

# Diagnosis, Therapy and Follow-Up of Diabetes Mellitus in Children and Adolescents

## Authors

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## Bibliography

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## Causes and Background

The improvement of the care of children and adolescents with diabetes mellitus is an essential task of the Working Group for Paediatric Diabetology/Arbeitsgemeinschaft für Pädiatrische Diabetologie (AGPD).

In order to meet the needs of a chronic disease in childhood and adolescence, specific aspects of this stage of life must be taken into account.

The present recommendations are addressed to all professional groups that care for and support children and adolescents with

diabetes and their families, as well as to higher-level organisations (e. g. health insurance companies) that are involved with or affected by the disease.

In accordance with the specifications of the health ministers of the federal German states as well as the current practice of many clinics, these paediatric guidelines are valid until the age of up to 18 years.

In individual clinical cases, however, these guidelines can also be extended to apply to early adulthood.

## Epidemiology and Types of Diabetes in Childhood and Adolescence

### Type 1 diabetes

Type 1 diabetes is still the most common metabolic disease in children. According to current estimates, 15 600 to 17 400 children and adolescents aged 0–14 years live with type 1 diabetes in Germany [Rosenbauer et al. 2013].

At the beginning of the millennium, 21 000 to 24 000 children and adolescents aged 0–19 years were affected [Rosenbauer et al. 2002]. This figure is currently estimated at around 30 000 to 32 000 [Rosenbauer et al. 2012].

In the 1990s, average annual new illness rates (incidence rates) were reported between 12.9 (95 % confidence interval 12.4–13.4) and 14.2 (95 % confidence interval 12.9–15.5) per 100 000 children aged 0–14 years and 17.0 (95 % confidence interval 15.2–18.8) per 100 000 children aged 0–19 years [Neu et al. 2001]; [Rosenbauer et al. 2002]; [Neu et al. 2008]. The incidence rate has increased by 3–4 % per year [Ehehalt et al. 2008]; [Neu et al. 2013]. Compared to the early 1990s, the new illness rate for 0–14-year-olds has now doubled and is currently 22.9 (95 % confidence interval 22.2–23.6). The increase in incidence rates especially affects the younger age groups.

### Type 2 diabetes

Parallel to the increase in the prevalence of excess weight and adiposity in childhood and adolescence [Kurth and Schaffrath (2007)]; [Kromeyer-Hauschild et al. 2001], the incidence of type 2 diabetes has increased in this age group. [Initial population-based estimates of type 2 Diabetes Prevention Trial-Type 1 Diabetes Study Group (2002)] showed an incidence of 1.57 per 100 000 (95 % confidence interval 0.98–2.42) [Rosenbauer et al. 2003]. [Studies carried out in Mann et al., (2004)] showed that type 2 diabetes in Germany occurs in 0 to 20-year-olds with a prevalence of 2.3 per 100 000 [Neu et al. 2005]. A second cross-sectional survey in Baden-Württemberg conducted in 2016 confirmed the relatively low and constant incidence of 2.4 per 100 000 [Neu et al. 2017].

## Risk Factors, Prevention and Early Detection of Diabetes

According to the current guidelines of the International Pediatric Diabetes Association/Internationalen Pädiatrischen Diabetesgesellschaft ISPAD, the progression of type 1 diabetes has recently been divided into 4 stages [Couper et al., (2018)]. Stage 1, the beginning of type 1 diabetes according to the new classification, is when 2 or more diabetes-specific autoantibodies are detectable but children and adolescents are completely asymptomatic. If glucose tolerance is impaired, this corresponds to stage 2. Stage 1 and stage 2 can precede months and years of clinical manifestation. Stage 3 is when there is a manifestation and stage 4 is the case of a type 1 diabetic who has lived with the disease for some time.

Measures to maintain beta cell function can start before the onset of islet autoimmunity (early stage 1, primary prevention), after the development of autoantibodies but before clinical symptoms (stages 1 and 2) or rapidly after the manifestation of type 1

diabetes (stage 3). The progression of type 1 diabetes with proven autoantibodies occurs more rapidly with seroconversion to islet autoimmunity before the 3<sup>rd</sup> year of life and in children with an HLA-DR3/DR4-DQ8 genotype [Ziegler et al., (2013)].

The 5 and 10-year risk of type 1 diabetes manifestation in children who show multiple autoantibodies at the age of 5 years or earlier is 51 and 75 %, respectively [Danne et al., (2018)], German Health Report Diabetes/Dt. Gesundheitsbericht Diabetes].

### Type 1 diabetes

The diagnosis of type 1 diabetes is based on clinical symptoms and blood glucose monitoring. In case of doubt, further parameters can be used for diagnosis. These include:

- Autoantibodies associated with diabetes (ICA, GAD65, IA-2, IAA, ZnT8),
- An oral glucose tolerance test, and
- Determination of HbA1c [Ehehalt et al. 2010]; [Mayer-Davis et al., (2018)].

10–15 % of all children and adolescents under the age of 15 with type 1 diabetes have first-degree relatives with diabetes and thus a positive family history [Rosenbauer et al. 2003]; [Scottish Study Group for the Care of the Young Diabetic (2001)]. The risk of developing diabetes is 3 times higher for children with a father suffering from diabetes than for children with a mother suffering from diabetes [Gale and Gillespie (2001)]. While antibodies and other markers might provide a prediction and risk calculation regarding the occurrence of diabetes, there are no effective prevention strategies that could prevent the manifestation of diabetes [Rosenbloom et al. 2000]; [Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council NHMRC (2005a)].

A general screening for type 1 diabetes should therefore not be performed in the general population or in high-risk groups among children and adolescents [Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council NHMRC (2005b)]. According to the latest recommendations gleaned from scientific studies, screening and intervention in the absence of symptoms of type 1 diabetes remain reserved [Couper et al., (2018)].

### Type 2 diabetes

An oral glucose tolerance test for the early detection of type 2 diabetes should be performed as of age 10 in cases of excess weight (BMI > 90<sup>th</sup> percentile) and the presence of at least 2 of the following risk factors:

- Type 2 diabetes in 1<sup>st</sup> or 2<sup>nd</sup> degree relatives,
- Belonging to a group with increased risk (e. g. East Asians, African Americans, Hispanics),
- Extreme obesity (BMI > 99.5<sup>th</sup> percentile) or
- Signs of insulin resistance or changes associated with it (arterial hypertension, dyslipidaemia, elevated transaminases, polycystic ovarian syndrome, acanthosis nigricans)

[Working Group for Obesity in Childhood and Adolescence (AGA) 2008/Arbeitsgemeinschaft Adipositas im Kindes- und Jugendalter AGA (2008)].

## Therapy for Type 1 Diabetes

### Start of therapy

Insulin therapy should be initiated immediately after the diagnosis of type 1 diabetes, as the child's metabolism can deteriorate rapidly. A diabetes team experienced with children should be called in as soon as possible [Bangstad et al. 2007].

### Therapy goals

Initial treatment and long-term care should be carried out by a team experienced in paediatric diabetology continuously from age 1–18, and, in certain cases, also up to the age of 21. Specialised care has been shown to contribute to a reduction in hospital days and readmissions, to a lower HbA1c value, better disease management and fewer complications [Cadario et al. 2009]; [Pihoker et al. 2014]; Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council NHMRC (2005c)].

The treatment of type 1 diabetes by the treatment team should include:

- Insulin therapy,
- Individual metabolic self-monitoring,
- Age-adapted structured training as well as
- Psychosocial care for the affected families.

The following medical goals are in the foreground when caring for paediatric patients with diabetes mellitus [Danne et al. 2014]; [Ziegler and Neu (2018)]: avoidance of acute metabolic lapses, prevention of diabetes-related microvascular and macrovascular secondary diseases and normal physical development (growth in height, weight gain, begin of puberty). The patient's psychosocial development should be affected as little as possible by diabetes and its therapy, and integration and inclusion in day care, school and vocational training should be ensured.

Individual therapy goals should be formulated together with the child or adolescent and his or her family (HbA1c value, blood glucose target ranges, behavioural changes that come with risk-taking lifestyles, integration efforts, etc.).

The HbA1c target value of <7.5% was modified in 2018 by the ISPAD to a new target value of <7.0%, the ADA recommendations still lie at <7.5%, whereas the English NICE recommendations assume a target value of <6.5% [DiMeglio et al., (2018)].

An additional parameter for evaluating the metabolic state is the time spent in the target range (TIR = time in range). As a rule, the target range is defined as 70–180 mg/dl. An individual goal for the duration of the TIR is recommended [Danne et al., (2017)]; [Battelino et al., (2019)].

Preprandial glucose values should be between 70 and 130 mg/dl (4.0–7.0 mmol/l) and postprandial values between 90 and 180 mg/dl (5.0–10.0 mmol/l). Values of 80–140 mg/dl (4.4–7.8 mmol/l) are recommended at bedtime [DiMeglio et al., (2018)].

The average frequency of glucose control should be between 5 and 6 times a day but can be significantly higher in individual cases [Ziegler et al. 2011].

### Continuous treatment of type 1 diabetes

The continuity of the treatment of diabetes mellitus of a child or adolescent with diabetes, both over time and during different phases of life and development, is decisive for ensuring a metabolic situation as close as possible to normoglycaemia and an unencumbered psychosocial development.

### Care of children in day cares and schools

Children with diabetes should be cared for in day cares, regular schools and after-school centres [Hellems and Clarke (2007)]. The right to inclusion is laid down in § 53 and § 54 of the German Social Code Book XII/Sozialgesetzbuch XII. This provides the basis for the assumption of costs for age-appropriate care.

An individual plan should be created for each institution which includes the frequency and intervention limits of blood glucose measurements, the delivery of insulin (mode, time, dose calculation), defining of mealtimes, symptoms and management of hypoglycaemias and hyperglycaemias [American Diabetes Association ADA (2015)]. In addition to children, adolescents and their parents, all caregivers in the social environment must be trained to enable inclusion [Ziegler and Neu (2018)].

### Support during the transition to young adulthood

The transition from paediatric to adult care affects young people with diabetes aged 16–21 years in a life phase of general upheaval and should therefore be accompanied. Various models (transitional consultations, structured paediatric/internal medicine transition, etc.) are practised [Nakhla et al. 2008]; Australian Paediatric Endocrine Group et al. 2005; [Court et al., (2008)].

### Care in case of illness and preventing illness risks

In the case of serious illnesses or perioperatively, children with diabetes should be referred to an experienced centre with well-trained staff. The paediatric diabetologist should also be consulted [Brink et al. 2007].

Under no circumstances should insulin be completely omitted in the case of low glucose levels or refusal to eat. The administration of carbohydrates is necessary in order to avoid substrate deficiency and ketone body formation. The possibility of measuring  $\beta$ -hydroxybutyrate should be provided [Laffel et al., (2018)].

Children with diabetes mellitus should be vaccinated according to STIKO recommendations.

### Diabetes treatment during physical activity/sports

Regular exercise should be a matter of course for children and adolescents with diabetes and improves metabolic control.

Regular swimming has been shown to significantly reduce HbA1c [Sideravice et al. 2006].

Since blood glucose is lowered by energy consumption during physical activity, the risk of hypoglycaemia is increased. The strongest predictor for hypoglycaemia is the initial glucose value, which should be at least 120 mg/dl (6.6 mmol/l); otherwise additional carbohydrates may be required [Tansey et al. 2006]. Individual therapy plans with insulin dose adjustment and corresponding behavioural rules should be put together for each patient [Adolfsson et al., (2018)].

## Insulin treatment

The standard treatment for paediatric patients with type 1 diabetes is intensified insulin therapy [Danne et al., (2018)].

All insulin therapy should be carried out as part of comprehensive diabetic care and with the support of the family.

Insulin therapy should be individually tailored to each child [Diabetes Control and Complications Trial Research Group 1995]; [White et al. 2008]; [Nathan et al. 2005]; [Musen et al. 2008].

Human insulin or insulin analogues should be used for paediatric patients [Bangstad et al. 2007]; [Danne et al. 2005]; [Mortensen et al. 2000]; [Deeb et al. 2001]; [Plank et al. 2005]; [Simpson et al. 2007].

Normal insulin should be used for intravenous insulin treatment.

## Rapid-acting insulin and insulin analogues (prandial substitution)

There are differences between rapid-acting human insulin and fast-acting insulin analogues in the onset and duration of action in children and can be used flexibly for prandial substitution in children depending on the situation [Danne et al. 2005]; [Mortensen et al. 2000].

Rapid-acting insulin analogues should be used for insulin pump therapy.

## Long-acting insulin and insulin analogues (basal substitution)

Both NPH insulin and long-acting insulin analogues can be used individually for basal insulin substitution in children [Danne et al. 2003]; [Danne et al. 2008]; [Thisted et al. 2006]; [Robertson et al. 2007]; [Danne et al. 2013]; [Thalange et al. 2015].

## Insulin pump therapy

Insulin pump therapy for children and adolescents is both safe and effective. It has a positive effect on the frequency of hypoglycaemia, ketoacidosis and the metabolism [Karges et al., (2017)]. Particularly in young children, pump therapy enables better adjustment of the insulin dose, especially at night, thus helping to prevent hypoglycaemias. Insulin pump therapy is recommended for the following indications:

- Small children, especially new-borns, infants and pre-schoolers,
- Children and adolescents with a marked increase in blood glucose in the early morning hours (Dawn phenomenon),
- Severe hypoglycaemias, recurrent and nocturnal hypoglycaemias (despite intensified conventional therapy = ICT),
- HbA1c value outside target range (despite ICT),
- Severe blood glucose fluctuations despite ICT independent of the HbA1c value,
- Incipient microvascular or macrovascular secondary diseases,
- Limitation of the quality of life through previous insulin therapy
- Children with a great fear of needles,
- Pregnant adolescents (ideally before conception in the case of a planned pregnancy) as well as
- Competitive athletes [Phillip et al. 2007].

## Continuous glucose monitoring (CGM), sensor-augmented insulin therapy (SaT) and sensor-augmented pump therapy (SaP)

CGM systems have been approved and can be prescribed for children and adolescents. They are available in the form of rt (real-time) CGM systems and in the form of isc (intermittent scanning) CGM systems. They can be used in combination with ICT (sensor-augmented insulin therapy = SaT). Some CGM systems can be used together with an insulin pump, or the insulin pump can serve as a monitor for CGM data. This combination (CSII + CGM) is now called sensor-augmented pump therapy SaP. In addition, there is the possibility of switching off the basal rate when the tissue glucose reaches a critical limit (SaP + LGS = low-glucose suspend). A further development of the LGS already interrupts the supply of insulin if it predicts that hypoglycaemia will occur in the foreseeable future (predicted or predictive insulin switch-off, predictive low-glucose suspend = PLGS). The combination of both systems is called sensor-integrated pump therapy (SiP). In other countries, pump models in combination with a CGM system are already available that allow insulin dose adjustment at both high and low glucose levels through automatic basal rate adjustment.

CGM should be used for children and adolescents with type 1 diabetes and insulin pump therapy

- To reduce the hypoglycaemia rate (frequency, duration, depth) or
- In cases of recurrent nocturnal hypoglycaemia or
- In cases of a lack of hypoglycaemia perception or
- In cases of severe hypoglycaemia or
- For improvement of metabolic control without a simultaneous increase in hypoglycaemias or
- To reduce pronounced glucose variability

[Bergenstal et al. 2013]; [Ly et al. 2013]; [Maahs et al. 2014].

CGM should be used in paediatric patients with type 1 diabetes who have not achieved their HbA1c targets after having considered and used other measures and training courses for optimizing metabolic control [Battelino et al. 2012]; [Bergenstal et al. 2010]; [Danne et al., (2017)]; [Sherr et al., (2018)].

## Nutritional recommendations

Nutritional counselling for children and adolescents with diabetes is an important part of a comprehensive therapy training plan and should include the following components:

- Information on the blood glucose efficacy of carbohydrates, fats and proteins,
- Strengthening healthy diets as part of family meals and in public institutions: regular, balanced meals and snacks (fruit, vegetables, raw vegetables), prevention of eating disorders (especially uncontrolled, binge eating) and the prevention of excess weight,
- Consideration of cultural eating habits,
- Enough energy for age-appropriate growth and development,
- Working toward a normal BMI, which includes regular physical activity,
- A good balance between energy intake and consumption in accordance with the insulin profiles,
- Nutrition during illness and sport and
- Reducing the risk of cardiovascular disease.

Nutrition specialists (dietitians/ecotrophologists) with an in-depth knowledge of paediatric and juvenile nutrition and insulin therapy should provide this counselling [Smart et al. 2014]; [Craig et al. 2011].

Nutritional recommendations should include all dietary components and their share in daily energy intake [German Nutrition Society/Deutsche Gesellschaft für Ernährung DGE (2015)].

## Diabetes training

Patient training is an essential part of diabetes therapy. It cannot be successful without adequate, individualised medical treatment [Bloomgarden et al. 1987]; [de Weerd et al. 1991].

Children, adolescents and their parents or other primary caregivers should have continuous access to qualified training starting from the time of diagnosis onwards [Craig et al. 2011]; [Bundesärztekammer BÄK, Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften AWMF, Kassenärztliche Bundesvereinigung KBV (2012)]; [Canadian Diabetes Association Clinical Practice Guidelines Expert Committee 2013]; [Kulzer et al., (2013a)]; [Martin et al. 2012]; [Lange et al. 2014]; [Haas et al. 2014]. Training should be offered to caregivers in institutions (e. g. teachers in schools, educators in day cares, nurseries, after-school centres or group homes) [Hellems and Clarke (2007)]; [Lange et al. 2012]; [Clarke et al. 2013].

The training should be conducted by a multi-professional diabetes team with proper knowledge of age-specific needs, possibilities and requirements that current diabetes therapies place on patients and their families.

All team members should participate in the training and work toward formulating and achieving uniform therapy concepts and goals [Swift et al. 2010]; [Lange et al. 2014]; [Cameron et al. 2013].

The learning process should be accompanied by evaluated training materials that are oriented towards the cognitive development and needs of children and adolescents. The same applies to training materials for parents which should include parental educational tasks and age-specific diabetes therapy of their children [Martin et al. 2012]; [Lange et al. 2012]; [Lange et al. 2014].

Diabetic training is a continuous process and can only be successful through repeated needs-based offers (at least every 2 years) during long-term care. New therapy concepts, e. g. the start of insulin pump therapy or continuous glucose monitoring (CGM) and new life stages (e. g. school enrolment) should be accompanied by additional training. Other diseases (e. g. celiac disease or ADHD) or acute complications (e. g. DKA, severe hypoglycaemias) or psychological problems require personalised treatment [Jacobson et al. 1997]; [Haas et al. 2014]; [Lange et al. 2014]; [Delamater et al. 2014].

## Rehabilitation

In-patient rehabilitation can be carried out:

- In the case of persistently poor skills in dealing with diabetes,
- If there are diabetic secondary complications which are either already present or threaten to arise in the short-term,
- After the in-patient primary therapy of the newly diagnosed diabetes mellitus if initial training cannot be provided near the patient's home (in the form of follow-up treatment),

- In the case of long-term inadequate metabolic control under out-patient care conditions, e. g. recurrent hypoglycaemia or ketoacidosis, and
- In the event of serious disruptions to activities and/or to the child or adolescent being able to participate in age-appropriate activities or in everyday life, e. g. frequent sick days (§ 4 SGB 9; Federal Working Group for Rehabilitation/ Bundesarbeitsgemeinschaft Rehabilitation)

[Federal Working Group for Rehabilitation/Bundesarbeitsgemeinschaft für Rehabilitation BAR (2008)]; [Fröhlich et al. 2008]; [German Pension Insurance Association/Deutsche Rentenversicherung Bund 2009]; [German Society for Paediatric Rehabilitation and Prevention/Deutsche Gesellschaft für pädiatrische Rehabilitation und Prävention 2007]; [Stachow et al. 2001].

## Psychological and Social Risks, Comorbidities and Interventions

In the case of a diabetes diagnosis, a history of the psychosocial family situation should be recorded. The families should also receive psychosocial counselling and the interdisciplinary team should provide them with therapeutic aids for diabetes management. The psychological situation of the parents and other primary caregivers also needs to be taken into account [Hürter and Otten (1991)]; [Sundelin et al. 1996]; [Delamater et al. 1990]; [Craig et al. 2011]; [Delamater et al. 2014]; [Forsander et al. 1998]; [Sullivan-Bolyai et al. 2011]; [Forsander et al. 2000]; [Zenlea et al. 2014].

The current psychosocial situation and possibly stressful life events should be continuously recorded within the framework of long-term care (intellectual, academic, emotional and social development) and taken into account in therapy planning.

For this reason, it is important for social workers and psychologists with diabetes-specific expertise to be an integral part of the interdisciplinary diabetes team [Silverstein et al. 2005]; [Craig et al. 2011]; [de Wit et al. 2008]; [Delamater et al. 2014]; [Kulzer et al., (2013a)]; [Hilliard et al. 2011]; [Haas et al. 2014]; [de Wit et al., (2012)].

Particularly in adolescents, signs of eating disorders and mood affective disorders (e. g. anxiety, depression, adjustment disorders) should be monitored and professional help sought and carried out in a timely manner.

If a psychiatrically relevant disorder is present, paediatric and juvenile psychiatrists or psychological psychotherapists should be consulted in order to initiate co-treatment if necessary. A coordinated treatment between psychiatrist and diabetes team should be strived for [Northam et al. 2005]; [Lawrence et al. 2006]; [Delamater et al. 2014]; [Kulzer et al., (2013b)]; [Young et al. 2013].

Children and adolescents with diabetes have an increased risk of impaired information processing and learning. Children with early onset diabetes, severe hypoglycaemias and chronic hyperglycaemias in early life are particularly affected.

Therefore, the school performance of children with increased risk (diabetes diagnosis under 5 years, severe/chronic hyperglycaemias) should be recorded. In case of learning difficulties, they, just as all children, should be neuro-physiologically and psychological-

ly examined in order to determine whether a learning disability is present and, if necessary, offer support [Delamater et al. 2014].

## Acute Complications

### Diabetic ketoacidosis

Diabetic ketoacidosis is a potentially life-threatening disease. It should be treated immediately in a specialized facility by a diabetes team experienced with children. A written treatment plan for treating diabetic ketoacidosis in children and adolescents should exist [Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council NHMRC (2005d)]; [Glaser et al. 2006]; [Fiordalisi et al. 2007].

The biochemical criteria for ketoacidosis include:

- pH < 7.3,
- Bicarbonate < 15 mmol/l,
- Hyperglycaemia > 11 mmol/l, > 200 mg/dl and
- Ketonuria and presences of ketones in serum.

Ketoacidosis is categorised into 3 stages of severity:

- Mild (pH < 7.3; bicarbonate < 15 mmol/l),
  - Moderate (pH < 7.2; bicarbonate < 10 mmol/l) and
  - Severe (pH < 7.1; bicarbonate 5 mmol/l)
- [Wolfsdorf et al. 2007].

The following therapy goals are to be pursued in ketoacidosis:

- Stabilisation of cardiovascular system with initial volume bolus using isotonic fluid,
- Subsequent slow, balanced fluid resuscitation and electrolyte replacement,
- Slow normalization of blood glucose,
- Balance out acidosis and ketosis,
- Avoidance of therapy complications (cerebral oedema, hypokalaemia) and
- Diagnosis and therapy of triggering factors [Australasian Paediatric Endocrine Group, Department of Health and

Ageing, National Health and Medical Research Council NHMRC (2005b)]; [Wolfsdorf et al. 2018] (► **Table 1**).

During the treatment of severe diabetic ketoacidosis, clinical observation and monitoring should take place at least every hour [Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council NHMRC (2005e)]; [Edge et al. 2006]; [Wolfsdorf et al. 2018].

Patients with severe ketoacidosis and an increased risk of cerebral oedema should be treated immediately in an intensive care unit or a specialized diabetes unit with comparable equipment by a diabetes team experienced with children.

Patients with suspected cerebral oedema should be treated in an intensive care unit in cooperation with an experienced diabetes team [Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council NHMRC (2005f)]; [Wolfsdorf et al. 2018].

Patients with clear signs of cerebral oedema should be treated with mannitol or hypertonic saline solution before further diagnostic measures (MRT) are initiated [Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council NHMRC (2005f)]; [Fiordalisi et al. 2007]; [Hanas et al. 2007]; [Roberts et al. 2001]; [Franklin et al. 1982]; [Banks and Furryk (2008)]; [Wolfsdorf et al. 2018].

Case reports or case series are available on the therapeutic efficacy in symptomatic cerebral oedema of an early intravenous mannitol administration (0.5–1 g/kg) over 10–15 min and repeated if necessary (after 30 min.) [Fiordalisi et al. 2007]; [Hanas et al. 2007]; [Roberts et al. 2001]; [Franklin et al. 1982].

### Hypoglycaemia

Hypoglycaemia is the most common acute complication in diabetes [Diabetes Control and Complications Trial Research Group 1994].

According to the latest recommendation by the Hypoglycemia Study Group [International Hypoglycaemia Study Group (2017)], a distinction is made between blood glucose values in the following groups:

► **Table 1** Medicinal treatment of ketoacidosis (taking the control of electrolytes, pH, blood glucose, ketone bodies into consideration).

Treatment goal/indication	Medicine	Dose	Chronological sequence
Stabilisation of cardiovascular system, if necessary	NaCl 0.9 %	10–20 ml/kg IV	Immediately over 1–2 h
Fluid resuscitation after initial cardiovascular stabilisation	NaCl 0.9 % or Ringer's solution, after 4–6 h NaCl 0.45 % also possible	Maximum daily IV dose < 1.5 to 2 times the maintenance requirement in relation to age/weight/body	At least over 36–48 h
Lowering of blood glucose	Normal insulin	0.1U/kg/h IV, for younger children 0.05U/kg/h	Begin insulin administration 1–2 h after start of volume administration; no interruption of insulin delivery up to pH > 7.3; lowering of blood glucose by 2–5 mmol/l/h (36–90 mg/dl/h)
Avoidance of hypoglycaemia	Glucose	Final concentration: 5 % glucose/0.45 % NaCl solution	Start from BG as of 15 mmol/l (270 mg/dl) or at lowering of BG > 5 mmol/l/h (90 mg/dl/h)
Balance of potassium	KCl	40 mmol/l volume; 5 mmol/kg/day IV; not > 0.5 mmol/kg/h	For hypokalaemia immediately, for normokalaemia with the onset of insulin administration, in the case of hyperkalaemia only after resumption of urine production; continuous administration until volume compensation has been fully compensated

Stage 1: <70 mg/dl (3.9 mmol/l), requires attention and treatment, if necessary

Stage 2: <54 mg/dl (3 mmol/l), always requires immediate treatment and

Stage 3: with impaired consciousness, always requires immediate treatment.

