query	Results	Time
			[tw] OR artificial b cell* [tw] OR artificial b-cell* [tw])) OR ((closed- loop* [tw] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR (("closed loop*" AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])))) OR (("bioartificial pancreas" [tw] OR "bio-artificial pancreas" [tw])) AND (((((((insulin pump [tw]) OR (insulin delivery system* [tw])) OR ((insulin [tw])) OR ((insulin [tw])) OR ((Infusion Pumps, Implantable [mh])) OR ((Insulin Infusion System [mh])) OR ((continuous subcutaneous insulin infusion [tw])) OR ((csii [tw])) Sort by: Most Recent		
#25	...		Search: (((((((insulin pump [tw]) OR (insulin delivery system* [tw])) OR ((insulin [tw])) OR ((Insulin Pumps, Implantable [mh])) OR ((Insulin Infusion System [mh])) OR ((continuous subcutaneous insulin infusion [tw])) OR ((csii [tw])) Sort by: Most Recent	483,391	09:04:22
#24	...		Search: (csii [tw]) Sort by: Most Recent	1,871	09:03:55
#23	...		Search: (continuous subcutaneous insulin infusion [tw]) Sort by: Most Recent	2,362	09:03:49
#22	...		Search: (Insulin Infusion System [mh]) Sort by: Most Recent	6,630	09:03:42
#21	...		Search: (Infusion Pumps, Implantable [mh]) Sort by: Most Recent	3,860	09:03:31
#20	...		Search: (insulin [tw]) Sort by: Most Recent	479,975	09:03:25
#19	...		Search: (insulin delivery system* [tw]) Sort by: Most Recent	879	09:03:13
#18	...		Search: (insulin pump [tw]) Sort by: Most Recent	3,143	09:03:06
#17	...		Search: (((((((((((diabetes mellitus, type 1 [mh]) OR ((type 1 diabetes mellitus [tw])) OR ((type 1 diabetes [tw])) OR ((type i" diabetes mellitus [tw])) OR ((type-i" diabetes mellitus [tw])) OR ((insulin-dependent" diabet* [tw])) OR ((Artificial pancreas [mh])) OR ((Bioartificial Organs [mh] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])) OR ((Bionics [mh] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])) OR ((synthetic pancreas" [tw] AND (insulin [tw] OR diabet* [tw])) OR ((artificial endocrine pancreas" [tw] AND (insulin [tw] OR diabet* [tw])) OR ((artificial endocrine pancreas" [tw] AND (insulin [tw] OR diabet* [tw])) OR ((artificial beta cell* [tw] OR artificial b cell* [tw] OR artificial b-cell* [tw])) OR ((closed- loop* [tw] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])) OR ((closed loop*" AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])) OR ((bioartificial pancreas" [tw] OR "bio-artificial pancreas" [tw])) Sort by: Most Recent	124,057	09:02:44
#16	...		Search: ("bioartificial pancreas" [tw] OR "bio-artificial pancreas" [tw]) Sort by: Most Recent	299	09:01:47
#15	...		Search: ("closed loop*" AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])) Sort by: Most Recent	2,105	09:01:42
#14	...		Search: (closed-loop* [tw] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])) Sort by: Most Recent	2,087	09:01:36
#13	...		Search: (artificial beta cell* [tw] OR artificial b cell* [tw] OR artificial b-cell* [tw]) Sort by: Most Recent	163	09:01:29
#12	...		Search: ("artificial endocrine pancreas" [tw] AND (insulin [tw] OR diabet* [tw])) Sort by: Most Recent	200	09:01:21
#11	...		Search: ("synthetic pancreas" [tw] AND (insulin [tw] OR diabet* [tw])) Sort by: Most Recent	4	09:01:15
#10	...		Search: (Bionics [mh] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])) Sort by: Most Recent	37	09:01:05
#9	...		Search: (Bioartificial Organs [mh] AND (pancreas [tw] OR insulin [tw] OR diabet* [tw])) Sort by: Most Recent	76	09:00:55
#8	...		Search: (Artificial pancreas [mh]) Sort by: Most Recent	1,040	09:00:46
#7	...		Search: ("insulin-dependent" diabet* [tw]) Sort by: Most Recent	28,634	09:00:38

Search	Actions	Details	Query	Results	Time
#6	...		Search: ("type-i" diabetes mellitus [tw]) Sort by: Most Recent	9,713	09:00:28
#5	...		Search: ("type i" diabetes mellitus [tw]) Sort by: Most Recent	9,713	09:00:18
#4	...		Search: (type 1 diabetes [tw]) Sort by: Most Recent	104,131	09:00:08
#3	...		Search: (type 1 diabetes mellitus [tw]) Sort by: Most Recent	14,466	08:59:52
#2	...		Search: (diabetes mellitus, type 1 [mh]) Sort by: Most Recent	88,707	08:59:39

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