

Electronic supplementary material to The management of type 1 diabetes in adults. The updated 2026 consensus report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD)

Electronic supplementary material 1: General principles to maintain safe glucose levels during and after exercise^{1,2}

- Target glucose levels should be between 7-10 mmol/l (126–180 mg/dl) during exercise.
- Consider increasing this range for individuals at increased risk of hypoglycaemia and/or with impaired hypoglycaemia awareness.
- Do not exercise if hyperglycaemic and ketones are >1.5 mmol/l or if there is moderate ketonuria
- Treat hypoglycaemia before and during exercise
- Take regular carbohydrate during exercise
 - 1.0–1.5 g/kg body weight per h of intense physical activity during the peak action of an insulin bolus that has not been reduced
 - 0.2–0.5 g/kg body weight per h of intense physical activity during the peak action of an insulin bolus that has been reduced or that was administered more than 2 h before starting physical activity
- Have the last meal and insulin dose 2-3 h prior to exercise
- For those using multiple daily injections:
 - Reduce the insulin dose of a rapid-acting insulin analogue if administered within 2-3 h of the physical activity and the planned activity is longer than 30 minutes.
 - The bolus reduction ranges from 25–75% and depends on the timing and intensity of the physical activity.
 - Reduce the meal bolus at the next meal by up to 50%
 - A reduction of NPH or long-acting analogue basal insulin should be considered during multi-hour or all-day endurance effort or if exercising in the late afternoon or evening
 - A reduction in the dose of ultra-long-acting insulin analogues should be considered before multi-day activities.
- For those using insulin pumps without automation or cannot adjust any settings within the system:
 - Reduce the basal insulin rate 2-h before the start of physical activity if the planned activity is longer than 30 minutes.

- The bolus reduction should be made ranges from 20–80% and depends on the timing and intensity of the physical activity.
- If the insulin pump is detached during physical activity, the pump's operation should be suspended.
- A reduction in basal rate should be considered after exercising in the late afternoon or evening
- For those using most automated insulin delivery systems
 - Advice depends on the type of device used and should be personalised.
 - Where possible, plan for physical activity when insulin on board is low, such as before meals or in the fasted state
 - For planned physical activity, set a higher glucose target 1–2 h before activity if a decrease in glucose or stable glucose is expected during the activity (aerobic activity) or maintain a regular (or lower) glucose target if a glucose increase is expected (anaerobic exercise)
 - If physical activity occurs within 2 h of a carbohydrate-rich meal, reduce the prandial bolus insulin dose by 25–33% if a decrease in glucose is expected during the activity
 - For unplanned physical activity, set a higher glucose target immediately at the onset of activity if a decrease in glucose or stable glucose is expected and consume 10–20 g of fast-acting carbohydrate if sensor glucose is <7.0 mmol/l (126 mg/dl)
 - If the glucose level is below target at the onset of exercise, consume carbohydrate 5–10 minutes prior to the physical activity. These amounts will usually be smaller when an AID system is being used
 - Carbohydrate loading in advance of activity (earlier than 20 min) may result in a rise in glucose and trigger an AID-increase in basal rate or auto-correct bolus dose that may increase the risk of hypoglycaemia during or immediately after the activity.

References

1. Adolfsson P, Taplin CE, Zaharieva DP, et al. ISPAD Clinical Practice Consensus Guidelines 2022: Exercise in children and adolescents with diabetes. *Pediatr Diabetes* 2022; **23**(8): 1341-72.
2. Moser O, Zaharieva DP, Adolfsson P, et al. 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). *Diabetologia* 2025; **68**(2): 255-80.

Electronic supplementary material 2: Selection of validated psychosocial measures for use in people with type 1 diabetes*

Measure Category	Measure	Number of Items	Links
Depression & Depressive Symptoms	Patient Health Questionnaire 9 (PHQ-9)	9	professional.diabetes.org/sites/default/files/media/ada_mental_health_toolkit_questionnaires.pdf
	Patient Health Questionnaire 2 (PHQ-2)	2	https://med.stanford.edu/content/dam/sm/ppc/documents/Mental_Health/PHQ-2_English.pdf
	Center for Epidemiologic Studies-Depression (CES-D)	20	https://nida.nih.gov/sites/default/files/Mental_HealthV.pdf
	Geriatric Depression Scale	15	https://integrationacademy.ahrq.gov/sites/default/files/2020-07/Update_Geriatric_Depression_Scale-15.pdf
Emotional Well-Being	World Health Organization Wellbeing Index (WHO-5)	5	https://www.who.int/publications/m/item/WHO-UCN-MSD-MHE-2024.01
Anxiety	Generalized Anxiety Disorder Seven (GAD-7)	7	professional.diabetes.org/sites/default/files/media/ada_mental_health_toolkit_questionnaires.pdf
Diabetes Distress	Diabetes Distress Scale (T1-DDAS)	28	https://diabetesdistress.org/
	Diabetes Distress Scale (T1-DDAS) Short Form	7	https://diabetesdistress.org/dd-assess-score-1/
	Diabetes Distress Scale	2	https://diabetesdistress.org/dd-assess-score-1/
	Problem Areas in Diabetes (PAID)	20	professional.diabetes.org/sites/default/files/media/ada_mental_health_toolkit_questionnaires.pdf
	Problem Areas in Diabetes (PAID) Short Form	5 or 1	https://www.vumc.com/departments/diabetes-psychology.htm
	Well-being Questionnaire (W-BQ)	12	https://healthpsychologyresearch.com/guidelines/w-bq12-well-being-questionnaire
Hypoglycemia Fear	Hypoglycemia Fear Survey-II (HFS-II W)	33	professional.diabetes.org/sites/default/files/media/ada_mental_health_toolkit_questionnaires.pdf
	Subscale within T1-DDAS	2	https://diabetesdistress.org/dd-assess-score-1/
Disordered Eating	Diabetes Eating Problems Survey-Revised (DEPS-R)	16	https://insideoutinstitute.org.au/resource-library/diabetes-eating-problem-survey-revised-deps-r
Cognition	Montreal Cognitive Assessment (MoCA)	30	https://mocacognition.com/the-moca-test/
	Mini-Cog	3 and clock drawing	https://mini-cog.com/
	Mini-Mental State Examination	11	https://eclass.upatras.gr/modules/document/file.php/SLT184/mmse.pdf
	Functional Activities Questionnaire	10	https://www.healthcare.uiowa.edu/familymedicine/fpinfo/docs/functional-activities-assessment-tool.pdf
Social Determinants of Health (Social Drivers of Health & Health-Related Social Needs)	PRAPARE: Protocol for Responding to and Assessing Patients' Assets, Risks and Experiences	21	https://prapare.org/the-prapare-screening-tool/
	Centers for Medicare and Medicaid Services (CMS; USA)	5 domains	Required domains are food insecurity, interpersonal safety, housing insecurity, transportation insecurity, and utilities.
	World Health Organization (WHO)	5 domains	https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1

* Most of the tools listed here are freely available for clinical use. Clinicians are advised to check for licenses and validated linguistic versions. MAPI Trust offers an overview of diabetes specific measures.

<https://eprovide.mapi-trust.org/advanced-search?search=type%20%20diabetes>