Slight hypoglycaemia can be corrected by the patient through the intake of fast-acting carbohydrates.

Severe hypoglycaemia can only be remedied by external help due to the accompanying limitation or loss of consciousness. In addition to a loss of consciousness, a severe hypoglycaemia can also be accompanied by a cerebral seizure.

Children and adolescents with type 1 diabetes should always carry fast-acting carbohydrates in the form of glucose or similar, in order to be able to act immediately in the event of mild hypoglycaemia and thus prevent severe hypoglycaemia. Parents or other primary caregivers should be instructed in the use of glucagon injections or other immediate measures.

Caregivers in e. g. day cares, day-care centres and teachers in schools should also receive instruction on the risks and treatment options for hypoglycaemia.

In the case of hypoglycaemia perception disorder, a higher blood glucose level should be temporarily set [Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council NHMRC (2005f)]; [Clarke et al. 2008]. The use of a CGM system with hypoglycaemia suspend should also be considered.

## Long-term Complications and Preventive Examinations (Screening)

The HbA1c value should be determined at least every 3 months to check metabolic control [Diabetes Control and Complications Trial Research Group 1994]; [Nathan et al. 2005]; [White et al. 2008]. All other long-term controls are listed in ►Table 2.

## Associated Autoimmune Diseases

### Diagnostics and therapy of thyroid diseases

In children and adolescents with diabetes, TSH determination and determination of thyroid autoantibodies (anti-TPO, TgAb) should be performed upon diabetes manifestation and at regular intervals of 1–2 years or with associated symptoms [Australasian Paediatric Endocrine Group et al. 2005; [Bangstad et al. 2007]; [Silverstein et al. 2005]; [Kordonouri et al. 2011].

If TPO a TSH increase and/or autoantibodies are present, a sonography of the thyroid gland should be performed.

For the therapy of autoimmune hypothyroidism or struma, L-thyroxine should be used according to the therapy plan (►Fig. 1).

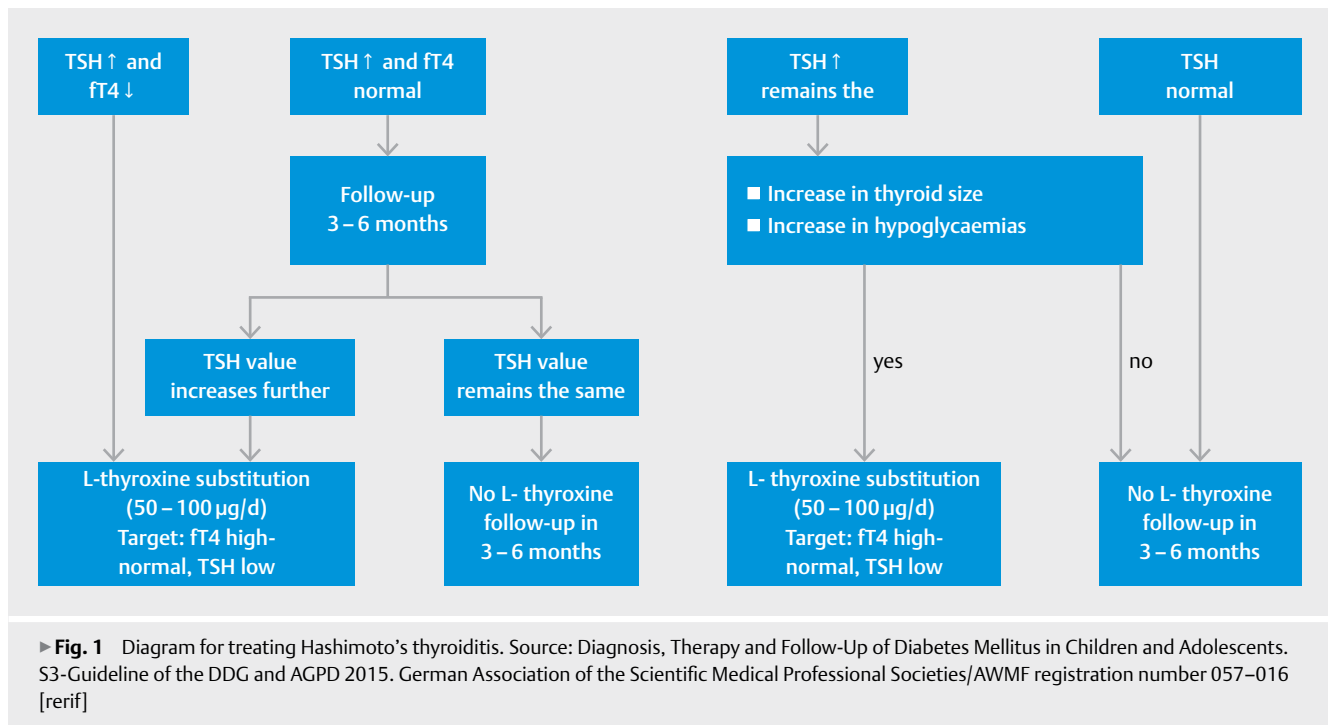
### Diagnostics and therapy of celiac disease

Children and adolescents with diabetes are to be examined for celiac disease in the event of diabetes manifestation and at intervals of 1–2 years and in the case of associated symptoms [Australasian

►Table 2 Long-term complications: Screening examinations and interventions.

Screening examination and intervals	Recommended screening method(s)	Interventions
1. Retinopathy: <ul style="list-style-type: none"> <li>▪ Every 1-2 years</li> <li>▪ From age 11 or as of 5 years of diabetes</li> </ul>	<ul style="list-style-type: none"> <li>▪ Binocular bi-microscopic funduscopy in mydriasis by experienced ophthalmologist</li> </ul>	<ul style="list-style-type: none"> <li>▪ Improvement of glycaemic control</li> <li>▪ Normalise blood pressure</li> <li>▪ Normalise dyslipidaemia</li> <li>▪ Laser therapy</li> <li>▪ Intravitreal injections</li> </ul>
2. Nephropathy <ul style="list-style-type: none"> <li>▪ Annually</li> <li>▪ From age 11 or as of 5 years of diabetes</li> </ul>	Detection of microalbuminuria: <ul style="list-style-type: none"> <li>▪ Concentration measurement: 20-200 mg/l</li> <li>▪ Albumin excretion rate &gt; 20-&lt; 200µg/min</li> <li>▪ Albumin-creatinine ratio</li> <li>▪ 24-hour urine collection, if necessary</li> </ul>	<ul style="list-style-type: none"> <li>▪ Improvement of glycaemic control</li> <li>▪ For hypertension + microalbuminuria: <ul style="list-style-type: none"> <li>– ACE inhibitors</li> <li>– Angiotensin II receptor blockers</li> </ul> </li> <li>▪ Persistent microalbuminuria without hypertension: consider ACE inhibitors</li> <li>▪ Nicotine abstinence</li> </ul>
3. Nephropathy <ul style="list-style-type: none"> <li>▪ For long-term poor metabolic condition from age 11 or as of 5 years of diabetes annually</li> </ul>	<ul style="list-style-type: none"> <li>▪ Medical examination</li> <li>▪ Tactile sensitivity (aesthesiometer)</li> <li>▪ Vibration sensitivity (tuning fork test)</li> <li>▪ Testing reflexes</li> </ul>	<ul style="list-style-type: none"> <li>▪ Improvement of glycaemic control</li> </ul>
4. Hypertension <ul style="list-style-type: none"> <li>▪ Every 3 months and as of age 11 annually at minimum</li> </ul>	<ul style="list-style-type: none"> <li>▪ Rest-RR</li> <li>▪ 24-hour RR with at least 2 × &gt; 95th percentile or microalbuminuria</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lifestyle intervention (exercise, salt reduction, weight reduction, reduction of alcohol, nicotine)</li> <li>▪ If not successful: ACE inhibitors; for contraindications or side effects: angiotensin II receptor blockers; combination with other drugs if required</li> </ul>
5. Hyperlipidaemia: <ul style="list-style-type: none"> <li>▪ Within the first year of diagnosis</li> <li>▪ Then every 2 years</li> <li>▪ Before puberty every 5 years</li> </ul>	Detection of <ul style="list-style-type: none"> <li>▪ Total cholesterol</li> <li>▪ HDL</li> <li>▪ LDL</li> <li>▪ Triglycerides</li> </ul>	<ul style="list-style-type: none"> <li>▪ Dietary therapy</li> <li>▪ if not successful: statins from age 8</li> </ul>





Paediatric Endocrine Group et al. 2005; [Hill et al. 2005]; [Silverstein et al. 2005]; [Kordonouri et al. 2007]; [Kordonouri et al. 2014]; [Kordonouri et al. 2011].

In cases of confirmed celiac disease (serologic and biptic) with symptoms or extraintestinal manifestation, a gluten-free diet should be followed [Hansen et al. 2006]; [Amin et al. 2002]; [Hill et al. 2005]; [Lewis et al. 1996]; [Kordonouri et al. 2011].

According to the latest recommendations, a biopsy can be dispensed with in the case of clear clinical symptoms, high tTG-A antibodies (> 10 times above norm) and endomysium antibodies as well as a positive HLA-DQ2 or DQ8 haplotype [Mahmud et al., (2018)]. However, this recommendation is inconsistent with other guidelines. As most children with type 1 diabetes and positive tTG-A are asymptomatic, a biopsy is still frequently required to confirm the diagnosis.

In asymptomatic patients, the indication for a gluten-free diet or further follow-up should be carried out in cooperation with the paediatric gastroenterologist.

## Other Forms of Diabetes in Childhood and Adolescence

### Type 2 diabetes

Type 2 diabetes in adolescents should be diagnosed according to the limits for fasting glucose and oral glucose tolerance test (OGTT) using the standard or reference method.

If the following limit values are exceeded, the result in asymptomatic patients must be confirmed by a second test on a later day:

- fasting glucose: > 126 mg/dl (> 7.0 mmol/l) and

- OGTT: 2h value > 200 mg/dl (> 11.1 mmol/l) [Genuth et al. 2003].

Additional laboratory tests can provide information on the differentiation between type 2 diabetes and type 1 diabetes:

- c-peptide and
- diabetes-specific autoantibodies (GAD, IA-2, ICA, IAA, ZnT8) [Alberti et al. 2004]; [Genuth et al. 2003].

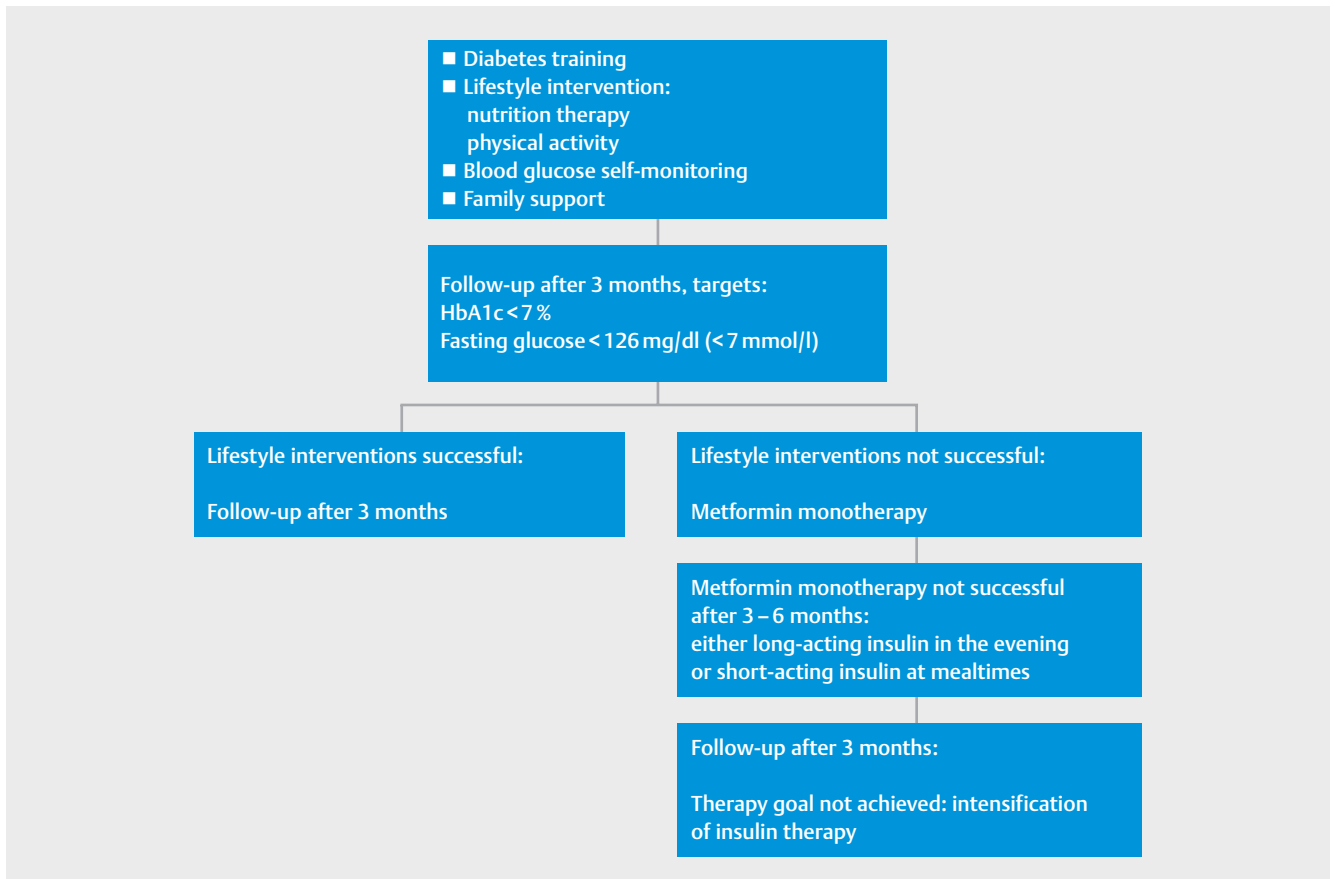
In the treatment of type 2 diabetes in adolescents (► **Fig. 2**) [Alberti et al. 2004]), the target fasting glucose should be < 126 mg/dl and the target HbA1c value should be < 7 % [Zeitler et al. 2014]; [UK Prospective Diabetes Study UKPDS Group (1998a)]; [Holman et al. 2008].

Training for adolescents with type 2 diabetes should include nutritional counselling and guidance on physical activity as part of a structured obesity programme [Reinehr et al. 2007]; [Working Group for Obesity in Childhood and Adolescence/Arbeitsgemeinschaft Adipositas im Kindes- und Jugendalter AGA (2008)].

In addition, individually tailored modular training for type 2 diabetes should take place using the relevant contents from the type 1 diabetes training.

At a starting HbA1c value of  $\geq 9\%$  or spontaneous hyperglycaemia  $\geq 250$  mg/dl and with signs of absolute insulin deficiency (ketonuria, ketoacidosis), an initial insulin therapy should be started. In all other cases, metformin is the first drug of choice for drug therapy in children and adolescents [Shimazaki et al. 2007]; [UK Prospective Diabetes Study UKPDS Group (1998b)]; [Jones et al. 2002]; [Gottschalk et al. 2007]; [Zeitler et al. 2014]. In addition to insulin, metformin is currently the only approved drug for this age group.





► **Fig. 2** Diagram for treating type 2 diabetes in children and adolescents. Source: Diagnosis, Therapy and Follow-Up of Diabetes Mellitus in Children and Adolescents. S3-Guideline of the DDG and AGPD 2015. German Association of the Scientific Medical Professional Societies/AWMF registration number 057-016 [rerif]

## Monogenetic diabetes

A molecular genetic diagnosis of the most common MODY forms can be recommended in cases of justified assumptions because of its importance for therapy, long-term prognosis and genetic counselling of families [Hattersley et al. 2006]; [Ellard et al. 2008] (► **Table 3**).

Before the affected genes are sequenced, counselling and information must be provided in accordance with the Gene Diagnostics Act, especially on the right to knowledge and ignorance of genetic information [Murphy et al. 2008]; [McDonald and Ellard (2013)]; [Ellard et al. 2008]; [Badenhoop et al. 2008]; [Deutsche Gesellschaft für Psychiatrie, Psychotherapie und Nervenheilkunde DGPPN (2009)].

## Neonatal diabetes mellitus (NDM)

A special form of genetic diabetes is neo-natal diabetes mellitus (NDM) and diabetes that manifests within the first 6 months of life. Clinically, they are classified into 2 subgroups: transient (TNDM) and permanent (PNDM) neonatal diabetes mellitus. For diagnosis of neonatal diabetes or diabetes manifestation up to and including the sixth month of life, see the box "Neonatal diabetes - diagnostic procedure".

## NEONATAL DIABETES - DIAGNOSTIC PROCEDURE

Diagnostic procedure for diabetes manifestation up to the 6th month of life, if necessary up to the 1<sup>st</sup> year of life

1. Exclusion of pancreatic insufficiency
  - Sonography to rule out pancreatic aplasia
  - Determination of elastase in faeces to exclude exocrine insufficiency
2. If sonography is unremarkable or not assessable:
  - Determination of diabetic autoantibodies (GAD, IA-2, ICA, IAA, ZnT8)
3. If sonography is unremarkable or not assessable, autoantibodies negative and elastase in stool o. B., a molecular genetic analysis should be carried out promptly because of the high therapeutic relevance for the differential diagnosis of:
  - Anomalies of chromosome 6q24 (TNDM)
  - Mutations of the KCNJ11 gene (PNDM, TNDM)
  - Mutations of the ABCC8 gene (PNDM, TNDM)
  - Mutations of insulin gene (PNDM)
4. For reduced elastase in stool and negative molecular genetic analysis for chromosome 6q24, KCNJ11, ABCC8 and insulin gene as well as negative or positive autoantibodies:
  - Examination for rare genetic diseases/genetic syndromes

► **Table 3** The most common MODY forms and their clinical characteristics.

MODY type (international share in percent); heredity	Age (Y) at manifestation	Severity of hyperglycaemia	Clinical picture
HNF1A-MODY (MODY3) HNF-1 $\alpha$ (20–50%) autosomal dominant	14 (4–18)	Severe hyperglycaemia	<ul style="list-style-type: none"> <li>Strong increase of FC in OGTT (&gt;90 mg/dl), low renal threshold (frequent glucosuria in BG values) &lt; 180 mg/dl (&lt; 10 mmol/l))</li> <li>Increasing hyperglycaemia with age</li> <li>Response to sulfonylureas/glinides</li> </ul>
GCK-MODY (MODY2) Glucokinase (20–50%) autosomal dominant	10 (0–18)	Mild hyperglycaemia	<ul style="list-style-type: none"> <li>Often by chance</li> <li>Fasting BG slightly increased between 99 and 144 mg/dl (5.5–8 mmol/l)</li> <li>BG increase in the OGTT low (by &lt;63 mg/dl or &lt;3.5 mmol/l)</li> <li>No BG deterioration in old age</li> <li>Rarely microvascular or macrovascular complications, even without drug therapy</li> </ul>
HNF4A-MODY (MODY1) HNF-4 $\alpha$ (1–5%) autosomal dominant	17 (5–18)	Significantly hyperglycaemic	<ul style="list-style-type: none"> <li>Similar to HNF-1<math>\alpha</math>, but renal threshold normal</li> <li>Response to sulfonylureas</li> </ul>

In the case of etiologically unexplained neonatal diabetes mellitus and diabetes mellitus, which manifests itself up to the 6th month of life, a molecular genetic analysis should be performed as early as possible in order to start appropriate therapy for sulfonylurea-sensitive mutations as early as possible [Flanagan et al. 2006]; [Babenko et al. 2006]; [Klupa et al. 2008]; [Battaglia et al. 2012]; [Shah et al. 2012].

In most cases, insulin therapy is administered first if neonatal diabetes is present. Under in-patient conditions and tight controls, an initial therapy attempt with sulfonylureas may be useful if the result of the molecular genetic examination is expected shortly. In the presence of a mutation of the KCNJ11 or the ABCC8 gene, therapy with sulfonylureas should be attempted as early as possible [Hattersley et al. 2006]; [Pearson et al. 2006]; [Mlynarski et al. 2007]; [Koster et al. 2008]; [Slingerland et al. 2008]; [Thurber et al., (2015)].

### Diabetes in cystic fibrosis

Since diabetes in cystic fibrosis is often clinically difficult to detect, children with cystic fibrosis as of age 10 should receive an oral glucose tolerance test annually [Lanng et al. 1994]. New studies show better results using CGM to detect glucose variability [Chan et al., (2018)].

With a confirmed diagnosis of diabetes, early treatment of cystic fibrosis-related diabetes (CFRD) should be initiated [Nousia-Arvanitakis et al. 2001]; [Rolon et al. 2001]; [Lanng et al. 1994]; [Dobson et al. 2002]; [Frost et al., (2018)].

Insulin is to be used for long-term therapy of CF-related diabetes. In the first 12 months after diagnosis, however, a therapy attempt with glinides or sulphonylureas may be undertaken [Ballmann et al. 2014]; [O’Riordan et al. 2008].

If cystic fibrosis is present, a high-calorie, high-fat diet should also be followed after the diagnosis of diabetes. Calorie reduction is contraindicated [O’Riordan et al. 2008].

### Imprint (German)

The evidence-based guideline was prepared on behalf of the German Diabetes Society (DDG). The German Diabetes Society is represented by its president (2019–2021 Prof. Dr. Monika Kellerer) and the DDG guideline officer (Prof. Dr. Andreas Neu).

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### Conflict of Interest

The conflicts of interest of all members of the Guideline Group are detailed in the long version of the Guideline (Table 32).

### German Diabetes Association: Clinical Practice Guidelines

This is a translation of the DDG clinical practice guideline published in: *Diabetologie* 2019; 14 (Suppl 2): S153–S166, DOI <https://doi.org/10.1055/a-0898-9576>.

### ABBREVIATIONS

µg	microgram
ABCC8	gene localization for the sulfonylurea receptor 1
ACE	angiotensin-converting enzymes
ACR	albumin creatinine ratio
ADA	American Diabetes Association
ADHD	attention deficit/hyperactivity disorder
AER	albumin excretion rate
AGA	Working Group for Obesity/Arbeitsgemeinschaft für Adipositas
AGPDA	Working Group for Paediatric Diabetology/Arbeitsgemeinschaft für Pädiatrische Diabetologie
AHCPR	Agency for Health Care Policy and Research
AIHA	autoimmune hemolytic anemia
Abs	antibodies
ALT	alanine transaminase = liver enzyme
APS	Working Group for Paediatric Metabolic Disorders/Arbeitsgemeinschaft für Pädiatrische Stoffwechselstörungen
PGAs	polyglandular autoimmune syndromes
AT <sub>1</sub> blocker	angiotensin II receptor blocker

AWMF	German Association of the Scientific Medical Professional Societies/Arbeitsgemeinschaft der wissenschaftlichen medizinischen Fachgesellschaften
BABYDIAB	German BabyDiab-Study (German baby diabetes study)
BAR	Federal Working Group for Rehabilitation/Bundesarbeitsgemeinschaft für Rehabilitation
BdKJ	Association of Diabetic Children and Adolescents/Bund diabetischer Kinder und Jugendlicher
BG	blood glucose
BMI	body mass index
BMI-SDS	body mass index standard deviation score
BS	blood sugar
CFRD	cystic fibrosis-related diabetes (diabetes in cystic fibrosis)
CGM	continuous glucose monitoring
CK	creatinine kinase
C-peptide	connecting peptide (connecting peptide) = part of proinsulin
CSII	continuous subcutaneous insulin injection = insulin pump
CT	computer tomography
DAG	German Obesity Society/Deutsche Adipositas Gesellschaft
DAISY	Diabetes Autoimmunity Study of the Young (autoimmunity study for adolescents with diabetes)
DCC-Trial	Diabetes Control and Complications Trial (study on the control and complications of diabetes)
DDG	German Diabetes Society/Deutsche Diabetes Gesellschaft
DEND	diabetes epilepsy and neurological delay (genetic syndrome with diabetes, epilepsy and neurological developmental disorder)
DENIS	German Nicotinamide Intervention Study/Deutsche Nicotinamide-Intervention-Study
DEPS-R	Diabetes Eating Problem Survey - Revised
DGE	German Nutrition Society/Deutsche Gesellschaft für Ernährung
DGEM	German Society for Nutritional Medicine/Deutsche Gesellschaft für Ernährungsmedizin
DGKJP	German Society for Paediatric and Juvenile Psychiatry, Psychosomatics and Psychotherapy/Deutsche Gesellschaft für Kinder- und Jugendpsychiatrie, Psychosomatik und Psychotherapie
diab.	diabetic
DiabetesDE	Diabetes Germany
DIAMYD	Diamyd® Study
DIPP	Diabetes Prediction and Prevention Project
DKA	diabetic ketoacidosis
dl	decilitre
DNSG	Diabetes And Nutrition Study Group
DPT-1	Diabetes Prevention Trial - Type 1

DPM	Diabetes patient management (documentation system)	ISPAD	International Society for Paediatric and Adolescent Diabetes
EASD Diabetes	European Association for the Study of Diabetes	ITP	immune thrombocytopenic purpura
EDIC-Trial	Epidemiology of Diabetes Interventions and Complications Trial = Follow-up Study of the DCC Trial	Y years	
EIF2AK3	gene genetic locus for mutations leading to a genetic syndrome with diabetes	n/a	not available
EC	evidence class (methodological quality of a study according to criteria of evidence-based medicine)	kcal	kilocalories
ECC	electrocardiogram	KCNJ11	inward-rectifier potassium ion channel, subfamily J, member 11
EMA	European Medicines Agency	kg	kilogram
ENDIT	European Nicotinamide Intervention Trial	BW	body weight
ES	educational support (therapeutic support in parenting)	Kir6.2	gene localization for KCNJ11
ethn.	ethnic	KJHG	child and youth welfare law
fam.	familiar	l litres	
FES	family environment scale = scale for the evaluation of social characteristics and the environment of families	LDL	low-density lipoprotein
FOXP3	gene genetic locus for mutations leading to genetic syndromes with diabetes	LGS	m <sup>2</sup> low-glucose suspend square meters
FST-D	family system therapy for patients with diabetes	g gram	
ft3	free triiodothyronine	max.	maximum
ft4	free thyroxine	GAD	glutamate decarboxylase
g gram		GCK	glucokinase
GAD	glutamate decarboxylase	h hour	
GCK	glucokinase	min.	minimum
h hour		HbA1c	glycolyzed haemoglobin
HbA1c	glycolyzed haemoglobin	HDL	high-density lipoprotein
HDL	high-density lipoprotein	HHS	hyperglycaemic hyperosmolar
HHS	hyperglycaemic hyperosmolar syndrome	HLA	human leukocyte antigen
HLA	human leukocyte antigen	HNF	hepatocyte nuclear factor
HNF	hepatocyte nuclear factor	HTA	health technology assessment = systematic assessment of medical technologies, procedures aids and organizational structures, in which medical services are provided
HTA	health technology assessment = systematic assessment of medical technologies, procedures aids and organizational structures, in which medical services are provided	I.E.	international unit(s)
I.E.	international unit(s)	i. m.	intramuscular
i. m.	intramuscular	IV	intravenously
IV	intravenously	IA-2	tyrosine phosphatase IA-2 antibody
IA-2	tyrosine phosphatase IA-2 antibody	IAA	insulin autoantibodies
IAA	insulin autoantibodies	ICA	islet cell antibody
ICA	islet cell antibody	ICT	intensified conventional therapy
ICT	intensified conventional therapy	IgA	immunoglobulin A
IgA	immunoglobulin A	IgG	immunoglobulin G
IgG	immunoglobulin G	INS	insulin(s)
INS	insulin(s)	IPEX	immunodysregulation polyendocrinopathy enteropathy X-linked syndrome
IPEX	immunodysregulation polyendocrinopathy enteropathy X-linked syndrome	IPF-1	geneinsulin promoter factor 1 gene = genetic locus for mutations leading to MODY-4 diabetes
IPF-1 gene	insulin promoter factor 1 gene = genetic locus for mutations leading to MODY-4 diabetes	PLGM	predictive low glucose management
IRMA	intraretinal microvascular anomaly	IRMA	intraretinal microvascular anomaly
		ISPAD	International Society for Paediatric and Adolescent Diabetes
		ITP	immune thrombocytopenic purpura
		Y years	
		n/a	not available
		kcal	kilocalories
		KCNJ11	inward-rectifier potassium ion channel, subfamily J, member 11

kg	kilogram
BW	body weight
Kir6.2	gene localization for KCNJ11
KJHG	child and youth welfare law
l	litres
LDL	LGS
m <sup>2</sup>	square meters
max.	maximum
mg	milligram
micro	microalbuminuria
min.	minimum
avg.	average
MJ	megajoules
ml	millilitres
mm	millimetres
mmHg	millimetres of mercury = used to measure blood pressure
mmol	millimole
mon	month(s)
MODY	maturity onset diabetes of the young (adult diabetes in adolescents) = monogenetic diabetes
MRI	magnetic resonance imaging
n	number
NaCl	sodium chloride
NDM	neonatal diabetes mellitus
NCV	nerve conduction velocity
NPH insulin	neutral protamine Hawthorn insulin
NYHA	New York Heart Association classification system of the New York Heart Association for the severity of heart failure
OGTT	oral glucose tolerance test
p	pp-value
pp-value	probability value - exceeding probability, statistical information
PAL	value
PAL value	physical activity level (value for measuring the daily physical activity expenditure)
Pat.	patient(s)
pCO <sub>2</sub>	arterial partial pressure of carbon dioxide
pH	potentia Hydrogenii (capacity of hydrogen) = negative logarithm of the hydrogen ion concentration/activity, measure for acidity of a medium
PLGM	predictive low glucose management
PNDM	permanent neonatal diabetes mellitus
RCT	randomized controlled trial
RR	Riva Rocci = arterial blood pressure, measured according to the method of Riva Rocci
s. c.	subcutaneous
SC	standard care (standard treatment)
SEARCH	search for diabetes in the youth study (studies for the identification of diabetes in children and adolescents)
SGB	criminal code/Strafgesetzbuch
SIGN	Scottish Intercollegiate Guidelines Network
sign.	significant
SSRI	selective serotonin reuptake inhibitor

STIKO	Permanent Vaccination Commission of the Federal Republic of Germany/Ständige Impfkommision der Bundesrepublik Deutschland
SAP	sensor-augmented pump therapy
sur 1	sulphonylurea receptor 1
SaT	sensor-augmented insulin therapy
T3	triiodothyronine
T4	thyroxine
daily	daily
tTG	tissue transglutaminase (tTG) antibodies
tg	thyroglobulin antibodies
TNDM	transient neonatal diabetes mellitus
TPO	thyroid peroxidase antibodies
TSHR	TSH receptor autoantibodies
TRIGR	Trial to Reduce IDDM in the Genetically at the Risk (Study on the reduction of diabetes mellitus by immunodeficiency for genetical risks)
TSH	thyroid-stimulating hormone/thyrotropin
Uunit	
UK	United Kingdom
esp.	especially
vs.	versus
WHO	World Health Organization
c. a.	condition after
CNS	central nervous system
ZnT8	zinc transporter 8

## References

- [1] Adolfsson P, Riddell MC, Taplin CE et al. ISPAD Clinical Practice Consensus Guidelines 2018: Exercise in children and adolescents with diabetes. *Pediatr Diabetes* 2018; 19: (Suppl. 27) 205–226. doi: <https://doi.org/10.1111/pedi.12755>
- [2] Agency for Health Care Policy and Research (AHCPR) Acute Pain Management: Operative or Medical Procedures and Trauma. Clinical Practice Guideline., Public Health Service, U.S. Department of Health and Human Services, Rockville, Md 1992
- [3] Ahern JA, Ramchandani N, Cooper J, Himmel A, Silver D, Tamborlane WV. Using a primary nurse manager to implement DCCT recommendations in a large pediatric program. *Diabetes Educ* 2000; 26: 990–994. EK III
- [4] Al Hanshi S., Shann F. Insulin infused at 0.05 vs. 0.1 units/ kg/hr in children admitted to intensive care with diabetic ketoacidosis. *Pediatr Crit Care Med* 2011; 12: 137–140. EK III
- [5] Alberti G, Zimmet P, Shaw J, Bloomgarden Z, Kaufman F, Silink M. Type 2 diabetes in the young: the evolving epidemic: the international diabetes federation consensus workshop. *Diabetes Care* 2004; 27: 1798–1811. EK IV
- [6] Ambrosino JM, Fennie K, Whittemore R, Jaser S, Dowd MF, Grey M. Short-term effects of coping skills training in school-age children with type 1 diabetes. *Pediatr Diabetes* 2008; 9: 74–82. EK Ib
- [7] American Diabetes Association (ADA) Management of dyslipidemia in children and adolescents with diabetes. *Diabetes Care* 2003; 26: 2194–2197. EK IV

- [8] American Diabetes Association (ADA) Standards of medical care in diabetes-2009. *Diabetes Care* 2009; 32: Suppl 1 S13–S61. EK IV
- [9] American Diabetes Association (ADA) Standards of Medical Care in Diabetes – 2015. Section 11: Children and Adolescents. *Diabetes Care* 2015; 38: S70–S76. EK IV
- [10] Amin R, Murphy N, Edge J, Ahmed ML, Acerini CL, Dunger DB. A longitudinal study of the effects of a gluten-free diet on glycemic control and weight gain in subjects with type 1 diabetes and celiac disease. *Diabetes Care* 2002; 25: 1117–1122. EK III
- [11] Andersen HU, Lanng S, Pressler T, Laugesen CS, Mathiesen ER. Cystic fibrosis-related diabetes: the presence of microvascular diabetes complications. *Diabetes Care* 2006; 29: 2660–2663. EK III
- [12] Anderson B, Ho J, Brackett J, Finkelstein D, Laffel L. Parental involvement in diabetes management tasks: relationships to blood glucose monitoring adherence and metabolic control in young adolescents with insulin-dependent diabetes mellitus. *J Pediatr* 1997; 130: 257–265. EK III
- [13] Anderson BJ, Brackett J, Ho J, Laffel LM. An office-based intervention to maintain parent-adolescent teamwork in diabetes management. Impact on parent involvement, family conflict, and subsequent glycemic control. *Diabetes Care* 1999; 22: 713–721. EK IIb
- [14] Anderson RM, Funnell MM, Butler PM, Arnold MS, Fitzgerald JT, Feste CC. Patient empowerment. Results of a randomized controlled trial. *Diabetes Care* 1995; 18: 943–949. EK Ib
- [15] Appel LJ, Champagne CM, Harsha DW, Cooper LS, Obarzanek E, Elmer PJ, Stevens VJ, Vollmer WM, Lin PH, Svetkey LP, Stedman SW, Young DR. Effects of comprehensive lifestyle modification on blood pressure control: main results of the PREMIER clinical trial. *JAMA* 2003; 289: 2083–2093. EK Ib
- [16] Arbeitsgemeinschaft Adipositas im Kindes- und Jugendalter (AGA) Therapie der Adipositas im Kindes- und Jugendalter. Evidenzbasierte Leitlinie der Arbeitsgemeinschaft Adipositas im Kindes- und Jugendalter (AGA) und der beteiligten medizinisch-wissenschaftlichen Fachgesellschaften, Berufsverbände und weiterer Organisationen, AGA, Ulm. 2008; EK IV
- [17] Arbeitsgemeinschaft für Pädiatrische Diabetologie Untersuchungen auf diabetische Folgeerkrankungen an Augen, Nieren und Nerven bei pädiatrischen Diabetespatienten. *Diabet Inform* 1998; 20: 124–127
- [18] Arbeitsgemeinschaft für Pädiatrische Diabetologie Stellungnahme zur Notwendigkeit eines Kinderpsychologen in der Langzeitbetreuung von Kindern und Jugendlichen mit Diabetes mellitus, 20 ed., AGPD. 1999;
- [19] Arbeitsgemeinschaft für Pädiatrische Diabetologie (AGPD) Kinder mit Diabetes im Kindergarten. Informationen für Erzieherinnen und Erzieher in Kindergärten. <http://www.diabetes-kinder.de> 2009; EK IV
- [20] Arbeitsgemeinschaft für Pädiatrische Diabetologie (AGPD) Kinder mit Diabetes in der Schule. Informationen für Lehrerinnen und Lehrer. <http://www.diabetes-kinder.de> 2010; EK IV
- [21] Arbeitsgemeinschaft Pädiatrische Diabetologie (AGPD) Kosten der ambulanten Langzeitbetreuung. 1999; EK IV
- [22] Astrup A, Ryan L, Grunwald GK, Storgaard M, Saris W, Melanson E, Hill JO. The role of dietary fat in body fatness: Evidence from a preliminary meta-analysis of ad libitum low-fat dietary intervention studies. *Br J Nutr* 2000; 83: Suppl 1 S25–S32. EK Ia
- [23] Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council (NHMRC) Clinical practice guidelines: Type 1 diabetes in children and adolescents. 2005; EK IV
- [24] Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council (NHMRC) Clinical practice guidelines: Type 1 diabetes in children and adolescents. 2005; EK IV
- [25] Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council (NHMRC) Clinical practice guidelines: Type 1 diabetes in children and adolescents. 2005; EK Ib
- [26] Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council (NHMRC) Clinical practice guidelines: Type 1 diabetes in children and adolescents. 2005; EK IIb-III
- [27] Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council (NHMRC) Clinical practice guidelines: Type 1 diabetes in children and adolescents. 2005; EK III
- [28] Australasian Paediatric Endocrine Group, Department of Health and Ageing, National Health and Medical Research Council (NHMRC) Clinical practice guidelines: Type 1 diabetes in children and adolescents. 2005; EK III/IV
- [29] Babcock DS. Thyroid disease in the pediatric patient: emphasizing imaging with sonography. *Pediatr Radiol* 2006; 36: 299–308 quiz, EK IV
- [30] Babenko AP, Polak M, Cave H, Busiah K, Czernichow P, Scharfmann R, Bryan J, Guilar-Bryan L, Vaxillaire M, Froguel P. Activating mutations in the ABCC8 gene in neonatal diabetes mellitus. *N Engl J Med* 2006; 355: 456–466. EK III
- [31] Bachran R, Beyer P, Klinkert C, Heidtmann B, Rosenbauer J, Holl RW. Basal rates and circadian profiles in continuous subcutaneous insulin infusion (CSII) differ for preschool children, prepubertal children, adolescents and young adults. *Pediatr Diabetes* 2012; 13: 1–5. EK III
- [32] Badenhop K, Kordonouri O, Machicao F. Empfehlungen zur molekulargenetischen Diagnostik bei Verdacht auf MODY, DDG. 2008; EK IV
- [33] Baechle C, Castillo K, Strassburger K, Stahl-Pehe A, Meissner T, Holl RW, Giani G, Rosenbauer J. Is disordered eating behavior more prevalent in adolescents with early-onset type 1 diabetes than in their representative peers? *Int J Eat Disord* 2014; 47: 342–352. EK IIb
- [34] Ballmann M, Hubert D, Assael BM, Kronfeld K, Honer M, Holl RW. Open randomised prospective comparative multicentre intervention study of patients with cystic fibrosis and early diagnosed diabetes mellitus. *BMC Pediatr* 2014; 14: 70. EK Ib
- [35] Bangstad HJ, Danne T, Deeb LC, Jarosz-Chobot P, Urakami T, Hanas R. Insulin treatment. ISPAD clinical practice consensus guidelines 2006 – 2007. *Pediatr Diabetes* 2007; 8: 88–102. EK Ib
- [36] Bangstad HJ, Danne T, Deeb LC, Jarosz-Chobot P, Urakami T, Hanas R. Insulin treatment. ISPAD clinical practice consensus guidelines 2006 – 2007. *Pediatr Diabetes* 2007; 8: 88–102. EK IV
- [37] Banks CJ, Furyk JS. Review article: hypertonic saline use in the emergency department. *Emerg Med Australas* 2008; 20: 294–305. EK III
- [38] Barlow JH, Ellard DR. Psycho-educational interventions for children with chronic disease, parents and siblings: an overview of the research evidence base. *Child Care Health Dev* 2004; 30: 637–645. EK Ib
- [39] Barnard K, Thomas S, Royle P, Noyes K, Waugh N. Fear of hypoglycaemia in parents of young children with type 1 diabetes: a systematic review. *BMC Pediatr* 2010; 10: 50. EK Ia
- [40] Barnea-Goraly N, Raman M, Mazaika P, Marzelli M, Hershey T, Weinzimer SA, Aye T, Buckingham B, Mauras N, White NH, Fox LA, Tansey M, Beck RW, Ruedy KJ, Kollman C, Cheng P, Reiss AL. Alterations in white matter structure in young children with type 1 diabetes. *Diabetes Care* 2014; 37: 332–340. EK III
- [41] Battaglia D, Lin YW, Brogna C, Crino A, Grasso V, Mozzi AF, Russo L, Spera S, Colombo C, Ricci S, Nichols CG, Mercuri E, Barbetti F. Gliburide ameliorates motor coordination and glucose homeostasis in a child with diabetes associated with the KCNJ11 / S225 T, del226 – 232 mutation. *Pediatr Diabetes* 2012; 13: 656–660



- [42] Battelino T, Conget I, Olsen B, Schutz-Fuhrmann I, Hommel E, Hoogma R, Schierloh U, Sulli N, Bolinder J. The use and efficacy of continuous glucose monitoring in type 1 diabetes treated with insulin pump therapy: A randomised controlled trial. *Diabetologia* 2012; 55: 3155–3162. EK Ib
- [43] Battelino T, Danne T, Bergenstal RM et al. Clinical Targets for Continuous Glucose Monitoring Data Interpretation: Recommendations From the International Consensus on Time in Range. *Diabetes Care* 2019; Jun dci190028. doi: <https://doi.org/10.2337/dci19-0028>
- [44] Battelino T, Phillip M, Bratina N, Nimri R, Oskarsson P, Bolinder J. Effect of continuous glucose monitoring on hypoglycemia in type 1 diabetes. *Diabetes Care* 2011; 34: 795–800. EK Ib
- [45] Becker M, Galler A, Raile K. Meglitinide analogues in adolescent patients with HNF1A-MODY (MODY 3). *Pediatrics* 2014; 133: e775–e779
- [46] Bell KJ, Barclay AW, Petocz P, Colagiuri S, Brand-Miller JC. Efficacy of carbohydrate counting in type 1 diabetes: A systematic review and meta-analysis. *Lancet Diabetes Endocrinol* 2014; 2: 133–140
- [47] Berg CA, Schindler I, Maharajh S. Adolescents' and mothers' perceptions of the cognitive and relational functions of collaboration and adjustment in dealing with type 1 diabetes. *J Fam Psychol* 2008; 22: 865–874. EK III
- [48] Bergenstal RM, Klonoff DC, Garg SK, Bode BW, Meredith M, Slover RH, Ahmann AJ, Welsh JB, Lee SW, Kaufman FR. Threshold-based insulin-pump interruption for reduction of hypoglycemia. *N Engl J Med* 2013; 369: 224–232. EK Ib
- [49] Bergenstal RM, Tamborlane WV, Ahmann A, Buse JB, Dailey G, Davis SN, Joyce C, Peoples T, Perkins BA, Welsh JB, Willi SM, Wood MA. Effectiveness of sensor-augmented insulin-pump therapy in type 1 diabetes. *N Engl J Med* 2010; 363: 311–320. EK Ib
- [50] Biester T, Blaesig S, Remus K, Aschemeier B, Kordonouri O, Granhall C, Sondergaard F, Kristensen NR, Haahr H, Danne T. Insulin degludec's ultra-long pharmacokinetic properties observed in adults are retained in children and adolescents with type 1 diabetes. *Pediatr Diabetes* 2014; 15: 27–33
- [51] Biondi B, Cooper DS. The clinical significance of subclinical thyroid dysfunction. *Endocr Rev.* 2008; 29: 76–131. EK Ib-IV
- [52] Bitsko MJ, Bean MK, Bart S, Foster RH, Thacker L, Francis GL. Psychological treatment improves hemoglobin A1c outcomes in adolescents with type 1 diabetes mellitus. *J Clin Psychol Med Settings* 2013; 20: 333–342. EK III
- [53] Blackman SM, Raghinaru D, Adi S, Simmons JH, Ebner-Lyon L, Chase HP, Tamborlane WV, Schatz DA, Block JM, Litton JC, Raman V, Foster NC, Kollman CR, DuBose SN, Miller KM, Beck RW, Dimaggio LA. Insulin pump use in young children in the T1D Exchange clinic registry is associated with lower hemoglobin A1c levels than injection therapy. *Pediatr Diabetes* 2014; 15: 564–572. EK Ib
- [54] Blank W, Braun B. Sonografie der Schilddrüse – Teil 2: Schilddrüsenerkrankungen, Schilddrüsenfunktionsstörungen und Interventionen. *Ultraschall in Med* 2008; 29: 128–149. EK IV
- [55] Blankfield AJ, Holahan B. Family support, coping strategies and depressive symptoms among mothers of children with diabetes. *J Fam Psychol* 1996; 10: 173–179. EK III
- [56] Bläsing S, Remus K, Danne T, Lange K. 'Fit for school': Evaluation of a training course for 5 – 6 year old children with type 1 diabetes. *Pediatr Diabetes* 2011; 12: 72. EK III
- [57] Bloomgarden ZT, Karmally W, Metzger MJ, Brothers M, Nechemias C, Bookman J, Faierman D, Ginsberg-Fellner F, Rayfield E, Brown WV. Randomized, controlled trial of diabetic patient education: improved knowledge without improved metabolic status. *Diabetes Care* 1987; 10: 263–272. EK Ib
- [58] Bonfanti R, Colombo C, Nocerino V, Massa O, Lampasona V, Iafusco D, Viscardi M, Chiumello G, Meschi F, Barbetti F. Insulin gene mutations as cause of diabetes in children negative for five type 1 diabetes autoantibodies. *Diabetes Care* 2009; 32: 123–125
- [59] Bonfig W, Kapellen T, Dost A, Fritsch M, Rohrer T, Wolf J, Holl RW. Growth in children and adolescents with type 1 diabetes. *J Pediatr* 2012; 160: 900–903
- [60] Bonnefond A, Philippe J, Durand E, Dechaume A, Huyvaert M, Montagne L, Marre M, Balkau B, Fajardy I, Vambergue A, Vatin V, Delplanque J, Le GD, De GF, Lecoeur C, Sand O, Vaxillaire M, Froguel P. Whole-exome sequencing and high throughput genotyping identified KCNJ11 as the thirteenth MODY gene. *PLoS One* 2012; 7: e37 423
- [61] Bonnefond A, Sand O, Guerin B, Durand E, De GF, Huyvaert M, Rachdi L, Kerr-Conte J, Pattou F, Vaxillaire M, Polak M, Scharfmann R, Czernichow P, Froguel P. GATA6 inactivating mutations are associated with heart defects and, inconsistently, with pancreatic agenesis and diabetes. *Diabetologia* 2012; 55: 2845–2847
- [62] Bornet F, Haardt MJ, Costagliola D, Blayo A, Slama G. Sucrose or honey at breakfast have no additional acute hyperglycaemic effect over an isoglucidic amount of bread in type 2 diabetic patients. *Diabetologia* 1985; 28: 213–217. EK Ib
- [63] Brackenridge A, Wallbank H, Lawrenson RA, Russell-Jones D. Emergency management of diabetes and hypoglycaemia. *Emerg Med J* 2006; 23: 183–185. EK III
- [64] Brand-Miller J, Hayne S, Petocz P, Colagiuri S. Low-glycemic index diets in the management of diabetes: a meta-analysis of randomized controlled trials. *Diabetes Care* 2003; 26: 2261–2267. EK Ia
- [65] Brink S, Laffel L, Likitmaskul S, Liu L, Maguire AM, Olsen B, Silink M, Hanas R. Sick day management in children and adolescents with diabetes. *Pediatr Diabetes* 2007; 8: 401–407. EK IV
- [66] Brink S, Laffel L, Likitmaskul S, Liu L, Maguire AM, Olsen B, Silink M, Hanas R. Sick day management in children and adolescents with diabetes. *Pediatr Diabetes* 2007; 8: 401–407
- [67] Brown M, Ahmed ML, Clayton KL, Dunger DB. Growth during childhood and final height in type 1 diabetes. *Diabet Med* 1994; 11: 182–187. EK III
- [68] Bryden KS, Neil A, Mayou RA, Peveler RC, Fairburn CG, Dunger DB. Eating habits, body weight, and insulin misuse. A longitudinal study of teenagers and young adults with type 1 diabetes. *Diabetes Care* 1999; 22: 1956–1960. EK III
- [69] Buckingham BA, Cameron F, Calhoun P, Maahs DM, Wilson DM, Chase HP, Bequette BW, Lum J, Sibayan J, Beck RW, Kollman C. Outpatient safety assessment of an in-home predictive low-glucose suspend system with type 1 diabetes subjects at elevated risk of nocturnal hypoglycemia. *Diabetes Technol Ther* 2013; 15: 622–627. EK Ib
- [70] Bundesarbeitsgemeinschaft für Rehabilitation (BAR) Gemeinsames Rahmenkonzept der Gesetzlichen Krankenkassen und der Gesetzlichen Rentenversicherung für die Durchführung stationärer medizinischer Leistungen der Vorsorge und Rehabilitation für Kinder und Jugendliche. [http://www.bar-frankfurt.de/fileadmin/dateiliste/publikationen/arbeitsmaterialien/downloads/Gemeinsames\\_Rahmenkonzept\\_2008](http://www.bar-frankfurt.de/fileadmin/dateiliste/publikationen/arbeitsmaterialien/downloads/Gemeinsames_Rahmenkonzept_2008);
- [71] Bundesärztekammer (BÄK), Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (AWMF), Kassenärztliche Bundesvereinigung (KBV) Nationale VersorgungsLeitlinie Diabetes. Strukturierte Schulungsprogramme – Langfassung; 1. Auflage Version 3 doi: <http://doi.org/10.6101/AZQ/0001432012> EK IV
- [72] Bundesärztekammer (BÄK), Kassenärztliche Bundesvereinigung (KBV), Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (AWMF) Nationales Programm für VersorgungsLeitlinien. Methoden-Report. 4. Auflage doi: <http://doi.org/10.6101/AZQ/000061> 2010



- [73] Cadario F, Prodam F, Bellone S, Trada M, Binotti M, Trada M, Allochis G, Baldelli R, Esposito S, Bona G, Aimaretti G. Transition process of patients with type 1 diabetes (T1DM) from paediatric to the adult health care service: A hospital-based approach. *Clin Endocrinol (Oxf)* 2009; 71: 346–350. EK III
- [74] Cameron FJ, Amin R, de BC, Codner E, Acerini CL. ISPAD Clinical Practice Consensus Guidelines 2014. Diabetes in adolescence. *Pediatr Diabetes* 2014; 15: 245–256. EK III
- [75] Cameron FJ, de BC, Aanstoot HJ, Hoey H, Lange K, Castano L, Mortensen HB. Lessons from the Hvidoere International Study Group on childhood diabetes: Be dogmatic about outcome and flexible in approach. *Pediatr Diabetes* 2013; 14: 473–480. EK III
- [76] Cameron FJ, Scratch SE, Nadebaum C, Northam EA, Koves I, Jennings J, Finney K, Neil JJ, Wellard RM, Mackay M, Inder TE. Neurological consequences of diabetic ketoacidosis at initial presentation of type 1 diabetes in a prospective cohort study of children. *Diabetes Care* 2014; 37: 1554–1562. EK IIb
- [77] Cameron FJ, Skinner TC, de Beaufort CE, Hoey H, Swift PG, Aanstoot H, Aman J, Martul P, Chiarelli F, Daneman D, Danne T, Dorchy H, Kaprio EA, Kaufman F, Kocova M, Mortensen HB, Njolstad PR, Phillip M, Robertson KJ, Schoenle EJ, Urakami T, Vanelli M, Ackermann RW, Skovlund SE. Are family factors universally related to metabolic outcomes in adolescents with Type 1 diabetes? *Diabet Med* 2008; 25: 463–468. EK III
- [78] Canadian Diabetes Association Clinical Practice Guidelines Expert Committee Canadian Diabetes Association 2013 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada. *Can J Diabetes* 2013; 37: S1–S212. EK IV
- [79] Carlsson AK, Axelsson IE, Borulf SK, Bredberg AC, Lindberg BA, Sjoberg KG, Ivarsson SA. Prevalence of IgA-antiendomy-sium and IgA-antiigliadin autoantibodies at diagnosis of insulin- dependent diabetes mellitus in Swedish children and adolescents. *Pediatrics* 1999; 103: 1248–1252. EK III
- [80] Ceriello A, Giugliano D, Quattraro A, Lefebvre PJ. Anti-oxidants show an anti-hypertensive effect in diabetic and hypertensive subjects. *Clin Sci (Lond)* 1991; 81: 739–742. EK Ib
- [81] Chan CL, Vigers T, Pyle L, Zeitler PS, Sagel SD, Nadeau KJ. Continuous glucose monitoring abnormalities in cystic fibrosis youth correlate with pulmonary function decline. *J Cyst Fibros* 2018; 17: 783–790
- [82] Chan NN, Brain HP, Feher MD. Metformin-associated lactic acidosis: A rare or very rare clinical entity? *Diabet Med* 1999; 16: 273–281. EK IIa
- [83] Chandalia M, Garg A, Lutjohann D, von Bergmann K, Grundy SM, Brinkley LJ. Beneficial effects of high dietary fiber intake in patients with type 2 diabetes mellitus. *N Engl J Med* 2000; 342: 1392–1398. EK Ib
- [84] Channon SJ, Huws-Thomas MV, Rollnick S, Hood K, Cannings- John RL, Rogers C, Gregory JW. A multicenter randomized controlled trial of motivational interviewing in teenagers with diabetes. *Diabetes Care* 2007; 30: 1390–1395. EK Ib
- [85] Chetty VT, Almulla A, Oduyungbo A, Thabane L. The effect of continuous subcutaneous glucose monitoring (CGMS) vs. intermittent whole blood finger-stick glucose monitoring (SBGM) on hemoglobin A1c (HBA1c) levels in Type I diabetic patients: a systematic review. *Diabetes Res Clin Pract* 2008; 81: 79–87. EK Ia
- [86] Cheung N, Rogers SL, Donaghue KC, Jenkins AJ, Tikellis G, Wong TY. Retinal arteriolar dilation predicts retinopathy in adolescents with type 1 diabetes. *Diabetes Care* 2008; 31: 1842–1846. EK IIb
- [87] Chiang JL, Kirkman MS, Laffel LM, Peters AL. Type 1 diabetes through the life span: a position statement of the American Diabetes Association. *Diabetes Care* 2014; 37: 2034–2054
- [88] Christiansen E, Schnider S, Palmvig B, Tauber-Lassen E, Pedersen O. Intake of a diet high in trans monounsaturated fatty acids or saturated fatty acids. Effects on postprandial insulinemia and glycemia in obese patients with NIDDM. *Diabetes Care* 1997; 20: 881–887. EK Ib
- [89] Churchill JN, Ruppe RL, Smaldone A. Use of continuous insulin infusion pumps in young children with type 1 diabetes: A systematic review. *J Pediatr Health Care* 2009; 23: 173–179. EK 1a
- [90] Clar C, Waugh N, Thomas S. Routine hospital admission vs. out-patient or home care in children at diagnosis of type 1 diabetes mellitus. *Cochrane Database Syst Rev* 2007; CD004 099. EK IIa-III
- [91] Clarke W, Deeb LC, Jameson P, Kaufman F, Klingensmith G, Schatz D, Silverstein JH, Siminerio LM. Diabetes care in the school and day care setting. *Diabetes Care* 2013; 36: S75–S79. EK IV
- [92] Clarke W, Jones T, Rewers A, Dunger D, Klingensmith GJ. Assessment and management of hypoglycemia in children and adolescents with diabetes. *Pediatr Diabetes* 2008; 9: 165–174. EK IV
- [93] Clarke W, Jones T, Rewers A, Dunger D, Klingensmith GJ. Assessment and management of hypoglycemia in children and adolescents with diabetes. *Pediatr Diabetes* 2008; 9: 165–174. EK IV
- [94] Clarke W, Jones T, Rewers A, Dunger D, Klingensmith GJ. Assessment and management of hypoglycemia in children and adolescents with diabetes. *Pediatr Diabetes* 2008; 9: 165–174. EK III
- [95] Cochran JB, Walters S, Losek JD. Pediatric hyperglycemic hyperosmolar syndrome: Diagnostic difficulties and high mortality rate. *Am J Emerg Med* 2006; 24: 297–301. EK III
- [96] Colombo C, Porzio O, Liu M, Massa O, Vasta M, Salardi S, Beccaria L, Monciotti C, Toni S, Pedersen O, Hansen T, Federici L, Pesavento R, Cadario F, Federici G, Ghirri P, Arvan P, Iafusco D, Barbetti F. Seven mutations in the human insulin gene linked to permanent neonatal/ infancy-onset diabetes mellitus. *J Clin Invest* 2008; 118: 2148–2156. EK III
- [97] Colquitt J, Royle P, Waugh N. Are analogue insulins better than soluble in continuous subcutaneous insulin infusion? Results of a meta-analysis. *Diabet Med* 2003; 20: 863–866. EK Ia
- [98] Colton P, Olmsted M, Daneman D, Rydall A, Rodin G. Disturbed eating behavior and eating disorders in preteen and early teenage girls with type 1 diabetes: A case-controlled study. *Diabetes Care* 2004; 27: 1654–1659. EK III
- [99] Colton PA, Olmsted MP, Daneman D, Rodin GM. Depression, disturbed eating behavior, and metabolic control in teenage girls with type 1 diabetes. *Pediatr Diabetes* 2013; 14: 372–376. EK III
- [100] Copeland PM, Anderson B. Diabetes mellitus and eating disorders. *Harv Rev Psychiatry* 1995; 3: 36–40. EK IV
- [101] Coster S, Gulliford MC, Seed PT, Powrie JK, Swaminathan R. Monitoring blood glucose control in diabetes mellitus: A systematic review. *Health Technol Assess* 2000; 4: i–93. EK Ia
- [102] Couch R, Jetha M, Dryden DM. Diabetes education for children with type 1 diabetes mellitus and their families, Agency for Healthcare Research and Quality (AHRQ), Rockville (MD). 2008. EK Ia
- [103] Couper JJ, Haller MJ, Greenbaum CJ et al. ISPAD Clinical Practice Consensus Guidelines 2018: Stages of type 1 diabetes in children and adolescents. *Pediatr Diabetes* 2018; 19: (Suppl.27) 20–27
- [104] Court JM, Cameron FJ, Berg-Kelly K, Swift PG. Diabetes in adolescence. *Pediatr Diabetes* 2008; 9: 255–262. EK IV
- [105] Craig ME, Twigg SM, Donaghue KC, Cheung NW, Cameron FJ, Conn J, Jenkins AJ, Silink M. Australian Type Diabetes Guidelines Expert Advisory Group National evidence-based clinical care guidelines for type 1 diabetes in children, adolescents and adults, Australian Government Department of Health and Ageing, Canberra. 2011; EK IV
- [106] Cranston I, Lomas J, Maran A, Macdonald I, Amiel SA. Restoration of hypoglycaemia awareness in patients with longduration insulin-dependent diabetes. *Lancet* 1994; 344: 283–287. EK III
- [107] d'Emden H, Holden L, McDermott B, Harris M, Gibbons K, Gledhill A, Cotterill A. Disturbed eating behaviours and thoughts in Australian adolescents with type 1 diabetes. *J Paediatr Child Health* 2013; 49: E317–E323. EK III

- [108] Dalla Pozza R, Bechtold S, Bonfig W, Putzker S, Kozlik-Feldmann R, Netz H, Schwarz HP. Age of onset of type 1 diabetes in children and carotid intima medial thickness. *J Clin Endocrinol Metab* 2007; 92: 2053–2057. EK Ib
- [109] Danne T. Deutscher Gesundheitsbericht. *Diabetes*. 2014; [http://www.diabetesde.org/fileadmin/users/Patientenseite/PDFs\\_und\\_TEXTE/Infomaterial/Gesundheitsbericht\\_2014\\_kl.pdf](http://www.diabetesde.org/fileadmin/users/Patientenseite/PDFs_und_TEXTE/Infomaterial/Gesundheitsbericht_2014_kl.pdf) 2014; EK Ib
- [110] Danne T, Aman J, Schober E, Deiss D, Jacobsen JL, Friberg HH, Jensen LH. A comparison of postprandial and preprandial administration of insulin aspart in children and adolescents with type 1 diabetes. *Diabetes Care* 2003; 26: 2359–2364. EK Ib
- [111] Danne T, Bangstad HJ, Deeb L, Jarosz-Chobot P, Mungaie L, Saboo B, Urakami T, Battelino T, Hanas R. ISPAD Clinical Practice Consensus Guidelines 2014. Insulin treatment in children and adolescents with diabetes. *Pediatr Diabetes* 2014; 15: 115–134. EK IV
- [112] Danne T, Battelino T, Jarosz-Chobot P, Kordonouri O, Pankowska E, Ludvigsson J, Schober E, Kaprio E, Saukkonen T, Nicolino M, Tubiana-Rufi N, Klinkert C, Haberland H, Vazeou A, Madacsy L, Zangen D, Cherubini V, Rabbone I, Toni S, de BC, Bakker-van WW, van den BN, Volkov I, Barrio R, Hanas R, Zumsteg U, Kuhlmann B, Aebi C, Schumacher U, Gschwend S, Hindmarsh P, Torres M, Shehadeh N, Phillip M. Establishing glycaemic control with continuous subcutaneous insulin infusion in children and adolescents with type 1 diabetes: Experience of the PedPump Study in 17 countries. *Diabetologia* 2008; 51: 1594–1601. EK III
- [113] Danne T, Becker RH, Heise T, Bittner C, Frick AD, Rave K. Pharmacokinetics, prandial glucose control, and safety of insulin glulisine in children and adolescents with type 1 diabetes. *Diabetes Care* 2005; 28: 2100–2105. EK Ib
- [114] Danne T, Datz N, Endahl L, Haahr H, Nestoris C, Westergaard L, Fjording MS, Kordonouri O. Insulin detemir is characterized by a more reproducible pharmacokinetic profile than insulin glargine in children and adolescents with type 1 diabetes: results from a randomized, double-blind, controlled trial. *Pediatr Diabetes* 2008; 9: 554–560. EK Ib
- [115] Danne T, Kordonouri O. Use of technology to potentially preserve C-Peptide in type 1 diabetes mellitus. *Pediatr Endocrinol Rev* 2010; 7: Suppl 3 396–400. EK Ib
- [116] Danne T, Kordonouri O, Enders I, Weber B. Factors influencing height and weight development in children with diabetes. Results of the Berlin Retinopathy Study. *Diabetes Care* 1997; 20: 281–285. EK III
- [117] Danne T, Mortensen HB, Hougaard P, Lynggaard H, Aanstoot HJ, Chiarelli F, Daneman D, Dorchy H, Garandeau P, Greene SA, Hoey H, Holl RW, Kaprio EA, Kocova M, Martul P, Matsuura N, Robertson KJ, Schoenle EJ, Sovik O, Swift PG, Tsou RM, Vanelli M, Aman J. Persistent differences among centers over 3 years in glycemic control and hypoglycemia in a study of 3805 children and adolescents with type 1 diabetes from the Hvidore Study Group. *Diabetes Care* 2001; 24: 1342–1347. EK III
- [118] Danne T, Nimri R, Battelino T et al International consensus on use of continuous glucose monitoring. *Diabetes Care* 2017; 40: 1631–1640
- [119] Danne T, Phillip M, Buckingham BA et al. ISPAD Clinical Practice Consensus Guidelines 2018: Insulin treatment in children and adolescents with diabetes. *Pediatr Diabetes* 2018; 19: (Suppl. 27) 115–135. doi: <https://doi.org/10.1111/pedi.12718>
- [120] Danne T, Philotheou A, Goldman D, Guo X, Ping L, Cali A, Johnston P. A randomized trial comparing the rate of hypoglycemia—assessed using continuous glucose monitoring—in 125 preschool children with type 1 diabetes treated with insulin glargine or NPH insulin (the PRESCHOOL study). *Pediatr Diabetes* 2013; 14: 593–601. EK Ib
- [121] Danne T, Rastam J, Odendahl R, Nake A, Schimmel U, Szczepanski R, Moeller J, Deiss D. Parental preference of prandial insulin aspart compared with preprandial human insulin in a basal-bolus scheme with NPH insulin in a 12-wk crossover study of preschool children with type 1 diabetes. *Pediatr Diabetes* 2007; 8: 278–285. EK Ia
- [122] Danne T, Tsioli C, Kordonouri O, Blaesig S, Remus K, Roy A, Keenan B, Lee SW, Kaufman FR. The PILGRIM study: in silico modeling of a predictive low glucose management system and feasibility in youth with type 1 diabetes during exercise. *Diabetes Technol Ther* 2014; 16: 338–347. EK Ib
- [123] Danne T, Weber B, Hartmann R, Enders I, Burger W, Hovener G. Long-term glycaemic control has a nonlinear association to the frequency of background retinopathy in adolescents with diabetes. Follow-up of the Berlin Retinopathy Study. *Diabetes Care* 1994; 17: 1390–1396. EK III
- [124] Danne T, Ziegler R, Kapellen T. *Diabetes bei Kindern und Jugendlichen*. Dt. Gesundheitsbericht Diabetes. 2019: Kirchheim-Verlag; 124–135
- [125] Davis CL, Delamater AM, Shaw KH, La Greca AM, Eidson MS, Perez-Rodriguez JE, Nemery R. Parenting styles, regimen adherence, and glycemic control in 4- to 10-year-old children with diabetes. *J Pediatr Psychol* 2001; 26: 123–129. EK III
- [126] de Beaufort CE, Lange K, Swift PG, Aman J, Cameron F, Castano L, Dorchy H, Fisher LK, Hoey H, Kaprio E, Kocova M, Neu A, Njolstad PR, Phillip M, Schoenle E, Robert JJ, Urakami T, Vanelli M, Danne T, Barrett T, Chiarelli F, Aanstoot HJ, Mortensen HB. Metabolic outcomes in young children with type 1 diabetes differ between treatment centers: the Hvidoere Study in Young Children 2009. *Pediatr Diabetes* 2013; 14: 422–428. EK Ib
- [127] de Man SA, Andre JL, Bachmann H, Grobbee DE, Ibsen KK, Laaser U, Lippert P, Hofman A. Blood pressure in childhood: pooled findings of six European studies. *J Hypertens* 1991; 9: 109–114. EK Ib
- [128] de Weerd O, Visser AP, Kok GJ, de Weerd O, van der Veen EA. Randomized controlled multicentre evaluation of an education programme for insulin-treated diabetic patients: effects on metabolic control, quality of life, and costs of therapy. *Diabet Med* 1991; 8: 338–345. EK Ib
- [129] de Wit M., Winterdijk P, Aanstoot HJ, Anderson B, Danne T, Deeb L, Lange K, Nielsen AO, Skovlund S, Peyrot M, Snoek F. Assessing diabetes-related quality of life of youth with type 1 diabetes in routine clinical care: the MIND Youth Questionnaire (MY-Q). *Pediatr Diabetes* 2012; 13: 638–646. EK IV
- [130] de Wit M, Delemarre-van de Waal HA, Bokma JA, Haasnoot K, Houdijk MC, Gemke RJ, Snoek FJ. Monitoring and discussing health-related quality of life in adolescents with type 1 diabetes improve psychosocial well-being: A randomized controlled trial. *Diabetes Care* 2008; 31: 1521–1526. EK Ib
- [131] de Wit M, Pouwer F, Gemke RJ, Delemarre-van de Waal HA, Snoek FJ. Validation of the WHO-5 Well-Being Index in adolescents with type 1 diabetes. *Diabetes Care* 2007; 30: 2003–2006. EK III
- [132] Decourcey DD, Steil GM, Wypij D, Agus MS. Increasing use of hypertonic saline over mannitol in the treatment of symptomatic cerebral edema in pediatric diabetic ketoacidosis: an 11-year retrospective analysis of mortality \*. *Pediatr Crit Care Med* 2013; 14: 694–700. EK III
- [133] Deeb LC, Holcombe JH, Brunelle R, Zalani S, Brink S, Jenner M, Kitson H, Perlman K, Spencer M. Insulin lispro lowers postprandial glucose in prepubertal children with diabetes. *Pediatrics* 2001; 108: 1175–1179. EK Ib
- [134] Deiss D, Bolinder J, Riveline JP, Battelino T, Bosi E, Tubiana-Rufi N, Kerr D, Phillip M. Improved glycemic control in poorly controlled patients with type 1 diabetes using real-time continuous glucose monitoring. *Diabetes Care* 2006; 29: 2730–2732. EK Ib
- [135] Delamater AM, Bubb J, Davis SG, Smith JA, Schmidt L, White NH, Santiago JV. Randomized prospective study of self-management training with newly diagnosed diabetic children. *Diabetes Care* 1990; 13: 492–498. EK Ib

- [136] Delamater AM, de WM, McDarby V, Malik J, Acerini CL. ISPAD Clinical Practice Consensus Guidelines 2014. Psychological care of children and adolescents with type 1 diabetes. *Pediatr Diabetes* 2014; 15: 232–244. EK IV
- [137] Delamater AM, Jacobson AM, Anderson B, Cox D, Fisher L, Lustman P, Rubin R, Wysocki T. Psychosocial therapies in diabetes: report of the Psychosocial Therapies Working Group. *Diabetes Care* 2001; 24: 1286–1292. EK Ia
- [138] Delamater AM, Shaw KH, Applegate EB, Pratt IA, Eidson M, Lancelotta GX, Gonzalez-Mendoza L, Richton S. Risk for metabolic control problems in minority youth with diabetes. *Diabetes Care* 1999; 22: 700–705. EK III
- [139] Delamater AM, de Wit M, McDarby V, Malik J, Acerini CL. Psychological care of children and adolescents with type 1 diabetes. *Pediatric Diabetes* 2014; 15: 232–244
- [140] Deutsche Gesellschaft für Ernährung (DGE) Österreichische Gesellschaft für Ernährung (ÖGE), Schweizerische Gesellschaft für Ernährungsforschung (SGE), eds.: Referenzwerte für die Nährstoffzufuhr. 2. Auflage ed. Bonn: 2015. EK IV
- [141] Deutsche Gesellschaft für Ernährung (DGE) Österreichische Gesellschaft für Ernährung (ÖGE), Schweizerische Gesellschaft für Ernährungsforschung (SGE), Schweizerische Vereinigung für Ernährung (SVE): Referenzwerte für die Nährstoffzufuhr. Neuer Umschau Buchverl., Neustadt/ Weinstraße 2008. EK IV
- [142] Deutsche Gesellschaft für Kinder- und Jugendpsychiatrie, Psychosomatik und Psychotherapie (DGKJP) Behandlung von depressiven Störungen bei Kindern und Jugendlichen. Evidenz- und konsensbasierte Leitlinie (S3). Langfassung, Stand: 01.07.2013. [http://www.awmf.org/uploads/tx\\_szleitlinien/028-0431\\_S3\\_Depressive\\_St%C3%BC6rungen\\_bei\\_Kindern\\_Jugendlichen\\_2013-07.pdf](http://www.awmf.org/uploads/tx_szleitlinien/028-0431_S3_Depressive_St%C3%BC6rungen_bei_Kindern_Jugendlichen_2013-07.pdf). 2013; EK IV
- [143] Deutsche Gesellschaft für pädiatrische Rehabilitation und Prävention Leitlinie Rehabilitation Diabetes mellitus im Kindes- und Jugendalter. [http://www.awmf.org/uploads/tx\\_szleitlinien/070-003k\\_S2\\_Diabetes\\_mellitus\\_stationaere\\_Rehabilitation.pdf](http://www.awmf.org/uploads/tx_szleitlinien/070-003k_S2_Diabetes_mellitus_stationaere_Rehabilitation.pdf). 2007;
- [144] Deutsche Gesellschaft für Psychiatrie, Psychotherapie und Nervenheilkunde (DGPPN) Bundesärztekammer (BÄK), Kassenärztliche Bundesvereinigung (KBV), Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (AWMF). S3-Leitlinie/ Nationale VersorgungsLeitlinie Unipolare Depression – Langfassung. 1. Auflage Version 5 doi: [http://doi.org/10.6101/AZQ/000\\_239\\_2009](http://doi.org/10.6101/AZQ/000_239_2009) EK IV
- [145] Deutsche Hochdruckliga, Deutsche Hypertoniegesellschaft Leitlinien zur Behandlung der arteriellen Hypertonie, DHL, Heidelberg. 2008;
- [146] Deutsche Rentenversicherung Bund Rahmenkonzept zur medizinischen Rehabilitation in der gesetzlichen Rentenversicherung. 3rd ed. Deutsche Rentenversicherung Bund; Berlin: 2009
- [147] Diabetes Control and Complications Trial Research Group Epidemiology of severe hypoglycemia in the diabetes control and complications trial. The DCCT Research Group. *Am J Med* 1991; 90: 450–459. EK III
- [148] Diabetes Control and Complications Trial Research Group Effect of intensive diabetes treatment on the development and progression of long-term complications in adolescents with insulin-dependent diabetes mellitus: Diabetes Control and Complications Trial. *J Pediatr* 1994; 125: 177–188. EK Ib
- [149] Diabetes Control and Complications Trial Research Group The relationship of glycemic exposure (HbA1c) to the risk of development and progression of retinopathy in the diabetes control and complications trial. *Diabetes* 1995; 44: 968–983. EK Ib
- [150] Diabetes Control and Complications Trial Research Group The absence of a glycemic threshold for the development of long-term complications: the perspective of the Diabetes Control and Complications Trial. *Diabetes* 1996; 45: 1289–1298
- [151] Diabetes Prevention Trial-Type 1 Diabetes Study Group Effects of insulin in relatives of patients with type 1 diabetes mellitus. *N Engl J Med* 2002; 346: 1685–1691. EK Ib
- [152] DiMeglio LA, Acerini CL, Codner E et al. ISPAD Clinical Practice Consensus Guidelines 2018: Glycemic control targets and glucose monitoring for children, adolescents, and young adults with diabetes. *Pediatr Diabetes* 2018; 19: (Suppl. 27) 10–114. doi: <https://doi.org/10.1111/pedi.12737>
- [153] Dobson L, Hattersley AT, Tiley S, Elworthy S, Oades PJ, Sheldon CD. Clinical improvement in cystic fibrosis with early insulin treatment. *Arch Dis Child* 2002; 87: 430–431
- [154] Dodson PM, Beevers M, Hallworth R, Webberley MJ, Fletcher RF, Taylor KG. Sodium restriction and blood pressure in hypertensive type II diabetics: randomised blind controlled crossover studies of moderate sodium restriction and sodium supplementation. *BMJ* 1989; 298: 227–230. EK Ib
- [155] Doherty FM, Calam R, Sanders MR. Positive parenting program (triple P) for families of adolescents with type 1 diabetes: a randomized controlled trial of self-directed teen triple P. *J Pediatr Psychol* 2013; 38: 846–858. EK Ib
- [156] Donaghue KC, Chiarelli F, Trotta D, Allgrove J, hl-Jorgensen K. ISPAD clinical practice consensus guidelines 2006 – 2007. Microvascular and macrovascular complications. *Pediatr Diabetes* 2007; 8: 163–170. EK III
- [157] Donaghue KC, Chiarelli F, Trotta D, Allgrove J, hl-Jorgensen K. ISPAD clinical practice consensus guidelines 2006 – 2007. Microvascular and macrovascular complications. *Pediatr Diabetes* 2007; 8: 163–170. EK IIb
- [158] Donaghue KC, Chiarelli F, Trotta D, Allgrove J, hl-Jorgensen K. ISPAD clinical practice consensus guidelines 2006 – 2007. Microvascular and macrovascular complications. *Pediatr Diabetes* 2007; 8: 163–170. EK IV
- [159] Donaghue KC, Chiarelli F, Trotta D, Allgrove J, hl-Jorgensen K. ISPAD clinical practice consensus guidelines 2006 – 2007. Microvascular and macrovascular complications. *Pediatr Diabetes* 2007; 8: 163–170
- [160] Donaghue KC, Craig ME, Chan AK, Fairchild JM, Cusumano JM, Verge CF, Crock PA, Hing SJ, Howard NJ, Silink M. Prevalence of diabetes complications 6 years after diagnosis in an incident cohort of childhood diabetes. *Diabet Med* 2005; 22: 711–718. EK IIb-III
- [161] Donaghue KC, Wadwa RP, Dimeglio LA, Wong TY, Chiarelli F, Marcovecchio ML, Salem M, Raza J, Hofman PL, Craig ME. ISPAD Clinical Practice Consensus Guidelines 2014. Microvascular and macrovascular complications in children and adolescents. *Pediatr Diabetes* 2014; 15: Suppl 20 257–269. EK IV
- [162] Doolan A, Donaghue K, Fairchild J, Wong M, Williams AJ. Use of HLA typing in diagnosing celiac disease in patients with type 1 diabetes. *Diabetes Care* 2005; 28: 806–809. EK IIa
- [163] Dost A, Klinkert C, Kapellen T, Lemmer A, Naeke A, Grabert M, Kreuder J, Holl RW. Arterial hypertension determined by ambulatory blood pressure profiles: contribution to microalbuminuria risk in a multicenter investigation in 2105 children and adolescents with type 1 diabetes. *Diabetes Care* 2008; 31: 720–725
- [164] Dunger DB, Sperling MA, Acerini CL, Bohn DJ, Daneman D, Danne TP, Glaser NS, Hanas R, Hintz RL, Levitsky LL, Savage MO, Tasker RC, Wolfsdorf JL. ESPE/LWPES consensus statement on diabetic ketoacidosis in children and adolescents. *Arch Dis Child* 2004; 89: 188–194. EK IV
- [165] Edge JA, Jakes RW, Roy Y, Hawkins M, Winter D, Ford-Adams ME, Murphy NP, Bergomi A, Widmer B, Dunger DB. The UK case-control study of cerebral oedema complicating diabetic ketoacidosis in children. *Diabetologia* 2006; 49: 2002–2009. EK II

- [166] Edghill E, Flanagan SE, Patch AM, Boustred C, Parrish A, Shields B, Shepherd MH, Hussain K, Kapoor RR, Malecki M, MacDonald MJ, Stoy J, Steiner DF, Philipson LH, Bell GI, Hattersley AT, Ellard S. Insulin mutation screening in 1044 patients with diabetes: Mutations in the INS gene are a common cause of neonatal diabetes but a rare cause of diabetes diagnosed in childhood or adulthood. *Diabetes* 2008; 57: 1034–1042. EK III
- [167] Ehehalt S, Blumenstock G, Willasch AM, Hub R, Ranke MB, Neu A. Continuous rise in incidence of childhood Type 1 diabetes in Germany. *Diabet Med* 2008; 25: 755–757. EK III
- [168] Ehehalt S, Dietz K, Willasch AM, Neu A. Prediction model for the incidence and prevalence of type 1 diabetes in childhood and adolescence: evidence for a cohort-dependent increase within the next two decades in Germany. *Pediatr Diabetes* 2012; 13: 15–20. EK III
- [169] Ehehalt S, Gauger N, Blumenstock G, Feldhahn L, Scheffner T, Schweizer R, Neu A. Hemoglobin A1c is a reliable criterion for diagnosing type 1 diabetes in childhood and adolescence. *Pediatr Diabetes* 2010; 11: 446–449
- [170] Ellard S, Bellanne-Chantelot C, Hattersley AT. Best practice guidelines for the molecular genetic diagnosis of maturity-onset diabetes of the young. *Diabetologia* 2008; 51: 546–553. EK III
- [171] Ellard S, Flanagan SE, Girard CA, Patch AM, Harries LW, Parrish A, Edghill EL, Mackay DJ, Proks P, Shimomura K, Haberland H, Carson DJ, Shield JP, Hattersley AT, Ashcroft FM. Permanent neonatal diabetes caused by dominant, recessive, or compound heterozygous SUR1 mutations with opposite functional effects. *Am J Hum Genet* 2007; 81: 375–382
- [172] Ellert U, Bretschneider AK, Ravens-Sieberer U. Gesundheitsbezogene Lebensqualität bei Kindern und Jugendlichen in Deutschland. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz* 2014; 57: 798–806. EK IIb
- [173] Ellis D, Naar-King S, Templin T, Frey M, Cunningham P, Sheidow A, Cakan N, Idalski A. Multisystemic therapy for adolescents with poorly controlled type 1 diabetes: reduced diabetic ketoacidosis admissions and related costs over 24 months. *Diabetes Care* 2008; 31: 1746–1747. EK Ib
- [174] Ellis DA, Naar-King S, Chen X, Moltz K, Cunningham PB, Idalski-Carcone A. Multisystemic therapy compared to telephone support for youth with poorly controlled diabetes: findings from a randomized controlled trial. *Ann Behav Med* 2012; 44: 207–215. EK Ib
- [175] Ellis SE, Speroff T, Dittus RS, Brown A, Pichert JW, Elasy TA. Diabetes patient education: A meta-analysis and metaregression. *Patient Educ Couns* 2004; 52: 97–105. EK Ib
- [176] Eppens MC, Craig ME, Jones TW, Silink M, Ong S, Ping YJ. Type 2 diabetes in youth from the Western Pacific region: Glycaemic control, diabetes care and complications. *Curr Med Res Opin* 2006; 22: 1013–1020. EK III
- [177] Erhart M, Holling H, Bettge S, Ravens-Sieberer U, Schlack R. Der Kinder- und Jugendgesundheitsurvey (KiGGS): Risiken und Ressourcen für die psychische Entwicklung von Kindern und Jugendlichen. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz* 2007; 50: 800–809. EK III
- [178] European Medicines Agency (EMA) Outcome of review of new safety data on insulin glargine. [http://www.ema.europa.eu/docs/en\\_GB/document\\_library/Medicine\\_QA/2013/05/WC500\\_143\\_823.pdf](http://www.ema.europa.eu/docs/en_GB/document_library/Medicine_QA/2013/05/WC500_143_823.pdf). 2013;
- [179] European Society of Cardiology Leitlinien für das Management der arteriellen Hypertonie. ESC Pocket Guideline. [http://leitlinien.dgk.org/files/2014\\_Pocket-Leitlinien\\_Arterielle\\_Hypertonie.pdf](http://leitlinien.dgk.org/files/2014_Pocket-Leitlinien_Arterielle_Hypertonie.pdf). 2013;
- [180] Fagot-Campagna A, Narayan KM, Imperatore G. Type 2 diabetes in children. *BMJ* 2001; 322: 377–378. EK III
- [181] Felber J, Aust D, Baas S, Bischoff S, Blaker H, Daum S, Keller R, Koletzko S, Laass M, Nothacker M, Roeb E, Schuppan D, Stallmach A. Ergebnisse einer S2k-Konsensuskonferenz der Deutschen Gesellschaft für Gastroenterologie, Verdauungs- und Stoffwechselerkrankungen (DGVS) gemeinsam mit der Deutschen Zöliakie-Gesellschaft (DZG) zur Zöliakie, Weizenallergie und Weizensensitivität. *Z Gastroenterol* 2014; 52: 711–743. EK IV
- [182] Feldt-Rasmussen B, Mathiesen ER, Jensen T, Lauritzen T, Deckert T. Effect of improved metabolic control on loss of kidney function in type 1 (insulin-dependent) diabetic patients: an update of the Steno studies. *Diabetologia* 1991; 34: 164–170
- [183] Fendler W, Baranowska AI, Mianowska B, Szadkowska A, Mlynarski W. Three-year comparison of subcutaneous insulin pump treatment with multi-daily injections on HbA1c, its variability and hospital burden of children with type 1 diabetes. *Acta Diabetol* 2012; 49: 363–370. EK IIb
- [184] Ficociello LH, Perkins BA, Silva KH, Finkelstein DM, Ignatowska-Switalska H, Gaciong Z, Cupples LA, Aschengrau A, Warram JH, Krolewski AS. Determinants of progression from microalbuminuria to proteinuria in patients who have type 1 diabetes and are treated with angiotensin-converting enzyme inhibitors. *Clin J Am Soc Nephrol* 2007; 2: 461–469. EK IIb
- [185] Fiordalisi I, Novotny WE, Holbert D, Finberg L, Harris GD. An 18-yr prospective study of pediatric diabetic ketoacidosis: an approach to minimizing the risk of brain herniation during treatment. *Pediatr Diabetes* 2007; 8: 142–149. EK III
- [186] Flanagan SE, Edghill EL, Gloyn AL, Ellard S, Hattersley AT. Mutations in KCNJ11, which encodes Kir6.2, are a common cause of diabetes diagnosed in the first 6 months of life, with the phenotype determined by genotype. *Diabetologia* 2006; 49: 1190–1197. EK IIb-III
- [187] Flanagan SE, Patch AM, Mackay DJ, Edghill EL, Gloyn AL, Robinson D, Shield JP, Temple K, Ellard S, Hattersley AT. Mutations in ATP-sensitive K<sup>+</sup> channel genes cause transient neonatal diabetes and permanent diabetes in childhood or adulthood. *Diabetes* 2007; 56: 1930–1937. EK IIb-III
- [188] Forsander G, Persson B, Sundelin J, Berglund E, Snellman K, Hellstrom R. Metabolic control in children with insulin-dependent diabetes mellitus 5y after diagnosis. Early detection of patients at risk for poor metabolic control. *Acta Paediatr* 1998; 87: 857–864. EK III
- [189] Forsander GA, Sundelin J, Persson B. Influence of the initial management regimen and family social situation on glycemic control and medical care in children with type I diabetes mellitus. *Acta Paediatr* 2000; 89: 1462–1468. EK IIa
- [190] Franklin B, Liu J, Ginsberg-Fellner F. Cerebral edema and ophthalmoplegia reversed by mannitol in a new case of insulin-dependent diabetes mellitus. *Pediatrics* 1982; 69: 87–90. EK III
- [191] Frost F, Dyce P, Nazareth D, Malone V, Walshaw MJ. Continuous glucose monitoring guided insulin therapy is associated with improved clinical outcomes in cystic fibrosis-related diabetes. *J Cyst Fibros* 2018; 17 (6): 798–803
- [192] Fröhlich C, Hermann T, Koch S, Regling B, Schiel R, Stachow R, Holl R. Indikationen für eine stationäre Rehabilitation von Kindern und Jugendlichen mit Typ-1-Diabetes – eine bundesweite "DPV-Wiss"-Analyse. *Diabet Stoffw* 2008; 93. EK III
- [193] Fröhlich-Reiterer EE, Hofer S, Kaspers S, Herbst A, Kordonouri O, Schwarz HP, Schober E, Grabert M, Holl RW. Screening frequency for celiac disease and autoimmune thyroiditis in children and adolescents with type 1 diabetes mellitus—data from a German/Austrian multicentre survey. *Pediatr Diabetes* 2008; 9: 546–553. EK III
- [194] Fröhlich-Reiterer EE, Kaspers S, Hofer S, Schober E, Kordonouri O, Pozza SB, Holl RW. Anthropometry, metabolic control, and follow-up in children and adolescents with type 1 diabetes mellitus and biopsy-proven celiac disease. *J Pediatr* 2011; 158: 589–593. EK III

- [195] Gaede P, Vedel P, Parving HH, Pedersen O. 21 Intensified multifactorial intervention in patients with type 2 diabetes mellitus and microalbuminuria: the Steno type 2 randomised study. *Lancet* 1999; 353: 617–622
- [196] Gage H, Hampson S, Skinner TC, Hart J, Storey L, Foxcroft D, Kimber A, Craddock S, McEvilly EA. Educational and psychosocial programmes for adolescents with diabetes: Approaches, outcomes and cost-effectiveness. *Patient Educ Couns* 2004; 53: 333–346. EK Ib
- [197] Gale EA, Bingley PJ, Emmett CL, Collier T. European Nicotinamide Diabetes Intervention Trial (ENDIT): A randomised controlled trial of intervention before the onset of type 1 diabetes. *Lancet* 2004; 363: 925–931. EK Ib
- [198] Gale EA, Gillespie KM. Diabetes and gender. *Diabetologia* 2001; 44: 3–15. EK Ib
- [199] Garg A. High-monounsaturated-fat diets for patients with diabetes mellitus: a meta-analysis. *Am J Clin Nutr* 1998; 67: 577S–582S. EK Ia
- [200] Garin I, Edghill EL, Akerman I, Rubio-Cabezas O, Rica I, Locke JM, Maestro MA, Alshaiikh A, Bundak R, del CG, Deeb A, Deiss D, Fernandez JM, Godbole K, Hussain K, O'Connell M, Klupa T, Kolouskova S, Mohsin F, Perlman K, Sumnik Z, Rial JM, Ugarte E, Vasanthi T, Johnstone K, Flanagan SE, Martinez R, Castano C, Patch AM, Fernandez-Rebollo E, Raile K, Morgan N, Harries LW, Castano L, Ellard S, Ferrer J, Perez de NG, Hattersley AT. Recessive mutations in the INS gene result in neonatal diabetes through reduced insulin biosynthesis. *Proc Natl Acad Sci USA* 2010; 107: 3105–3110
- [201] Gaudieri PA, Chen R, Greer TF, Holmes CS. Cognitive function in children with type 1 diabetes: A meta-analysis. *Diabetes Care* 2008; 31: 1892–1897. EK Ib
- [202] Gayes LA, Steele RG. A meta-analysis of motivational interviewing interventions for pediatric health behavior change. *J Consult Clin Psychol* 2014; 82: 521–535. EK Ia
- [203] Genuth S, Alberti KG, Bennett P, Buse J, Defronzo R, Kahn R, Kitzmiller J, Knowler WC, Lebovitz H, Lernmark A, Nathan D, Palmer J, Rizza R, Saudek C, Shaw J, Steffes M, Stern M, Tuomilehto J, Zimmet P. Follow-up report on the diagnosis of diabetes mellitus. *Diabetes Care* 2003; 26: 3160–3167
- [204] Gerstl EM, Rabl W, Rosenbauer J, Grobe H, Hofer SE, Krause U, Holl RW. Metabolic control as reflected by HbA1c in children, adolescents and young adults with type-1 diabetes mellitus: combined longitudinal analysis including 27 035 patients from 207 centers in Germany and Austria during the last decade. *Eur J Pediatr* 2008; 167: 447–453. EK Ib–III
- [205] Gheissari A, Javanmard SH, Shirzadi R, Amini M, Khalili N. The effects of blocking Angiotensin receptors on early stages of diabetic nephropathy. *Int J Prev Med* 2012; 3: 477–482
- [206] Giacco R, Parillo M, Rivelles AA, Lasorella G, Giacco A, D'Episcopo L, Riccardi G. Long-term dietary treatment with increased amounts of fiber-rich low-glycemic index natural foods improves blood glucose control and reduces the number of hypoglycemic events in type 1 diabetic patients. *Diabetes Care* 2000; 23: 1461–1466. EK Ib
- [207] Glaser N, Barnett P, McCaslin I, Nelson D, Trainor J, Louie J, Kaufman F, Quayle K, Roback M, Malley R, Kuppermann N. Risk factors for cerebral edema in children with diabetic ketoacidosis. The Pediatric Emergency Medicine Collaborative Research Committee of the American Academy of Pediatrics. *N Engl J Med* 2001; 344: 264–269. EK III
- [208] Glaser NS, Wootton-Gorges SL, Buonocore MH, Marcin JP, Rewers A, Strain J, DiCarlo J, Neely EK, Barnes P, Kuppermann N. Frequency of sub-clinical cerebral edema in children with diabetic ketoacidosis. *Pediatr Diabetes* 2006; 7: 75–80. EK III
- [209] Glasgow RE, Fisher EB, Anderson BJ, LaGreca A, Marrero D, Johnson SB, Rubin RR, Cox DJ. Behavioral science in diabetes. Contributions and opportunities. *Diabetes Care* 1999; 22: 832–843. EK Ia
- [210] Gloy AL, Diatloff-Zito C, Edghill EL, Bellanne-Chantelot C, Nivot S, Coutant R, Ellard S, Hattersley AT, Robert JJ. KCNJ11 activating mutations are associated with developmental delay, epilepsy and neonatal diabetes syndrome and other neurological features. *Eur J Hum Genet* 2006; 14: 824–830
- [211] Gloy AL, Pearson ER, Antcliff JF, Proks P, Bruining GJ, Slingerland AS, Howard N, Srinivasan S, Silva JM, Molnes J, Edghill EL, Frayling TM, Temple IK, Mackay D, Shield JP, Sumnik Z, van Rhijn A, Wales JK, Clark P, Gorman S, Aisenberg J, Ellard S, Njolstad PR, Ashcroft FM, Hattersley AT. Activating mutations in the gene encoding the ATP-sensitive potassium-channel subunit Kir6.2 and permanent neonatal diabetes. *N Engl J Med* 2004; 350: 1838–1849. EK III
- [212] Goebel-Fabbri AE, Fikkan J, Franko DL, Pearson K, Anderson BJ, Weinger K. Insulin restriction and associated morbidity and mortality in women with type 1 diabetes. *Diabetes Care* 2008; 31: 415–419. EK Ib
- [213] Golicki DT, Golicka D, Groele L, Pankowska E. Continuous Glucose Monitoring System in children with type 1 diabetes mellitus: A systematic review and meta-analysis. *Diabetologia* 2008; 51: 233–240. EK Ia
- [214] Gong M, Simaite D, Kuhnen P, Heldmann M, Spagnoli F, Blankenstein O, Hubner N, Hussain K, Raile K. Two novel GATA6 mutations cause childhood-onset diabetes mellitus, pancreas malformation and congenital heart disease. *Horm Res Paediatr* 2013; 79: 250–256
- [215] Gottschalk M, Danne T, Vlajnic A, Cara JF. Glimepiride vs. metformin as monotherapy in pediatric patients with type 2 diabetes: a randomized, single-blind comparative study. *Diabetes Care* 2007; 30: 790–794. EK Ib
- [216] Grabert M, Schweiggert F, Holl RW. A framework for diabetes documentation and quality management in Germany: 10 years of experience with DPV. *Comput Methods Programs Biomed* 2002; 69: 115–121. EK III
- [217] Graham DJ, Staffa JA, Shatin D, Andrade SE, Schech SD, La GL, Gurwitz JH, Chan KA, Goodman MJ, Platt R. Incidence of hospitalized rhabdomyolysis in patients treated with lipidlowering drugs. *JAMA* 2004; 292: 2585–2590. EK III
- [218] Green SM, Rothrock SG, Ho JD, Gallant RD, Borger R, Thomas TL, Zimmerman GJ. Failure of adjunctive bicarbonate to improve outcome in severe pediatric diabetic ketoacidosis. *Ann Emerg Med* 1998; 31: 41–48
- [219] Grey M, Boland EA, Davidson M, Li J, Tamborlane WV. Coping skills training for youth with diabetes mellitus has longlasting effects on metabolic control and quality of life. *J Pediatr* 2000; 137: 107–113. EK Ib
- [220] Grey M, Cameron ME, Lipman TH, Thurber FW. Psychosocial status of children with diabetes in the first 2 years after diagnosis. *Diabetes Care* 1995; 18: 1330–1336. EK Ib
- [221] Grey M, Cameron ME, Lipman TH, Thurber FW. Psychosocial status of children with diabetes in the first 2 years after diagnosis. *Diabetes Care* 1995; 18: 1330–1336. EK III
- [222] Grey M, Whittemore R, Jaser S, Ambrosino J, Lindemann E, Liberti L, Northrup V, Dziura J. Effects of coping skills training in school-age children with type 1 diabetes. *Res Nurs Health* 2009; 32: 405–418. EK Ib
- [223] Grey M, Whittemore R, Jeon S, Murphy K, Faulkner MS, Delamater A. Internet psycho-education programs improve outcomes in youth with type 1 diabetes. *Diabetes Care* 2013; 36: 2475–2482. EK Ib
- [224] Grulich-Henn J, Wagner V, Thon A, Schober E, Marg W, Kapellen TM, Haberland H, Raile K, Ellard S, Flanagan SE, Hattersley AT, Holl RW. Entities and frequency of neonatal diabetes: data from the diabetes documentation and quality management system (DPV). *Diabet Med* 2010; 27: 709–712. EK III

- [225] Haas L, Maryniuk M, Beck J, Cox CE, Duker P, Edwards L, Fisher EB, Hanson L, Kent D, Kolb L, McLaughlin S, Orzeck E, Piette JD, Rhinehart AS, Rothman R, Sklaroff S, Tomky D, Youssef G. National standards for diabetes self-management education and support. *Diabetes Care* 2014; 37: (Suppl 1) S144–S153. EK IV
- [226] Hale PJ, Crase J, Natrass M. Metabolic effects of bicarbonate in the treatment of diabetic ketoacidosis. *Br Med J (Clin Res Ed)*.1984; 289: 1035–1038. EK IIa
- [227] Hammes HP, Kerner W, Hofer S, Kordonouri O, Raile K, Holl RW. Diabetic retinopathy in type 1 diabetes—a contemporary analysis of 8784 patients. *Diabetologia* 2011; 54: 1977–1984
- [228] Hampson SE, Skinner TC, Hart J, Storey L, Gage H, Foxcroft D, Kimber A, Shaw K, Walker J. Effects of educational and psychosocial interventions for adolescents with diabetes mellitus: a systematic review. *Health Technol Assess* 2001; 5: 1–79. EK Ia
- [229] Hanas R, Adolfsson P. Insulin pumps in pediatric routine care improve long-term metabolic control without increasing the risk of hypoglycemia. *Pediatr Diabetes* 2006; 7: 25–31. EK III
- [230] Hanas R, Lindgren F, Lindblad B. Diabetic ketoacidosis and cerebral oedema in Sweden—a 2-year paediatric population study. *Diabet Med* 2007; 24: 1080–1085. EK III
- [231] Hanberger L, Ludvigsson J, Nordfeldt S. Use of a web 2.0 portal to improve education and communication in young patients with families: randomized controlled trial. *J Med Internet Res* 2013; 15: e175. EK Ib
- [232] Hansen D, Brock-Jacobsen B, Lund E, Bjorn C, Hansen LP, Nielsen C, Fenger C, Lillevang ST, Husby S. Clinical benefit of a gluten-free diet in type 1 diabetic children with screeningdetected celiac disease: A population-based screening study with 2 years follow-up. *Diabetes Care* 2006; 29: 2452–2456. EK IIa
- [233] Harris MA, Freeman KA, Beers M. Family therapy for adolescents with poorly controlled diabetes: initial test of clinical significance. *J Pediatr Psychol* 2009; 34: 1097–1107. EK IIb
- [234] Hattersley A, Bruining J, Shield J, Njolstad P, Donaghue K. ISPAD Clinical Practice Consensus Guidelines 2006 – 2007. The diagnosis and management of monogenic diabetes in children. *Pediatr Diabetes* 2006; 7: 352–360. EK IV
- [235] Haugstvedt A, Wentzel-Larsen T, Graue M, Sovik O, Rokne B. Fear of hypoglycaemia in mothers and fathers of children with Type 1 diabetes is associated with poor glycaemic control and parental emotional distress: a population-based study. *Diabet Med* 2010; 27: 72–78. EK IIb
- [236] Haugstvedt A, Wentzel-Larsen T, Rokne B, Graue M. Perceived family burden and emotional distress: similarities and differences between mothers and fathers of children with type 1 diabetes in a population-based study. *Pediatr Diabetes* 2011; 12: 107–114. EK IIb
- [237] Hecker W, Bartus B, Heinze E, Holl RW. Stoffwechseleinstellung des Diabetes mellitus Typ 1 bei Kindern und Jugendlichen deutscher und ausländischer Herkunft. *Diabet Stoffw* 1998; 5: 177–180. EK III
- [238] Hecker W, Grabert M, Holl RW. Quality of paediatric IDDMcare in Germany: a multicentre analysis. *German Paediatric Diabetology Group. J Pediatr Endocrinol Metab*.1999; 12: 31–38. EK III
- [239] Helgeson VS, Reynolds KA, Becker D, Escobar O, Siminerio L. Relations of behavioral autonomy to health outcomes among emerging adults with and without type 1 diabetes. *J Pediatr Psychol* 2014; 39: 1126–1137. EK III
- [240] Helgeson VS, Siminerio L, Escobar O, Becker D. Predictors of metabolic control among adolescents with diabetes: a 4-year longitudinal study. *J Pediatr Psychol* 2009; 34: 254–270. EK III
- [241] Helgeson VS, Snyder PR, Escobar O, Siminerio L, Becker D. Comparison of adolescents with and without diabetes on indices of psychosocial functioning for three years. *J Pediatr Psychol* 2007; 32: 794–806. EK IIb
- [242] Helgeson VS, Viccaro L, Becker D, Escobar O, Siminerio L. Diet of adolescents with and without diabetes: Trading candy for potato chips? *Diabetes Care* 2006; 29: 982–987 EK III
- [243] Hellemis MA, Clarke WL. Safe at school: a Virginia experience. *Diabetes Care* 2007; 30: 1396–1398. EK III
- [244] Hermann JM, Hammes HP, Rami-Merhar B, Rosenbauer J, Schutt M, Siegel E, Holl RW. HbA1c variability as an independent risk factor for diabetic retinopathy in type 1 diabetes: a German/Austrian multicenter analysis on 35 891 patients. *PLoS One* 2014; 9: e91 137
- [245] Herzer M, Hood KK. Anxiety symptoms in adolescents with type 1 diabetes: association with blood glucose monitoring and glycemic control. *J Pediatr Psychol* 2010; 35: 415–425. EK III
- [246] Herzer M, Vesco A, Ingerski LM, Dolan LM, Hood KK. Explaining the family conflict-glycemic control link through psychological variables in adolescents with type 1 diabetes. *J Behav Med* 2011; 34: 268–274. EK III
- [247] Hieftje K, Edelman EJ, Camenga DR, Fiellin LE. Electronic media-based health interventions promoting behavior change in youth: a systematic review. *JAMA Pediatr* 2013; 167: 574–580. EK Ia
- [248] Hill ID, Dirks MH, Liptak GS, Colletti RB, Fasano A, Guandalini S, Hoffenberg EJ, Horvath K, Murray JA, Pivor M, Seidman EG. Guideline for the diagnosis and treatment of celiac disease in children: Recommendations of the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition. *J Pediatr Gastroenterol Nutr* 2005; 40: 1–19. EK III
- [249] Hilliard ME, Herzer M, Dolan LM, Hood KK. Psychological screening in adolescents with type 1 diabetes predicts outcomes one year later. *Diabetes Res Clin Pract* 2011; 94: 39–44. EK III
- [250] Hirsch IB, Abelson J, Bode BW, Fischer JS, Kaufman FR, Mastroiuto J, Parkin CG, Wolpert HA, Buckingham BA. Sensor-augmented insulin pump therapy: results of the first randomized treat-to-target study. *Diabetes Technol Ther* 2008; 10: 377–383. EK Ib
- [251] Hoey H. Psychosocial factors are associated with metabolic control in adolescents: research from the Hvidoere Study Group on Childhood Diabetes. *Pediatr Diabetes* 2009; 10: Suppl 13 9–14. EK IIb
- [252] Holl RW, Grabert M. Versorgung von Kindern und Jugendlichen mit Diabetes – Entwicklungen der letzten 19 Jahre, In: Deutsche Diabetes-Hilfe, editor. *Gesundheitsbericht Diabetes 2015* 2015; S 128–138. EK III
- [253] Holl RW, Grabert M, Heinze E, Sorgo W, Debatin KM. Age at onset and long-term metabolic control affect height in type-1 diabetes mellitus. *Eur J Pediatr* 1998; 157: 972–977. EK III
- [254] Holl RW, Heinze E. Dawn- oder Somogyi-Phänomen? Hohe morgendliche Nüchternblutzuckerwerte bei jugendlichen Typ-1-Diabetikern. *Dtsch Med Wochenschr* 1992; 117: 1503–1507. EK III
- [255] Holl RW, Lang GE, Grabert M, Heinze E, Lang GK, Debatin KM. Diabetic retinopathy in pediatric patients with type-1 diabetes: effect of diabetes duration, prepubertal and pubertal onset of diabetes, and metabolic control. *J Pediatr* 1998; 132: 790–794. EK III
- [256] Holl RW, Pavlovic M, Heinze E, Thon A. Circadian blood pressure during the early course of type 1 diabetes. Analysis of 1011 ambulatory blood pressure recordings in 354 adolescents and young adults. *Diabetes Care* 1999; 22: 1151–1157. EK III
- [257] Holl RW, Wolf A, Heinze E, Teller WM. Nicht-immunologisch bedingte Formen des Diabetes mellitus bei Kindern und Jugendlichen. *Monatsschr Kinderheilkd* 1997; 145: 159–176. EK III
- [258] Hölling H, Erhart M, Ravens-Sieberer U, Schlack R. Verhaltensauffälligkeiten bei Kindern und Jugendlichen. Erste Ergebnisse aus dem Kinder- und Jugendgesundheitsurvey (KiGGS). *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz* 2007; 50: 784–793. EK III



- [259] Hölling H, Schlack R. Essstörungen im Kindes- und Jugendalter. Erste Ergebnisse aus dem Kinder- und Jugendgesundheitsurvey (KiGGS). Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 2007; 50: 794–799. EK III
- [260] Hölling H, Schlack R, Petermann F, Ravens-Sieberer U, Mauz E. Psychische Auffälligkeiten und psychosoziale Beeinträchtigungen bei Kindern und Jugendlichen im Alter von 3 bis 17 Jahren in Deutschland – Prävalenz und zeitliche Trends zu 2 Erhebungszeitpunkten (2003 – 2006 und 2009 – 2012). Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 2014; 57: 807–819. EK IIb
- [261] Holman RR, Paul SK, Bethel MA, Matthews DR, Neil HA. 10-year follow-up of intensive glucose control in type 2 diabetes. *N Engl J Med* 2008; 359: 1577–1589. EK Ib
- [262] Holmes CS, Chen R, Streisand R, Marschall DE, Souter S, Swift EE, Peterson CC. Predictors of youth diabetes care behaviors and metabolic control: a structural equation modeling approach. *J Pediatr Psychol* 2006; 31: 770–784. EK III
- [263] Holterhus PM, Odendahl R, Oesingmann S, Lepler R, Wagner V, Hiort O, Holl R. Classification of distinct baseline insulin infusion patterns in children and adolescents with type 1 diabetes on continuous subcutaneous insulin infusion therapy. *Diabetes Care* 2007; 30: 568–573. EK IIb-III
- [264] Hommel E, Olsen B, Battelino T, Conget I, Schutz-Fuhrmann I, Hoogma R, Schierloh U, Sulli N, Gough H, Castaneda J, de PS, Bolinder J. Impact of continuous glucose monitoring on quality of life, treatment satisfaction, and use of medical care resources: analyses from the SWITCH study. *Acta Diabetol* 2014; 51: 845–851. EK Ib
- [265] Hood KK, Huestis S, Maher A, Butler D, Volkening L, Laffel LM. Depressive symptoms in children and adolescents with type 1 diabetes: association with diabetes-specific characteristics. *Diabetes Care* 2006; 29: 1389–1391. EK III
- [266] Hood KK, Rausch JR, Dolan LM. Depressive symptoms predict change in glycemic control in adolescents with type 1 diabetes: rates, magnitude, and moderators of change. *Pediatr Diabetes* 2011; 12: 718–723. EK III
- [267] Hood KK, Rohan JM, Peterson CM, Drotar D. Interventions with adherence-promoting components in pediatric type 1 diabetes: meta-analysis of their impact on glycemic control. *Diabetes Care* 2010; 33: 1658–1664. EK Ia
- [268] Horsch A, McManus F, Kennedy P, Edge J. Anxiety, depressive, and posttraumatic stress symptoms in mothers of children with type 1 diabetes. *J Trauma Stress* 2007; 20: 881–891. EK III
- [269] Hovorka R, Elleri D, Thabit H, Allen JM, Leelarathna L, El-Khairi R, Kumareswaran K, Caldwell K, Calhoun P, Kollman C, Murphy HR, Acerini CL, Wilinska ME, Nodale M, Dunger DB. Overnight closed-loop insulin delivery in young people with type 1 diabetes: a free-living, randomized clinical trial. *Diabetes Care* 2014; 37: 1204–1211. EK Ib
- [270] Howell WH, McNamara DJ, Tosca MA, Smith BT, Gaines JA. Plasma lipid and lipoprotein responses to dietary fat and cholesterol: a meta-analysis. *Am J Clin Nutr* 1997; 65: 1747–1764. EK Ia
- [271] Hu FB, Cho E, Rexrode KM, Albert CM, Manson JE. Fish and long-chain omega-3 fatty acid intake and risk of coronary heart disease and total mortality in diabetic women. *Circulation* 2003; 107: 1852–1857. EK III
- [272] Hürter A, Otten A. Familien mit diabetischen Kindern und Jugendlichen: Psychische und soziale Probleme und der Wunsch nach psychologischer Hilfe im Vergleich mit anderen chronischen Erkrankungen. In: Roth R, Borkenstein M, editors. Psychosoziale Aspekte in der Betreuung von Kindern und Jugendlichen mit Diabetes, Karger, Basel; 1991: S 150–159. EK III
- [273] Hürter P, Bürger W, Schober E, Holl R, Klinghammer A. Qualitätssicherung in der Pädiatrischen Diabetologie. *Monatsschr Kinderheilkd* 1995; 143: 1146–1149. EK IV
- [274] Hürter P, von Schütz W, Lange K. Kinder und Jugendliche mit Diabetes. Medizinischer und psychologischer Ratgeber für Eltern. 3. Aufl ed. Springer; Berlin: 2012
- [275] Husby S, Koletzko S, Korponay-Szabo IR, Mearin ML, Phillips A, Shamir R, Troncone R, Giersiepen K, Branski D, Catassi C, Lelgeman M, Maki M, Ribes-Koninckx C, Ventura A, Zimmer KP. European Society for Pediatric Gastroenterology, Hepatology, and Nutrition guidelines for the diagnosis of coeliac disease. *J Pediatr Gastroenterol Nutr* 2012; 54: 136–160. EK IV
- [276] Hutchinson A, McIntosh A, Peters J, O’Keeffe C, Khunti K, Baker R, Booth A. Effectiveness of screening and monitoring tests for diabetic retinopathy—a systematic review. *Diabet Med* 2000; 17: 495–506. EK IIa
- [277] Icks A, Razum O, Rosenbauer J, Bachle C, Hungele A, Monkemoller K, Muller-Godeffroy E, Heidtmann B, Kapellen T, Scheuing N, Holl RW. Lower frequency of insulin pump treatment in children and adolescents of Turkish background with type 1 diabetes: analysis of 21 497 patients in Germany. *Diabetes Technol Ther* 2012; 14: 1105–1109. EK IIb
- [278] Icks A, Rosenbauer J, Holl RW, Giani G. Increased hospitalization with longer distance from treatment centre in diabetic paediatric patients in Germany. *Diabetologia* 2001; 44: 1068–1069. EK IIb-III
- [279] Icks A, Rosenbauer J, Strassburger K, Grabert M, Giani G, Holl RW. Persistent social disparities in the risk of hospital admission of paediatric diabetic patients in Germany—prospective data from 1277 diabetic children and adolescents. *Diabet Med* 2007; 24: 440–442. EK III
- [280] Ingerski LM, Laffel L, Drotar D, Repaske D, Hood KK. Correlates of glycemic control and quality of life outcomes in adolescents with type 1 diabetes. *Pediatr Diabetes* 2010; 11: 563–571. EK III
- [281] Institut für Qualität und Wirtschaftlichkeit im Gesundheitswesen (IQWiG) Kurzwirksame Insulinanaloga zur Behandlung des Diabetes mellitus Typ 1. Abschlussbericht. Auftrag A05 – 02. Version 1.0. Stand: 30.03.2007, IQWiG, Köln. 2007;
- [282] International Hypoglycaemia Study Group Glucose concentrations of less than 3.0mmol/L (54mg/dL) should be reported in clinical trials: A joint position statement of the American Diabetes Association and the European Association for the Study of Diabetes. *Diabetes Care* 2017; 40: 155–157
- [283] International Society for Pediatric and Adolescent Diabetes (ISPAD) Clinical Practice Consensus Guidelines 2014. *Pediatr Diabetes* 2014; 15: 1–290
- [284] Irgens HU, Molnes J, Johansson BB, Ringdal M, Skriverhaug T, Undlien DE, Sovik O, Joner G, Molven A, Njolstad PR. Prevalence of monogenic diabetes in the population-based Norwegian Childhood Diabetes Registry. *Diabetologia* 2013; 56: 1512–1519
- [285] Jacobson AM, Hauser ST, Lavori P, Willett JB, Cole CF, Wolfsdorf JL, Dumont RH, Wertlieb D. Family environment and glycemic control: a four-year prospective study of children and adolescents with insulin-dependent diabetes mellitus. *Psychosom Med* 1994; 56: 401–409. EK III
- [286] Jacobson AM, Hauser ST, Willett J, Wolfsdorf JL, Herman L. Consequences of irregular vs. continuous medical follow-up in children and adolescents with insulin-dependent diabetes mellitus. *J Pediatr* 1997; 131: 727–733. EK III
- [287] Jacobson AM, Musen G, Ryan CM, Silvers N, Cleary P, Waberski B, Burwood A, Weinger K, Bayless M, Dahms W, Harth J. Longterm effect of diabetes and its treatment on cognitive function. *N Engl J Med* 2007; 356: 1842–1852. EK Ib
- [288] Janner M, Knill SE, Diem P, Zuppinger KA, Mullis PE. Persistent microalbuminuria in adolescents with type I (insulin-dependent) diabetes mellitus is associated to early rather than late puberty. Results of a prospective longitudinal study. *Eur J Pediatr* 1994; 153: 403–408. EK IIb



- [289] Jefferies C, Solomon M, Perlman K, Sweezey N, Daneman D. Continuous glucose monitoring in adolescents with cystic fibrosis. *J Pediatr* 2005; 147: 396–398. EK IIb
- [290] Jefferson IG, Swift PG, Skinner TC, Hood GK. Diabetes services in the UK: third national survey confirms continuing deficiencies. *Arch Dis Child* 2003; 88: 53–56. EK III
- [291] Jeitler K, Horvath K, Berghold A, Gratzner TW, Neeser K, Pieber TR, Siebenhofer A. Continuous subcutaneous insulin infusion vs. multiple daily insulin injections in patients with diabetes mellitus: Systematic review and meta-analysis. *Diabetologia* 2008; 51: 941–951 la
- [292] Johansson S, Irgens H, Chudasama KK, Molnes J, Aerts J, Roque FS, Jonassen I, Levy S, Lima K, Knappskog PM, Bell GI, Molven A, Njolstad PR. Exome sequencing and genetic testing for MODY. *PLoS One* 2012; 7: e38 050
- [293] Jones CA, Leese GP, Kerr S, Bestwick K, Isherwood DI, Vora JP, Hughes DA, Smith C. Development and progression of microalbuminuria in a clinic sample of patients with insulin dependent diabetes mellitus. *Arch Dis Child* 1998; 78: 518–523. EK III
- [294] Jones KL, Arslanian S, Peterokova VA, Park JS, Tomlinson MJ. Effect of metformin in pediatric patients with type 2 diabetes: a randomized controlled trial. *Diabetes Care* 2002; 25: 89–94. EK Ib
- [295] Kalk WJ, Osler C, Constable J, Kruger M, Panz V. Influence of dietary protein on glomerular filtration and urinary albumin excretion in insulin-dependent diabetes. *Am J Clin Nutr* 1992; 56: 169–173. EK III
- [296] Kapellen T, Vogel C, Telleis D, Siekmeyer M, Kiess W. Treatment of diabetic ketoacidosis (DKA) with 2 different regimens regarding fluid substitution and insulin dosage (0.025 vs. 0.1 units/kg/h). *Exp Clin Endocrinol Diabetes* 2012; 120: 273–276. EK III
- [297] Kapellen TM, Klinkert C, Heidtmann B, Jakisch B, Haberland H, Hofer SE, Holl RW. Insulin pump treatment in children and adolescents with type 1 diabetes: experiences of the German working group for insulin pump treatment in pediatric patients. *Postgrad Med* 2010; 122: 98–105
- [298] Karges B, Muche R, Knerr I, Ertel W, Wiesel T, Hub R, Neu A, Klinghammer A, Aufschild J, Rapp A, Schirbel A, Boehm BO, Debatin KM, Heinze E, Karges W. Levothyroxine in euthyroid autoimmune thyroiditis and type 1 diabetes: A randomized, controlled trial. *J Clin Endocrinol Metab* 2007; 92: 1647–1652. EK Ib
- [299] Karges B, Rosenbauer J, Holterhus PM, Beyer P, Seithe H, Vogel C, Bockmann A, Peters D, Muther S, Neu A, Holl RW. Hospital admission for diabetic ketoacidosis or severe hypoglycemia in 31 330 young patients with type 1 diabetes. *Eur J Endocrinol* 2015; 173: 341–350. EK III
- [300] Karges B, Rosenbauer J, Kapellen T, Wagner VM, Schober E, Karges W, Holl RW. Hemoglobin A1c Levels and risk of severe hypoglycemia in children and young adults with type 1 diabetes from Germany and Austria: A trend analysis in a cohort of 37 539 patients between 1995 and 2012. *PLoS Med* 2014; 11: e1001 742. EK III
- [301] Karges B, Schwandt A, Heidtmann B et al. Association of Insulin Pump Therapy vs. Insulin Injection Therapy With Severe Hypoglycemia, Ketoacidosis, and Glycemic Control Among Children, Adolescents, and Young Adults With Type 1 Diabetes. *JAMA* 2017; Oct 10 318 (14): 1358–1366 doi: 10.1001/jama.2017.13994
- [302] Katan MB, Zock PL, Mensink RP. Dietary oils, serum lipoproteins, and coronary heart disease. *Am J Clin Nutr* 1995; 61: 1368S–1373S. EK Ia
- [303] Katz ML, Volkening LK, Butler DA, Anderson BJ, Laffel LM. Family-based psychoeducation and Care Ambassador intervention to improve glycemic control in youth with type 1 diabetes: a randomized trial. *Pediatr Diabetes* 2014; 15: 142–150. EK Ib
- [304] Keane S, Gallagher A, Ackroyd S, McShane MA, Edge JA. Cerebral venous thrombosis during diabetic ketoacidosis. *Arch Dis Child* 2002; 86: 204–205. EK IV
- [305] Kellner M, Danne T. Praxis-Leitlinien der Deutschen Diabetes Gesellschaft. *Diabet Stoffw* 2010; 5: S107–S108
- [306] Kellner M, Siegel E., Hrsg. Praxisleitlinien der Deutschen Diabetes Gesellschaft. *Diabet Stoffw*. 2014; 9: S95–S228
- [307] Kempf K, Rathmann W, Herder C. Impaired glucose regulation and type 2 diabetes in children and adolescents. *Diabetes Metab Res Rev* 2008; 24: 427–437. EK IIb-III
- [308] Kiess W, Bottner A, Raile K, Kapellen T, Muller G, Galler A, Paschke R, Wabitsch M. Type 2 diabetes mellitus in children and adolescents: a review from a European perspective. *Horm Res* 2003; 59: (Suppl 1): 77–84. EK III
- [309] Kilpatrick ES, Rigby AS, Atkin SL. The effect of glucose variability on the risk of microvascular complications in type 1 diabetes. *Diabetes Care* 2006; 29: 1486–1490. EK IIa
- [310] Kintzel R, Holl R, Haberland H, Grabert M, Dost A. Die diabetische Ketoazidose bei Erkrankungsbeginn im Kindes- und Jugendalter in der Bundesrepublik. *Diab Stoffw* 2003; 12: 8–12. EK IIb
- [311] Klupa T, Kowalska I, Wyka K, Skupien J, Patch AM, Flanagan SE, Noczynska A, Arciszewska M, Ellard S, Hattersley AT, Sieradzki J, Mlynarski W, Malecki MT. Mutations in the ABCC8 gene are associated with a variable clinical phenotype. *Clin Endocrinol (Oxf)* 2008. EK III
- [312] Knerr I, Dost A, Lepler R, Raile K, Schober E, Rascher W, Holl RW. Tracking and prediction of arterial blood pressure from childhood to young adulthood in 868 patients with type 1 diabetes: A multicenter longitudinal survey in Germany and Austria. *Diabetes Care* 2008; 31: 726–727. EK IIb-III
- [313] Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA, Nathan DM. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med* 2002; 346: 393–403. EK Ib
- [314] Koch C, Rainisio M, Madessani U, Harms HK, Hodson ME, Mastella G, McKenzie SG, Navarro J, Strandvik B. Presence of cystic fibrosis-related diabetes mellitus is tightly linked to poor lung function in patients with cystic fibrosis: data from the European Epidemiologic Registry of Cystic Fibrosis. *Pediatr Pulmonol* 2001; 32: 343–350. EK III
- [315] Koletzko B, Broekaert I, Kreuder J, Cremer P, Schwab O. Leitlinien zur Diagnostik und Therapie von Hyperlipidämien bei Kindern und Jugendlichen, APS. 2007;
- [316] Kongkaew C, Jampachaisri K, Chaturongkul CA, Scholfield CN. Depression and adherence to treatment in diabetic children and adolescents: a systematic review and meta-analysis of observational studies. *Eur J Pediatr* 2014; 173: 203–212. EK Ia
- [317] Konrad K, Scheuing N, Badenhoop K, Borkenstein MH, Gohlke B, Schoff C, Seufert J, Thon A, Holl RW. Cystic fibrosis-related diabetes compared with type 1 and type 2 diabetes in adults. *Diabetes Metab Res Rev* 2013; 29: 568–575
- [318] Konrad K, Thon A, Fritsch M, Frohlich-Reiterer E, Lilienthal E, Wudy SA, Holl RW. Comparison of cystic fibrosis-related diabetes with type 1 diabetes based on a German/Austrian Pediatric Diabetes Registry. *Diabetes Care* 2013; 36: 879–886. EK III
- [319] Kordonouri O, Biester T, Schnell K, Hartmann R, Tsioli C, Fath M, Datz N, Danne T. Lipoatrophy in children with type 1 diabetes: An increasing incidence? *J Diabetes Sci Technol* 2015; 9: 206–208. EK III
- [320] Kordonouri O, Charpentier N, Hartmann R. GADA positivity at onset of type 1 diabetes is a risk factor for the development of autoimmune thyroiditis. *Pediatr Diabetes* 2011; 12: 31–33. EK IIb
- [321] Kordonouri O, Deiss D, Danne T, Dorow A, Bassir C, Gruters- Kieslich A. Predictivity of thyroid autoantibodies for the development of thyroid disorders in children and adolescents with Type 1 diabetes. *Diabet Med* 2002; 19: 518–521. EK III

- [322] Kordonouri O, Hartmann R, Lauterborn R, Barnekow C, Hoeffe J, Deiss D. Age-specific advantages of continuous subcutaneous insulin infusion as compared with multiple daily injections in pediatric patients: one-year follow-up comparison by matched-pair analysis. *Diabetes Care* 2006; 29: 133–134. EK IIa
- [323] Kordonouri O, Klingensmith G, Knip M, Holl RW, Aanstoot HJ, Menon PS, Craig ME. ISPAD Clinical Practice Consensus Guidelines 2014. Other complications and diabetes-associated conditions in children and adolescents. *Pediatr Diabetes* 2014; 15: 270–278. EK IV
- [324] Kordonouri O, Klinghammer A, Lang EB, Gruters-Kieslich A, Grabert M, Holl RW. Thyroid autoimmunity in children and adolescents with type 1 diabetes: A multicenter survey. *Diabetes Care* 2002; 25: 1346–1350. EK III
- [325] Kordonouri O, Maguire AM, Knip M, Schober E, Lorini R, Holl RW, Donaghue K. Other complications and associated conditions, In: International Diabetes Federation (IDF), editor: Global IDF/ISPAD Guideline for Diabetes in Childhood and Adolescence Brussels 2011; S 124–128. EK IV
- [326] Kordonouri O, Maguire AM, Knip M, Schober E, Lorini R, Holl RW, Donaghue KC. ISPAD Clinical Practice Consensus Guidelines 2006 – 2007. Other complications and associated conditions. *Pediatr Diabetes* 2007; 8: 171–176
- [327] Kordonouri O, Maguire AM, Knip M, Schober E, Lorini R, Holl RW, Donaghue KC. ISPAD Clinical Practice Consensus Guidelines 2006 – 2007. Other complications and associated conditions. *Pediatr Diabetes* 2007; 8: 171–176. EK IV
- [328] Korhonen T, Huttunen JK, Aro A, Hentinen M, Ihalainen O, Majander H, Siitonen O, Uusitupa M, Pyorala K. A controlled trial on the effects of patient education in the treatment of insulin-dependent diabetes. *Diabetes Care* 1983; 6: 256–261. EK Ib
- [329] Koster JC, Cadario F, Peruzzi C, Colombo C, Nichols CG, Barbeti F. The G53D mutation in Kir6.2 (KCNJ11) is associated with neonatal diabetes and motor dysfunction in adulthood that is improved with sulfonylurea therapy. *J Clin Endocrinol Metab* 2008; 93: 1054–1061. EK III
- [330] Kovacs M, Feinberg TL, Paulauskas S, Finkelstein R, Pollock M, Crouse-Novak M. Initial coping responses and psychosocial characteristics of children with insulin-dependent diabetes mellitus. *J Pediatr* 1985; 106: 827–834. EK III
- [331] Kovacs M, Ho V, Pollock MH. Criterion and predictive validity of the diagnosis of adjustment disorder: a prospective study of youths with new-onset insulin-dependent diabetes mellitus. *Am J Psychiatry* 1995; 152: 523–528. EK III
- [332] Kovacs M, Iyengar S, Goldston D, Obrosky DS, Stewart J, Marsh J. Psychological functioning among mothers of children with insulin-dependent diabetes mellitus: a longitudinal study. *J Consult Clin Psychol* 1990; 58: 189–195. EK III
- [333] Kromeyer-Hauschild K, Wabitsch M, Kunze D, Geller F, Geiß HC, Hesse V, von Hippel A, Jaeger U, Johnsen D, Korte W, Menner K, Müller G, Müller JM, Niemann-Pilatus A, Remer T, Schaefer F, Wittchen HU, Zabransky S, Zellner K, Ziegler A, Hebebrand J. Perzentile für den Body-mass-Index für das Kindes- und Jugendalter unter Heranziehung verschiedener deutscher Stichproben. *Monatsschr Kinderheilkd* 2001; 149: 807–818. EK III
- [334] Kulzer B, Albus C, Herpertz S, Kruse J, Lange K, Lederbogen F, Petrak F. Psychosoziales und Diabetes (Teil 1). S2-Leitlinie Psychosoziales und Diabetes – Langfassung. *Diabet Stoffw* 2013; 8: 198–242. EK IV
- [335] Kulzer B, Albus C, Herpertz S, Kruse J, Lange K, Lederbogen F, Petrak F. Psychosoziales und Diabetes (Teil 2). S2-Leitlinie Psychosoziales und Diabetes – Langfassung. *Diabet Stoffw* 2013; 8: 292–324. EK IV
- [336] Kurth BM, Schaffrath RA. Die Verbreitung von Übergewicht und Adipositas bei Kindern und Jugendlichen in Deutschland. Ergebnisse des bundesweiten Kinder- und Jugendgesundheits surveys (KiGGs). *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz* 2007; 50: 736–743. EK III
- [337] l'Allemand D, Wiegand S, Reinehr T, Muller J, Wabitsch M, Widhalm K, Holl R. Cardiovascular risk in 26 008 European overweight children as established by a multicenter database. *Obesity (Silver Spring)* 2008; 16: 1672–1679. EK IIb-III
- [338] Laffel LM, Limbert C, Phelan H, Virmani A, Wood J, Hofer SE. ISPAD Clinical Practice Consensus Guidelines 2018: Sick day management in children and adolescents with diabetes. *Pediatr Diabetes* 2018; 19: (Suppl 27): 193–204 doi: <https://doi.org/10.1111/pedi.12741>
- [339] Laffel LM, Vangsness L, Connell A, Goebel-Fabbri A, Butler D, Anderson BJ. Impact of ambulatory, family-focused teamwork intervention on glycemic control in youth with type 1 diabetes. *J Pediatr* 2003; 142: 409–416. EK IIb
- [340] Laffel LM, Vangsness L, Connell A, Goebel-Fabbri A, Butler D, Anderson BJ. Impact of ambulatory, family-focused teamwork intervention on glycemic control in youth with type 1 diabetes. *J Pediatr* 2003; 142: 409–416. EK IIa
- [341] Laffel LM, Wentzell K, Loughlin C, Tovar A, Moltz K, Brink S. Sick day management using blood 3-hydroxybutyrate (3-OHB) compared with urine ketone monitoring reduces hospital visits in young people with T1DM: A randomized clinical trial. *Diabet Med* 2006; 23: 278–284. EK Ib
- [342] Laguna TA, Nathan BM, Moran A. Managing diabetes in cystic fibrosis. *Diabetes Obes Metab* 2010; 12: 858–864. EK IV
- [343] Lampeter EF, Klinghammer A, Scherbaum WA, Heinze E, Haastert B, Giani G, Kolb H. The Deutsche Nicotinamide Intervention Study: an attempt to prevent type 1 diabetes. DENIS Group. *Diabetes* 1998; 47: 980–984. EK Ib
- [344] Landolt MA, Ribl K, Laimbacher J, Vollrath M, Gnehm HE, Sennhauser FH. Posttraumatic stress disorder in parents of children with newly diagnosed type 1 diabetes. *J Pediatr Psychol* 2002; 27: 647–652. EK III
- [345] Lange K, Burger W, Holl R, Hürter P, Sassmann H, von Schütz W, Danne T. Diabetes bei Jugendlichen: Ein Schulungsprogramm, Kirchheim, Mainz 2009
- [346] Lange K, Danne T, Kordonouri O, Berndt V, Müller B, Schwarz HP, Hesse V, Busse-Widmann P. Diabetesmanifestation im Kindesalter: Alltagsbelastungen und berufliche Entwicklung der Eltern. *Dtsch Med Wochenschr* 2004; 129: 1130–1134. EK III
- [347] Lange K, Hildebrandt S, Danne T. Diabetesversorgung in der Pädiatrie – Leitlinien und Realität. Ergebnisse zweier bundesweiter Umfragen von 1998 und 2003. *Dtsch Arztebl* 2007; 104: A-2121–2126. EK III
- [348] Lange K, Hürter P. Effekte einer strukturierten Diabeteschulung für Jugendliche auf Stoffwechsel, Wissen, Wohlbefinden und Selbstständigkeit – Ergebnisse einer multizentrischen Studie. *Diabet Stoffw* 1998; 7: 62. EK IIb
- [349] Lange K, Kinderling S, Hürter P. Eine multizentrische Studie zur Prozess- und Ergebnisqualität eines strukturierten Schulungsprogramms. *Diabet Stoffw* 2001; 10: 59–65. EK III
- [350] Lange K, Kleine T, Danne T. Initialschulung für Eltern von Kindern mit Diabetes: Aufwand und Effekte bei Kindern und Eltern. *Dtsch Med Wochenschr* 2011; 136: 1106–1110. EK IIb
- [351] Lange K, Klotmann S, Sassmann H, Aschemeier B, Wintergerst E, Gerhardtsson P, Kordonouri O, Szybowska A, Danne T. A pediatric diabetes toolbox for creating centres of reference. *Pediatr Diabetes* 2012; 13: 49–61. EK IV
- [352] Lange K, Matthaei S, Lueg A, Lutze B, Roelver KM. Life chances (“Lebenschancen”) of young adults with onset of type 1 diabetes during Childhood. *Pediatric Diabetes* 2013; 14: 35. EK IIb
- [353] Lange K, Remus K, Bläsing S, Löscher-Binder M, Neu A, von Schütz W. Diabetes bei Kindern: ein Behandlungs- und Schulungsprogramm, Kirchheim, Mainz 2013

- [354] Lange K, Stachow U, Kurzinsky R, Holl R, Hürter P. Pädiatrische Betreuung von Kindern und Jugendlichen mit Diabetes. Eine bundesweite Umfrage der Arbeitsgemeinschaft für Pädiatrische Diabetologie in der Deutschen Diabetes-Gesellschaft und der Deutschen Gesellschaft für Kinderheilkunde und Jugendmedizin. *Diabet Stoffw* 2002; 11: 14–22. EK III
- [355] Lange K, Swift P, Pankowska E, Danne T. Diabetes education in children and adolescents. *Pediatric Diabetes* 2014; 15: 77–85. EK IV
- [356] Lange K, Swift P, Pankowska E, Danne T. ISPAD Clinical Practice Consensus Guidelines 2014. Diabetes education in children and adolescents. *Pediatr Diabetes* 2014; 15: Suppl 20 77–85. EK IV
- [357] Lange K, von Schütz W, Neu A, Löscher-Binder M, Remus K, Bläsing S, Sassmann H. Diabeteschulung. Schulungsprogramme und Curricula für Kinder, Jugendliche mit Typ 1 Diabetes, deren Eltern und andere Betreuer, Pabst, Lengerich. 2014
- [358] Lango Allen H., Flanagan SE, Shaw-Smith C, De FE, Akerman I, Caswell R, Ferrer J, Hattersley AT, Ellard S. GATA6 haploinsufficiency causes pancreatic agenesis in humans. *Nat Genet* 2012; 44: 20–22
- [359] Lanng S, Thorsteinsson B, Lund-Andersen C, Nerup J, Schiøtz PO, Koch C. Diabetes mellitus in Danish cystic fibrosis patients: prevalence and late diabetic complications. *Acta Paediatr* 1994; 83: 72–77. EK IIb-III
- [360] Lanng S, Thorsteinsson B, Nerup J, Koch C. Influence of the development of diabetes mellitus on clinical status in patients with cystic fibrosis. *Eur J Pediatr* 1992; 151: 684–687. EK III
- [361] Laron Z, Galatzer A, Amir S, Gil R, Karp M, Mimouni M. A multidisciplinary, comprehensive, ambulatory treatment scheme for diabetes mellitus in children. *Diabetes Care* 1979; 2: 342–348. EK III
- [362] Larsson K, Carlsson A, Cederwall E, Jonsson B, Neiderud J, Jonsson B, Lermmark A, Ivarsson SA. Annual screening detects celiac disease in children with type 1 diabetes. *Pediatr Diabetes* 2008; 9: 354–359. EK IIb
- [363] Lawrence JM, Standiford DA, Loots B, Klingensmith GJ, Williams DE, Ruggiero A, Liese AD, Bell RA, Waitzfelder BE, McKeown RE. Prevalence and correlates of depressed mood among youth with diabetes: the SEARCH for Diabetes in Youth study. *Pediatrics* 2006; 117: 1348–1358. EK IIb
- [364] Lawrence JM, Standiford DA, Loots B, Klingensmith GJ, Williams DE, Ruggiero A, Liese AD, Bell RA, Waitzfelder BE, McKeown RE. Prevalence and correlates of depressed mood among youth with diabetes: the SEARCH for Diabetes in Youth study. *Pediatrics* 2006; 117: 1348–1358. EK IV
- [365] Lazarus J, Brown RS, Daumerie C, Hubalewska-Dydejczyk A, Negro R, Vaidya B. 2014 European thyroid association guidelines for the management of subclinical hypothyroidism in pregnancy and in children. *Eur Thyroid J* 2014; 3: 76–94. EK IV
- [366] Lehmkuhl HD, Storch EA, Cammarata C, Meyer K, Rahman O, Silverstein J, Malasanos T, Geffken G. Telehealth behavior therapy for the management of type 1 diabetes in adolescents. *J Diabetes Sci Technol* 2010; 4: 199–208. EK Ib
- [367] Levene LS, McNally PG, Fraser RC, Lowy AGJ. What characteristics are associated with screening positive for microalbuminuria in patients with diabetes in the community? *Pract Diabet Int* 2004; 21: 287–292. EK III
- [368] Levin DL. Cerebral edema in diabetic ketoacidosis. *Pediatr Crit Care Med* 2008; 9: 320–329. EK III
- [369] Levy-Marchal C, Patterson CC, Green A. Geographical variation of presentation at diagnosis of type I diabetes in children: the EURODIAB study. *European and Diabetes. Diabetologia* 2001; 44: Suppl 3 B75–B80. EK III
- [370] Levy-Shraga Y, Elisha N, Ben-Ami M, Boyko V, Lerner-Geva L, Ziv T, Konvalina N, Cohen O, Pinhas-Hamiel O. Glycemic control and clinic attendance of emerging adults with type 1 diabetes at a transition care clinic. *Acta Diabetol* 2015. EK III
- [371] Lewis HM, Renaula TL, Garioch JJ, Leonard JN, Fry JS, Collin P, Evans D, Fry L. Protective effect of gluten-free diet against development of lymphoma in dermatitis herpetiformis. *Br J Dermatol* 1996; 135: 363–367. EK IIa
- [372] Liberatore RR Jr., Barbosa SF, Alkimi MG, Bellinati-Pires R, Florido MP, Isaac L, Kirschfink M, Grumach AS. Is immunity in diabetic patients influencing the susceptibility to infections? Immunoglobulins, complement and phagocytic function in children and adolescents with type 1 diabetes mellitus. *Pediatr Diabetes* 2005; 6: 206–212. EK III
- [373] Lin A, Northam EA, Rankins D, Werther GA, Cameron FJ. Neuropsychological profiles of young people with type 1 diabetes 12 yr after disease onset. *Pediatr Diabetes* 2010; 11: 235–243. EK IIb
- [374] Lind M, Svensson AM, Kosiborod M, Gudbjornsdottir S, Pivodic A, Wedel H, Dahlqvist S, Clements M, Rosengren A. Glycemic control and excess mortality in type 1 diabetes. *N Engl J Med* 2014; 371: 1972–1982. EK III
- [375] Lindstrom C, Aman J, Norberg AL. Parental burnout in relation to sociodemographic, psychosocial and personality factors as well as disease duration and glycaemic control in children with Type 1 diabetes mellitus. *Acta Paediatr* 2011; 100: 1011–1017. EK III
- [376] Lindstrom J, Ilanne-Parikka P, Peltonen M, Aunola S, Eriksson JG, Hemio K, Hamalainen H, Harkonen P, Keinanen-Kiukkaanniemi S, Laakso M, Louheranta A, Manninen M, Paturi M, Sundvall J, Valle TT, Uusitupa M, Tuomilehto J. Sustained reduction in the incidence of type 2 diabetes by lifestyle intervention: follow-up of the Finnish Diabetes Prevention Study. *Lancet* 2006; 368: 1673–1679. EK Ib
- [377] Liu C, Wu D, Zheng X, Li P, Li L. Efficacy and safety of metformin for patients with type 1 diabetes mellitus: a metaanalysis. *Diabetes Technol Ther* 2015; 17: 142–148. EK Ib
- [378] Lorini R, Klersy C, d'Annunzio G, Massa O, Minuto N, Iafusco D, Bellanne-Chantelot C, Frongia AP, Toni S, Meschi F, Cerutti F, Barbetti F. Maturity-onset diabetes of the young in children with incidental hyperglycemia: a multicenter Italian study of 172 families. *Diabetes Care* 2009; 32: 1864–1866
- [379] Lorini R, Scotta MS, Cortona L, Avanzini MA, Vitali L, De GC, Scaramuzza A, Severi F. Celiac disease and type I (insulindependent) diabetes mellitus in childhood: follow-up study. *J Diabetes Complications* 1996; 10: 154–159. EK III
- [380] Ludvigsson J, Bolli GB. Intensive insulin treatment in diabetic children. *Diabetes Nutr Metab* 2001; 14: 292–304. EK IIb
- [381] Ludvigsson J, Krisky D, Casas R, Battelino T, Castano L, Greening J, Kordonouri O, Otonkoski T, Pozzilli P, Robert JJ, Veeze HJ, Palmer J, Samuelsson U, Elding LH, Aman J, Kardell G, Neiderud HJ, Lundstrom G, Albinsson E, Carlsson A, Nordvall M, Fors H, Arvidsson CG, Edvardson S, Hanas R, Larsson K, Rathman B, Forsgren H, Desai H, Forsander G, Nilsson NO, Akesson CG, Keskinen P, Veijola R, Talvitie T, Raile K, Kapellen T, Burger W, Neu A, Engelsberger I, Heidtmann B, Bechtold S, Leslie D, Chiarelli F, Cicognani A, Chiumello G, Cerutti F, Zuccotti GV, Gomez GA, Rica I, Barrio R, Clemente M, Lopez Garcia MJ, Rodriguez M, Gonzalez I, Lopez JP, OyarzabalM Reeser HM, Nuboer R, Stouthart P, Bratina N, Bratanic N, de KM, Weill J, Ser N, Barat P, Bertrand AM, Carel JC, Reynaud R, Coutant R, Baron S. GAD65 antigen therapy in recently diagnosed type 1 diabetes mellitus. *N Engl J Med* 2012; 366: 433–442
- [382] Ludwig-Seibold CU, Holder M, Rami B, Raile K, Heidtmann B, Holl RW. Continuous glucose monitoring in children, adolescents, and adults with type 1 diabetes mellitus: analysis from the prospective DPV diabetes documentation and quality management system from Germany and Austria. *Pediatr Diabetes* 2012; 13: 12–14
- [383] Ly TT, Maahs DM, Rewers A, Dunger D, Oduwole A, Jones TW. ISPAD Clinical Practice Consensus Guidelines 2014. Assessment and management of hypoglycemia in children and adolescents with diabetes. *Pediatr Diabetes* 2014; 15: Suppl 20 180–192. EK IV

- [384] Ly TT, Nicholas JA, Retterath A, Lim EM, Davis EA, Jones TW. Effect of sensor-augmented insulin pump therapy and automated insulin suspension vs standard insulin pump therapy on hypoglycemia in patients with type 1 diabetes: a randomized clinical trial. *JAMA* 2013; 310: 1240–1247. EK Ib
- [385] Maahs DM, Calhoun P, Buckingham BA, Chase HP, Hramiak I, Lum J, Cameron F, Bequette BW, Aye T, Paul T, Slover R, Wadwa RP, Wilson DM, Kollman C, Beck RW. A randomized trial of a home system to reduce nocturnal hypoglycemia in type 1 diabetes. *Diabetes Care* 2014; 37: 1885–1891. EK Ib
- [386] Maahs DM, Hermann JM, DuBose SN, Miller KM, Heidtmann B, Dimeglio LA, Rami-Merhar B, Beck RW, Schober E, Tamborlane WV, Kapellen TM, Holl RW. Contrasting the clinical care and outcomes of 2622 children with type 1 diabetes less than 6 years of age in the United States T1D Exchange and German/Austrian DPV registries. *Diabetologia* 2014; 57: 1578–1585. EK III
- [387] Mahmud FH, Elbarbary NS, Fröhlich-Reiterer E et al. ISPAD Clinical Practice Consensus Guidelines 2018: Other complications and associated conditions in children and adolescents with type 1 diabetes. *Pediatr Diabetes* 2018; 19: (Suppl.27) 275–286
- [388] Mann JI, De L, Hermansen I, Karamanos K, Karlstrom B, Katsilambros B, Riccardi N, Rivellese G, Rizkalla AA, Slama S, Toeller G, Uusitupa M, Vessby M.B. Evidence-based nutritional approaches to the treatment and prevention of diabetes mellitus. *Nutr Metab Cardiovasc Dis* 2004; 14: 373–394
- [389] Mannucci E, Rotella F, Ricca V, Moretti S, Placidi GF, Rotella CM. Eating disorders in patients with type 1 diabetes: a meta-analysis. *J Endocrinol Invest* 2005; 28: 417–419. EK Ia
- [390] Margeisdottir HD, Larsen JR, Brunborg C, Overby NC, Dahl-Jorgensen K. High prevalence of cardiovascular risk factors in children and adolescents with type 1 diabetes: a population-based study. *Diabetologia* 2008; 51: 554–561. EK III
- [391] Markowitz JT, Butler DA, Volkeneing LK, Antisdel JE, Anderson BJ, Laffel LM. Brief screening tool for disordered eating in diabetes: internal consistency and external validity in a contemporary sample of pediatric patients with type 1 diabetes. *Diabetes Care* 2010; 33: 495–500. EK III
- [392] Martin D, Lange K, Sima A, Kownatka D, Skovlund S, Danne T, Robert JJ. Recommendations for age-appropriate education of children and adolescents with diabetes and their parents in the European Union. *Pediatr Diabetes* 2012; 13: Suppl 16 20–28. EK IV
- [393] Marzelli MJ, Mazaika PK, Barnea-Goraly N, Hershey T, Tsalikian E, Tamborlane W, Mauras N, White NH, Buckingham B, Beck RW, Ruedy KJ, Kollman C, Cheng P, Reiss AL. Neuroanatomical correlates of dysglycemia in young children with type 1 diabetes. *Diabetes* 2014; 63: 343–353. EK III
- [394] Mathiesen ER, Saurbrey N, Hommel E, Parving HH. Prevalence of microalbuminuria in children with type 1 (insulindependent) diabetes mellitus. *Diabetologia* 1986; 29: 640–643. EK III
- [395] Matthaei S, Bierwirth R, Fritsche A, Gallwitz B, Häring HU, Joost HG, Kellerer C, Kloos T, Nauck M, Scherthaner G, Siegel E, Thienel F. Medikamentöse antihyperglykämische Therapie des Diabetes mellitus Typ 2. Update der Evidenzbasierten Leitlinie der Deutschen Diabetes-Gesellschaft. [http://www.deutsche-diabetes-gesellschaft.de/fileadmin/Redakteur/Leitlinien/Evidenzbasierte\\_Leitlinien/EBL\\_Dm\\_Typ2\\_Update\\_2008.pdf](http://www.deutsche-diabetes-gesellschaft.de/fileadmin/Redakteur/Leitlinien/Evidenzbasierte_Leitlinien/EBL_Dm_Typ2_Update_2008.pdf) 2008;
- [396] Mauras N, Beck R, Xing D, Ruedy K, Buckingham B, Tansey M, White NH, Weinzimer SA, Tamborlane W, Kollman C. A randomized clinical trial to assess the efficacy and safety of real-time continuous glucose monitoring in the management of type 1 diabetes in young children aged 4 to <10 years. *Diabetes Care* 2012; 35: 204–210. EK Ib
- [397] Mayer-Davis EJ, Kahkoska AR, Jefferies C et al. ISPAD Clinical Practice Consensus Guidelines 2018: Definition, epidemiology, and classification of diabetes in children and adolescents. *Pediatr Diabetes* 2018; 19: (Suppl. 27) 7–19 doi: <https://doi.org/10.1111/pedi.12773>
- [398] McBroom LA, Enriquez M. Review of family-centered interventions to enhance the health outcomes of children with type 1 diabetes. *Diabetes Educ* 2009; 35: 428–438. EK Ia
- [399] McDonald TJ, Ellard S. Maturity onset diabetes of the young: identification and diagnosis. *Ann Clin Biochem* 2013; 50: 403–415. EK III
- [400] McKnight JA, Wild SH, Lamb MJ, Cooper MN, Jones TW, Davis EA, Hofer S, Fritsch M, Schober E, Svensson J, Almdal T, Young R, Warner JT, Delemer B, Souchon PF, Holl RW, Karges W, Kieninger DM, Tigas S, Bargiota A, Sampanis C, Cherubini V, Gesuita R, Strele I, Pildava S, Coppell KJ, Magee G, Cooper JG, Dinneen SF, Eeg-Olofsson K, Svensson AM, Gudbjornsdottir S, Veeze H, Aanstoot HJ, Khalangot M, Tamborlane WV, Miller KM. Glycaemic control of Type 1 diabetes in clinical practice early in the 21st century: an international comparison. *Diabet Med* 2015; 32: 1036–1050. EK Ib
- [401] Meltzer LJ, Johnson SB, Prine JM, Banks RA, Desrosiers PM, Silverstein JH. Disordered eating, body mass, and glycemic control in adolescents with type 1 diabetes. *Diabetes Care* 2001; 24: 678–682. EK III
- [402] Mensink RP, Zock PL, Kester AD, Katan MB. Effects of dietary fatty acids and carbohydrates on the ratio of serum total to HDL cholesterol and on serum lipids and apolipoproteins: a meta-analysis of 60 controlled trials. *Am J Clin Nutr* 2003; 77: 1146–1155. EK Ia
- [403] Milla CE, Warwick WJ, Moran A. Trends in pulmonary function in patients with cystic fibrosis correlate with the degree of glucose intolerance at baseline. *Am J Respir Crit Care Med* 2000; 162: 891–895. EK III
- [404] Miller KM, Beck RW, Bergenstal RM, Goland RS, Haller MJ, McGill JB, Rodriguez H, Simmons JH, Hirsch IB. Evidence of a strong association between frequency of self-monitoring of blood glucose and hemoglobin A1c levels in T1D exchange clinic registry participants. *Diabetes Care* 2013; 36: 2009–2014. EK III
- [405] Miller-Johnson S, Emery RE, Marvin RS, Clarke W, Lovinger R, Martin M. Parent-child relationships and the management of insulin-dependent diabetes mellitus. *J Consult Clin Psychol* 1994; 62: 603–610. EK III
- [406] Misso ML, Egberts KJ, Page M, O'Connor D, Shaw J. Continuous subcutaneous insulin infusion (CSII) vs. multiple insulin injections for type 1 diabetes mellitus. *Cochrane Database Syst Rev* 2010; CD005103 Ia
- [407] Mlynarski W, Tarasov AI, Gach A, Girard CA, Pietrzak I, Zubcevic L, Kusmierz J, Klupa T, Malecki MT, Ashcroft FM. Sulfonylurea improves CNS function in a case of intermediate DEND syndrome caused by a mutation in KCNJ11. *Nat Clin Pract Neurol* 2007; 3: 640–645. EK III
- [408] Mohn A, Di MS, Di LR, Tumini S, Chiarelli F. The effect of subclinical hypothyroidism on metabolic control in children and adolescents with Type 1 diabetes mellitus. *Diabet Med* 2002; 19: 70–73. EK IIa
- [409] Monetini L, Cavallo MG, Stefanini L, Ferrazzoli F, Bizzarri C, Marietti G, Curro V, Cervoni M, Pozzilli P. Bovine beta-casein antibodies in breast- and bottle-fed infants: their relevance in Type 1 diabetes. *Diabetes Metab Res Rev* 2001; 17: 51–54. EK III
- [410] Moore WV, Donaldson DL, Chonko AM, Ideus P, Wiegmann TB. Ambulatory blood pressure in type I diabetes mellitus. Comparison to presence of incipient nephropathy in adolescents and young adults. *Diabetes* 1992; 41: 1035–41. EK Ib
- [411] Morris LR, Murphy MB, Kitabchi AE. Bicarbonate therapy in severe diabetic ketoacidosis. *Ann Intern Med* 1986; 105: 836–840

- [412] Mortensen HB, Hougaard P, Ibsen KK, Parving HH. Relationship between blood pressure and urinary albumin excretion rate in young Danish type 1 diabetic patients: comparison to non-diabetic children. Danish Study Group of Diabetes in Childhood. *Diabet Med* 1994; 11: 155–161. EK IIa
- [413] Mortensen HB, Lindholm A, Olsen BS, Hylleberg B. Rapid appearance and onset of action of insulin aspart in paediatric subjects with type 1 diabetes. *Eur J Pediatr* 2000; 159: 483–488. EK Ib
- [414] Mortensen HB, Robertson KJ, Aanstoot HJ, Danne T, Holl RW, Hougaard P, Atchison JA, Chiarelli F, Daneman D, Dinesen B, Dorchy H, Garandeanu P, Greene S, Hoey H, Kaprio EA, Kocova M, Martul P, Matsuura N, Schoenle EJ, Sovik O, Swift PG, Tsou RM, Vanelli M, Aman J. Insulin management and metabolic control of type 1 diabetes mellitus in childhood and adolescence in 18 countries. Hvidovre Study Group on Childhood Diabetes. *Diabet Med* 1998; 15: 752–759. EK III
- [415] Muir AB, Quisling RG, Yang MC, Rosenbloom AL. Cerebral edema in childhood diabetic ketoacidosis: natural history, radiographic findings, and early identification. *Diabetes Care* 2004; 27: 1541–1546. EK IIb-III
- [416] Mulvaney SA, Rothman RL, Osborn CY, Lybarger C, Dietrich MS, Wallston KA. Self-management problem solving for adolescents with type 1 diabetes: intervention processes associated with an Internet program. *Patient Educ Couns* 2011; 85: 140–142. EK IIb
- [417] Mulvaney SA, Rothman RL, Wallston KA, Lybarger C, Dietrich MS. An internet-based program to improve self-management in adolescents with type 1 diabetes. *Diabetes Care* 2010; 33: 602–604. EK IIb
- [418] Murphy HR, Rayman G, Skinner TC. Psycho-educational interventions for children and young people with Type 1 diabetes. *Diabet Med* 2006; 23: 935–943. EK Ia
- [419] Murphy HR, Rayman G, Skinner TC. Psycho-educational interventions for children and young people with Type 1 diabetes. *Diabet Med* 2006; 23: 935–943. EK Ib
- [420] Murphy R, Ellard S, Hattersley AT. Clinical implications of a molecular genetic classification of monogenic beta-cell diabetes. *Nat Clin Pract Endocrinol Metab* 2008; 4: 200–213. EK IV
- [421] Musen G, Jacobson AM, Ryan CM, Cleary PA, Waberski BH, Weinger K, Dahms W, Bayless M, Silvers N, Harth J, White N. Impact of diabetes and its treatment on cognitive function among adolescents who participated in the Diabetes Control and Complications Trial. *Diabetes Care* 2008; 31: 1933–1938. EK Ib
- [422] Naar-King S, Idalski A, Ellis D, Frey M, Templin T, Cunningham PB, Cakan N. Gender differences in adherence and metabolic control in urban youth with poorly controlled type 1 diabetes: The mediating role of mental health symptoms. *J Pediatr Psychol* 2006; 31: 793–802. EK III
- [423] Nadeau KJ, Klingensmith G, Zeitler P. Type 2 diabetes in children is frequently associated with elevated alanine aminotransferase. *J Pediatr Gastroenterol Nutr* 2005; 41: 94–98. EK IIb-III
- [424] Naguib JM, Kulinskaya E, Lomax CL, Garralda ME. Neurocognitive performance in children with type 1 diabetes—a meta-analysis. *J Pediatr Psychol* 2009; 34: 271–282. EK Ib
- [425] Nahata L. Insulin therapy in pediatric patients with type I diabetes: continuous subcutaneous insulin infusion vs. multiple daily injections. *Clin Pediatr (Phila)* 2006; 45: 503–508. EK Ia
- [426] Nakhla M, Daneman D, Frank M, Guttman A. Translating transition: a critical review of the diabetes literature. *J Pediatr Endocrinol Metab* 2008; 21: 507–516. EK III
- [427] Nallasamy K, Jayashree M, Singhi S, Bansal A. Low-dose vs standard-dose insulin in pediatric diabetic ketoacidosis: a randomized clinical trial. *JAMA Pediatr* 2014; 168: 999–1005. EK Ib
- [428] Nansel TR, Iannotti RJ, Liu A. Clinic-integrated behavioral intervention for families of youth with type 1 diabetes: randomized clinical trial. *Pediatrics* 2012; 129: e866–e873. EK Ib
- [429] Nansel TR, Iannotti RJ, Simons-Morton BG, Cox C, Plotnick LP, Clark LM, Zeitoff L. Diabetes personal trainer outcomes: short-term and 1-year outcomes of a diabetes personal trainer intervention among youth with type 1 diabetes. *Diabetes Care* 2007; 30: 2471–2477. EK IIb
- [430] Nansel TR, Iannotti RJ, Simons-Morton BG, Plotnick LP, Clark LM, Zeitoff L. Long-term maintenance of treatment outcomes: diabetes personal trainer intervention for youth with type 1 diabetes. *Diabetes Care* 2009; 32: 807–809. EK IIb
- [431] Nardi L, Zucchini S, D'Alborton F, Salardi S, Maltoni G, Bisacchi N, Elleri D, Cicognani A. Quality of life, psychological adjustment and metabolic control in youths with type 1 diabetes: A study with self- and parent-report questionnaires. *Pediatr Diabetes* 2008; 9: 496–503. EK III
- [432] Nathan DM, Cleary PA, Backlund JY, Genuth SM, Lachin JM, Orchard TJ, Raskin P, Zinman B. Intensive diabetes treatment and cardiovascular disease in patients with type 1 diabetes. *N Engl J Med* 2005; 353: 2643–2653. EK Ib
- [433] Neu A, Ehehalt S, Bendas A, Rothe U, Kiess W, Holl RW, Stahl-Pehe A, Rosenbauer J. Incidence of childhood type 1 diabetes in Germany: A nationwide survey over a period of ten years. *Pediatric Diabetes* 2013; 14: 119
- [434] Neu A, Ehehalt S, Feldhahn LM, Kehrler M, Willasch AM, Hub R, Ranke MB. Diabeteshäufigkeit bei Kindern und Jugendlichen in Deutschland – 20 Jahre Diabetes-Inzidenzregister Baden- Württemberg. *Diabetologie* 2008; 309–313
- [435] Neu A, Ehehalt S, Willasch A, Kehrler M, Hub R, Ranke MB. Rising incidence of type 1 diabetes in Germany: 12-year trend analysis in children 0 – 14 years of age. *Diabetes Care* 2001; 24: 785–786. EK IIa
- [436] Neu A, Feldhahn L, Ehehalt S et al. No change in type 2 diabetes prevalence in children and adolescents over 10 years: Update of a population-based survey in South Germany. *Pediatr Diabetes* 2018; 19: 637–639 doi: <https://doi.org/10.1111/pedi.12622>
- [437] Neu A, Feldhahn L, Ehehalt S, Hub R, Ranke MB. Prevalence of type 2 diabetes and MODY in children and adolescents. A state-wide study in Baden-Wuerttemberg (Germany). *Pediatr Diabetes* 2005; 6: 27–28. EK III
- [438] Neu A, Hofer SE, Karges B, Oeverink R, Rosenbauer J, Holl RW. Ketoacidosis at diabetes onset is still frequent in children and adolescents: a multicenter analysis of 14 664 patients from 106 institutions. *Diabetes Care* 2009; 32: 1647–1648. EK IIb
- [439] Neu A, Lange K, Löscher-Binder M, Ziegler R. Diabetes – na und? DVD mit drei Informationsfilmen für Lehrer/innen von Kindern mit Diabetes zum Einsatz im Unterricht, = Arbeitsgemeinschaft pädiatrische Diabetologie (AGPD). 2011;
- [440] Neu A, Losch-Binder M, Ehehalt S, Schweizer R, Hub R, Serra E. Follow-up of adolescents with diabetes after transition from paediatric to adult care: results of a 10-year prospective study. *Exp Clin Endocrinol Diabetes* 2010; 118: 353–355. EK III
- [441] Neu A, Willasch A, Ehehalt S, Hub R, Ranke MB. Ketoacidosis at onset of type 1 diabetes mellitus in children—frequency and clinical presentation. *Pediatr Diabetes* 2003; 4: 77–81. EK III
- [442] Neuhauser H, Schienkiewitz A, Schaffrath RA, Dortschy R, Kurth BM. Robert Koch Institut (RKI): Referenzperzentile für anthropometrische Maßzahlen und Blutdruck aus der Studie zur Gesundheit von Kindern und Jugendlichen in Deutschland (KiGGS). 2. erweiterte Auflage, RKI, Berlin. 2013;
- [443] Neuhauser HK, Thamm M, Ellert U, Hense HW, Rosario AS. Blood pressure percentiles by age and height from nonoverweight children and adolescents in Germany. *Pediatrics* 2011; 127: e978–e988
- [444] Nichols PJ, Norris SL. A systematic literature review of the effectiveness of diabetes education of school personnel. *Diabetes Educ* 2002; 28: 405–414. EK III

- [445] Nieuwesteeg A, Pouwer F, van der Kamp R, van BH, Aanstoot HJ, Hartman E. Quality of life of children with type 1 diabetes: A systematic review. *Curr Diabetes Rev* 2012; 8: 434–443. EK III
- [446] Nimri R, Muller I, Atlas E, Miller S, Fogel A, Bratina N, Kordonouri O, Battelino T, Danne T, Phillip M. MD-Logic overnight control for 6 weeks of home use in patients with type 1 diabetes: Randomized crossover trial. *Diabetes Care* 2014; 37: 3025–3032. EK Ib
- [447] Nimri R, Weintrob N, Benzaquen H, Ofan R, Fayman G, Phillip M. Insulin pump therapy in youth with type 1 diabetes: A retrospective paired study. *Pediatrics* 2006; 117: 2126–2131. EK IIb-III
- [448] Nordfeldt S, Ludvigsson J. Adverse events in intensively treated children and adolescents with type 1 diabetes. *Acta Paediatr* 1999; 88: 1184–1193. EK IIb
- [449] Nordfeldt S, Ludvigsson J. Fear and other disturbances of severe hypoglycaemia in children and adolescents with type 1 diabetes mellitus. *J Pediatr Endocrinol Metab* 2005; 18: 83–91. EK III
- [450] Nordwall M, Hyllienmark L, Ludvigsson J. Early diabetic complications in a population of young patients with type 1 diabetes mellitus despite intensive treatment. *J Pediatr Endocrinol Metab* 2006; 19: 45–54. EK III
- [451] Norris JM, Barriga K, Klingensmith G, Hoffman M, Eisenbarth GS, Erlich HA, Rewers M. Timing of initial cereal exposure in infancy and risk of islet autoimmunity. *JAMA* 2003; 290: 1713–1720. EK III
- [452] Northam EA, Anderson PJ, Werther GA, Warne GL, Adler RG, Andrewes D. Neuropsychological complications of IDDM in children 2 years after disease onset. *Diabetes Care* 1998; 21: 379–384. EK III
- [453] Northam EA, Matthews LK, Anderson PJ, Cameron FJ, Werther GA. Psychiatric morbidity and health outcome in Type 1 diabetes—perspectives from a prospective longitudinal study. *Diabet Med* 2005; 22: 152–157. EK III
- [454] Northam EA, Todd S, Cameron FJ. Interventions to promote optimal health outcomes in children with Type 1 diabetes— are they effective? *Diabet Med* 2006; 23: 113–121. EK Ia-III
- [455] Nousia-Arvanitakis S, Galli-Tsinopoulou A, Karamouzis M. Insulin improves clinical status of patients with cystic-fibrosis-related diabetes mellitus. *Acta Paediatr* 2001; 90: 515–519. EK III
- [456] O'Hayon BE, Cummings EA, Daneman D, Ossip MG, Lawson ML, Sochett EB. Does dietary protein intake correlate with markers suggestive of early diabetic nephropathy in children and adolescents with Type 1 diabetes mellitus? *Diabet Med* 2000; 17: 708–712. EK III
- [457] O'Riordan SM, Robinson PD, Donaghue KC, Moran A. Management of cystic fibrosis-related diabetes. *Pediatr Diabetes* 2008; 9: 338–344
- [458] Okuda Y, Adrogue HJ, Field JB, Nohara H, Yamashita K. Counterproductive effects of sodium bicarbonate in diabetic ketoacidosis. *J Clin Endocrinol Metab* 1996; 81: 314–320
- [459] Olmsted MP, Daneman D, Rydall AC, Lawson ML, Rodin G. The effects of psychoeducation on disturbed eating attitudes and behavior in young women with type 1 diabetes mellitus. *Int J Eat Disord* 2002; 32: 230–239. EK Ib
- [460] Overby NC, Margeisdottir HD, Brunborg C, Andersen LF, hl-Jorgensen K. The influence of dietary intake and meal pattern on blood glucose control in children and adolescents using intensive insulin treatment. *Diabetologia* 2007; 50: 2044–2051. EK IIb
- [461] Overstreet S, Goins J, Chen RS, Holmes CS, Greer T, Dunlap WP, Frentz J. Family environment and the interrelation of family structure, child behavior, and metabolic control for children with diabetes. *J Pediatr Psychol* 1995; 20: 435–447. EK IIa
- [462] Pankowska E, Blazik M, Dziechciarz P, Szypowska A, Szajewska H. Continuous subcutaneous insulin infusion vs. multiple daily injections in children with type 1 diabetes: a systematic review and meta-analysis of randomized control trials. *Pediatr Diabetes* 2008. EK Ia
- [463] Pankowska E, Szypowska A, Lipka M, Skorka A. Sustained metabolic control and low rates of severe hypoglycaemic episodes in preschool diabetic children treated with continuous subcutaneous insulin infusion. *Acta Paediatr* 2007; 96: 881–884. EK IIb-III
- [464] Pattison HM, Moledina S, Barrett TG. The relationship between parental perceptions of diabetes and glycaemic control. *Arch Dis Child* 2006; 91: 487–490. EK III
- [465] Pavlovic MD, Milenkovic T, Dinic M, Misovic M, Dakovic D, Todorovic S, Dakovic Z, Zecevi RD, Doder R. The prevalence of cutaneous manifestations in young patients with type 1 diabetes. *Diabetes Care* 2007; 30: 1964–1967. EK III
- [466] Pearson ER, Flechtner I, Njolstad PR, Malecki MT, Flanagan SE, Larkin B, Ashcroft FM, Klimes I, Codner E, Iotova V, Slingerland AS, Shield J, Robert JJ, Holst JJ, Clark PM, Ellard S, Sovik O, Polak M, Hattersley AT. Switching from insulin to oral sulfonylureas in patients with diabetes due to Kir6.2 mutations. *N Engl J Med* 2006; 355: 467–477. EK III
- [467] Pearson ER, Liddell WG, Shepherd M, Corral RJ, Hattersley AT. Sensitivity to sulphonylureas in patients with hepatocyte nuclear factor-1alpha gene mutations: evidence for pharmacogenetics in diabetes. *Diabet Med* 2000; 17: 543–545. EK III
- [468] Perantie DC, Lim A, Wu J, Weaver P, Warren SL, Sadler M, White NH, Hershey T. Effects of prior hypoglycemia and hyperglycemia on cognition in children with type 1 diabetes mellitus. *Pediatr Diabetes* 2008; 9: 87–95. EK III
- [469] Persson S, Dahlquist G, Gerdtham UG, Steen CK. Impact of childhood-onset type 1 diabetes on schooling: A populationbased register study. *Diabetologia* 2013; 56: 1254–1262. EK IIb
- [470] Peterson DB, Lambert J, Gerring S, Darling P, Carter RD, Jelfs R, Mann JI. Sucrose in the diet of diabetic patients—just another carbohydrate? *Diabetologia* 1986; 29: 216–220. EK Ib
- [471] Peyrot M, Rubin RR. Behavioral and psychosocial interventions in diabetes: A conceptual review. *Diabetes Care* 2007; 30: 2433–2440. EK Ib
- [472] Peyrot M, Rubin RR. Treatment satisfaction in the sensor-augmented pump therapy for A1C reduction 3 (STAR 3) trial. *Diabet Med* 2013; 30: 464–467. EK Ib
- [473] Phillip M, Battelino T, Atlas E, Kordonouri O, Bratina N, Miller S, Biester T, Stefanija MA, Muller I, Nimri R, Danne T. Nocturnal glucose control with an artificial pancreas at a diabetes camp. *N Engl J Med* 2013; 368: 824–833. EK Ib
- [474] Phillip M, Battelino T, Rodriguez H, Danne T, Kaufman F. Use of insulin pump therapy in the pediatric age-group: consensus statement from the European Society for Paediatric Endocrinology, the Lawson Wilkins Pediatric Endocrine Society, and the International Society for Pediatric and Adolescent Diabetes, endorsed by the American Diabetes Association and the European Association for the Study of Diabetes. *Diabetes Care* 2007; 30: 1653–1662
- [475] Philotheou A, Arslanian S, Blatnick L, Peterkova V, Souhami E, Danne T. Comparable efficacy and safety of insulin glulisine and insulin lispro when given as part of a Basal-bolus insulin regimen in a 26-week trial in pediatric patients with type 1 diabetes. *Diabetes Technol Ther* 2011; 13: 327–334
- [476] Pihoker C, Forsander G, Fantahun B, Virmani A, Luo X, Hallman M, Wolfsdorf J, Maahs DM. ISPAD Clinical Practice Consensus Guidelines 2014. The delivery of ambulatory diabetes care to children and adolescents with diabetes. *Pediatr Diabetes* 2014; 15: Suppl 20: 86–101. EK IV
- [477] Plank J, Siebenhofer A, Berghold A, Jeitler K, Horvath K, Mrak P, Pieber TR. Systematic review and meta-analysis of shortacting insulin analogues in patients with diabetes mellitus. *Arch Intern Med* 2005; 165: 1337–1344. EK Ia



- [478] Plener PL, Molz E, Berger G, Schober E, Monkemoller K, Denzer C, Goldbeck L, Holl RW. Depression, metabolic control, and antidepressant medication in young patients with type 1 diabetes. *Pediatr Diabetes* 2015; 16: 58–66. EK IIb
- [479] Polak M, Dechaume A, Cave H, Nimri R, Crosnier H, Sulmont V, de Kerdanet M, Scharfmann R, Lebenthal Y, Froguel P, Vaxillaire M. Heterozygous missense mutations in the insulin gene are linked to permanent diabetes appearing in the neonatal period or in early infancy: A report from the French ND (Neonatal. Diabetes) Study Group. *Diabetes* 2008; 57: 1115–1119. EK III
- [480] Povlsen L, Olsen B, Ladelund S. Diabetes in children and adolescents from ethnic minorities: barriers to education, treatment and good metabolic control. *J Adv Nurs* 2005; 50: 576–582. EK III
- [481] Powers SW, Byars KC, Mitchell MJ, Patton SR, Standiford DA, Dolan LM. Parent report of mealtime behavior and parenting stress in young children with type 1 diabetes and in healthy control subjects. *Diabetes Care* 2002; 25: 313–318. EK III
- [482] Puttha R, Cooke D, Subbarayan A, Odeka E, Ariyawansa I, Bone M, Doughty I, Patel L, Amin R. Low dose (0.05 units/ kg/h) is comparable with standard dose (0.1 units/kg/h) intravenous insulin infusion for the initial treatment of diabetic ketoacidosis in children with type 1 diabetes-an observational study. *Pediatr Diabetes* 2010; 11: 12–17. EK III
- [483] Radetti G, Paganini C, Gentili L, Bernasconi S, Betterle C, Borkenstein M, Cvijovic K, Kadrnka-Lovrencic M, Krzisnik C, Battelino T. Frequency of Hashimoto's thyroiditis in children with type 1 diabetes mellitus. *Acta Diabetol* 1995; 32: 121–124. EK III
- [484] Raile K, Galler A, Hofer S, Herbst A, Dunstheimer D, Busch P, Holl RW. Diabetic nephropathy in 27 805 children, adolescents, and adults with type 1 diabetes: effect of diabetes duration, A1C, hypertension, dyslipidemia, diabetes onset, and sex. *Diabetes Care* 2007; 30: 2523–2528. EK IIb-III
- [485] Raile K, Klopocki E, Holder M, Wessel T, Galler A, Deiss D, Muller D, Riebel T, Horn D, Maringa M, Weber J, Ullmann R, Gruters A. Expanded clinical spectrum in hepatocyte nuclear factor 1b-maturity-onset diabetes of the young. *J Clin Endocrinol Metab* 2009; 94: 2658–2664. EK IV
- [486] Raile K, O'Connell M, Galler A, Werther G, Kuhnen P, Krude H, Blankenstein O. Diabetes caused by insulin gene (INS) deletion: clinical characteristics of homozygous and heterozygous individuals. *Eur J Endocrinol* 2011; 165: 255–260
- [487] Raile K, Schober E, Konrad K, Thon A, Grulich-Henn J, Meissner T, Wolfle J, Scheuing N, Holl RW. Treatment of young patients with HNF1A mutations (HNF1A-MODY). *Diabet Med* 2015; 32: 526–530
- [488] Rattay P, von der LE, Lampert T. Gesundheit von Kindern und Jugendlichen in Eineltern-, Stief- und Kernfamilien. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz* 2014; 57: 860–868. EK IIb
- [489] Reid GJ, Dubow EF, Carey TC, Dura JR. Contribution of coping to medical adjustment and treatment responsibility among children and adolescents with diabetes. *J Dev Behav Pediatr* 1994; 15: 327–335. EK III
- [490] Reinehr T, Schober E, Roth CL, Wiegand S, Holl R. Type 2 diabetes in children and adolescents in a 2-year follow-up: insufficient adherence to diabetes centers. *Horm Res* 2008; 69: 107–113. EK III
- [491] Reinehr T, Temmesfeld M, Kersting M, de SG, Toschke AM. Four-year follow-up of children and adolescents participating in an obesity intervention program. *Int J Obes (Lond)* 2007; 31: 1074–1077. EK III
- [492] Renders CM, Valk GD, Griffin SJ, Wagner EH, Eijk Van JT, Assendelft WJ. Interventions to improve the management of diabetes in primary care, outpatient, and community settings: a systematic review. *Diabetes Care* 2001; 24: 1821–1833. EK Ia
- [493] Rewers A, Klingensmith G, Davis C, Petitti DB, Pihoker C, Rodriguez B, Schwartz ID, Imperatore G, Williams D, Dolan LM, Dabelea D. Presence of diabetic ketoacidosis at diagnosis of diabetes mellitus in youth: the Search for Diabetes in Youth Study. *Pediatrics* 2008; 121: e1258–e1266. EK III
- [494] Rewers M, Pihoker C, Donaghue K, Hanas R, Swift P, Klingensmith GJ. Assessment and monitoring of glycemic control in children and adolescents with diabetes. *Pediatr Diabetes* 2007; 8: 408–418
- [495] Rewers M, Pihoker C, Donaghue K, Hanas R, Swift P, Klingensmith GJ. Assessment and monitoring of glycemic control in children and adolescents with diabetes. *Pediatr Diabetes* 2007; 8: 408–418. EK IV
- [496] Reynolds KA, Helgeson VS. Children with diabetes compared to peers: depressed? Distressed? A meta-analytic review. *Ann Behav Med* 2011; 42: 29–41. EK Ib
- [497] Riccardi G, Rivellese A, Pacioni D, Genovese S, Mastranzo P, Mancini M. Separate influence of dietary carbohydrate and fibre on the metabolic control in diabetes. *Diabetologia* 1984; 26: 116–421. EK Ib
- [498] Richter B, Neises G. 'Human' insulin vs. animal insulin in people with diabetes mellitus. *Cochrane Database Syst Rev* 2005; CD003 816. EK Ia
- [499] Riddell MC, Iscoe KE. Physical activity, sport, and pediatric diabetes. *Pediatr Diabetes* 2006; 7: 60–70. EK IV
- [500] Riley MD, Dwyer T. Microalbuminuria is positively associated with usual dietary saturated fat intake and negatively associated with usual dietary protein intake in people with insulin- dependent diabetes mellitus. *Am J Clin Nutr* 1998; 67: 50–57. EK III
- [501] Riveline JP, Schaepelynck P, Chaillous L, Renard E, Sola-Gazagnes A, Penfornis A, Tubiana-Rufi N, Sulmont V, Catargi B, Lukas C, Radermecker RP, Thivolet C, Moreau F, Benhamou PY, Guerci B, Leguerrier AM, Millot L, Sachon C, Charpentier G, Hanaire H. Assessment of patient-led or physician-driven continuous glucose monitoring in patients with poorly controlled type 1 diabetes using basal-bolus insulin regimens: a 1-year multicenter study. *Diabetes Care* 2012; 35: 965–971. EK Ib
- [502] Rivellese A, Riccardi G, Giacco A, Pacioni D, Genovese S, Mattioli PL, Mancini M. Effect of dietary fibre on glucose control and serum lipoproteins in diabetic patients. *Lancet* 1980; 2: 447–450. EK Ib
- [503] Roberts MD, Slover RH, Chase HP. Diabetic ketoacidosis with intracerebral complications. *Pediatr Diabetes* 2001; 2: 109–114. EK III
- [504] Robertson K, Riddell MC, Guinhouya BC, Adolfsson P, Hanas R. ISPAD Clinical Practice Consensus Guidelines 2014. Exercise in children and adolescents with diabetes. *Pediatr Diabetes* 2014; 15: Suppl 20 203–223. EK IV
- [505] Robertson KJ, Schoenle E, Gucev Z, Mordhorst L, Gall MA, Ludvigsson J. Insulin detemir compared with NPH insulin in children and adolescents with Type 1 diabetes. *Diabet Med* 2007; 24: 27–34. EK Ib
- [506] Rohrer T, Stierkorb E, Grabert M, Holterhus PM, Kapellen T, Knerr I, Mix M, Holl RW. Delayed menarche in young German women with type 1 diabetes mellitus: recent results from the DPV diabetes documentation and quality management system. *Eur J Pediatr* 2008; 167: 793–799
- [507] Rolon MA, Benali K, Munck A, Navarro J, Clement A, Tubiana-Rufi N, Czernichow P, Polak M. Cystic fibrosis-related diabetes mellitus: clinical impact of prediabetes and effects of insulin therapy. *Acta Paediatr* 2001; 90: 860–867. EK III
- [508] Ronkainen MS, Hamalainen AM, Koskela P, Akerblom HK, Knip M. Pregnancy induces nonimmunoglobulin insulinbinding activity in both maternal and cord blood serum. *Clin Exp Immunol* 2001; 124: 190–196. EK Ib
- [509] Rosenbauer J, Dost A, Karges B, Hungele A, Stahl A, Bachle C, Gerstl EM, Kastendieck C, Hofer SE, Holl RW. Improved metabolic control in children and adolescents with type 1 diabetes: a trend analysis using prospective multicenter data from Germany and Austria. *Diabetes Care* 2012; 35: 80–86. EK III



- [510] Rosenbauer J, Herzig P, Giani G. Familial risk Type 1 diabetes mellitus in preschool age. *Diabetologia* 2003; 46: A118. EK IIa
- [511] Rosenbauer J, Icks A, du Prel JB, Giani G. Populationsbasierte Daten zur Inzidenz des Typ-2-Diabetes mellitus bei Kindern und Jugendlichen in Deutschland. *Monatsschr Kinderheilkd* 2003; 151: 71. EK III
- [512] Rosenbauer J, Icks A, Giani G. Clinical characteristics and predictors of severe ketoacidosis at onset of type 1 diabetes mellitus in children in a North Rhine-Westphalian region, Germany. *J Pediatr Endocrinol Metab* 2002; 15: 1137–1145. EK IIb
- [513] Rosenbauer J, Icks A, Giani G. Incidence and prevalence of childhood type 1 diabetes mellitus in Germany—model-based national estimates. *J Pediatr Endocrinol Metab* 2002; 15: 1497–1504. EK IIb
- [514] Rosenbauer J, Icks A, Grabert M, Holl RW, Giani G. Hohe Prävalenz des Typ-1-Diabetes mellitus im Kindes- und Jugendalter in Deutschland (Abstract). *Kinder- Jugendmed* 2002; 2: A84. EK III
- [515] Rosenbauer J, Rothe U, Bendas A, Kiess W, Baechle C, Holl RW, Eehalt S, Neu A. In cooperation with the DIARY Group Baden-Wuerttemberg tCDRiStGPSUEatD-SI. National prevalence estimates of childhood type 1 diabetes in Germany. *Pediatric Diabetes* 2013; 14: 119. EK III
- [516] Rosenbloom AL, Schatz DA, Krischer JP, Skyler JS, Becker DJ, Laporte RE, Libman I, Pietropaolo M, Dosch HM, Finberg L, Muir A, Tamborlane WV, Grey M, Silverstein JH, Malone JL. Therapeutic controversy: Prevention and treatment of diabetes in children. *J Clin Endocrinol Metab* 2000; 85: 494–522. EK IV
- [517] Rubio-Cabezas O, Klupa T, Malecki MT. Permanent neonatal diabetes mellitus—the importance of diabetes differential diagnosis in neonates and infants. *Eur J Clin Invest* 2011; 41: 323–333
- [518] Rutledge KS, Chase HP, Klingensmith GJ, Walravens PA, Slover RH, Garg SK. Effectiveness of postprandial Humalog in toddlers with diabetes. *Pediatrics* 1997; 100: 968–972. EK IIa
- [519] Sacks FM, Svetkey LP, Vollmer WM, Appel LJ, Bray GA, Harsha D, Obarzanek E, Conlin PR, Miller ER III, Simons- Morton DG, Karanja N, Lin PH. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. DASH-Sodium Collaborative Research Group. *N Engl J Med* 2001; 344: 3–10. EK Ib
- [520] Sagen JV, Raeder H, Hathout E, Shehadeh N, Gudmundsson K, Baevre H, Abuelo D, Phornphutkul C, Molnes J, Bell GI, Gloy AL, Hattersley AT, Molven A, Sovik O, Njolstad PR. Permanent neonatal diabetes due to mutations in *KCNJ11* encoding Kir6.2: patient characteristics and initial response to sulfonylurea therapy. *Diabetes* 2004; 53: 2713–2718. EK III
- [521] Saßmann H, Albrecht C, Busse-Widmann P, Hevelke LK, Kranz J, Markowitz JT, Marshall LF, Meurs S, de Soye IH, Lange K. Psychometric properties of the German version of the Diabetes Eating Problem Survey-Revised: additional benefit of disease-specific screening in adolescents with Type 1 diabetes. *Diabet Med* 2015. EK IIb
- [522] Sassmann H, Danne T, Landgraf R, Lange K. Jugendliche und junge Erwachsene mit Diabetes: Lebensqualität, Stoffwechseleinstellung und Zufriedenheit mit der Langzeitbetreuung von Teilnehmern des CAMP-D. *Diabet Stoffw* 2007; 2: 69. EK III
- [523] Sassmann H, de HM, Danne T, Lange K. Reducing stress and supporting positive relations in families of young children with type 1 diabetes: a randomized controlled study for evaluating the effects of the DELFIN parenting program. *BMC Pediatr* 2012; 12: 152. EK Ib
- [524] Saßmann H, Lange K. Psychische Störungen bei Kindern und Jugendlichen mit Diabetes. In Petrak FHerpertz S, Hrsg. editors. *Handbuch der Psychodiabetologie*, Springer; Berlin: 2013. EK IV
- [525] Schatz DA, Bingley PJ. Update on major trials for the prevention of type 1 diabetes mellitus: the American Diabetes Prevention Trial (DPT-1) and the European Nicotinamide Diabetes Intervention Trial (ENDIT). *J Pediatr Endocrinol Metab* 2001; 14: (Suppl 1) 619–622 EK Ib
- [526] Scherbaum W. Verlautbarung der Deutschen Diabetes- Gesellschaft zur Versorgung von Kindern und Jugendlichen. *Diabet Inform* 1998; 20: 23. EK IV
- [527] Scheuing N, Bartus B, Berger G, Haberland H, Icks A, Knauth B, Nellen-Hellmuth N, Rosenbauer J, Teufel M, Holl RW. Clinical characteristics and outcome of 467 patients with a clinically recognized eating disorder identified among 52 215 patients with type 1 diabetes: a multicenter german/austrian study. *Diabetes Care* 2014; 37: 1581–1589. EK IIb
- [528] Schiaffini R, Patera PI, Bizzarri C, Ciampalini P, Cappa M. Basal insulin supplementation in Type 1 diabetic children: a long-term comparative observational study between continuous subcutaneous insulin infusion and glargine insulin. *J Endocrinol Invest* 2007; 30: 572–577. EK Ib
- [529] Schlesinger DM, Holsclaw DS, Fyfe B. Generalized Atherosclerosis in an Adult with CF and Diabetes Mellitus. Eleventh Annual North American Cystic Fibrosis Conference 1997; 365 EK III
- [530] Schmid K, Fink K, Holl RW, Hebestreit H, Ballmann M. Predictors for future cystic fibrosis-related diabetes by oral glucose tolerance test. *J Cyst Fibros* 2014; 13: 80–85
- [531] Schober E, Holl RW, Grabert M, Thon A, Rami B, Kapellen T, Seewi O, Reinehr T. Diabetes mellitus type 2 in childhood and adolescence in Germany and parts of Austria. *Eur J Pediatr* 2005; 164: 705–707. EK III
- [532] Schober E, Rami B, Grabert M, Thon A, Kapellen T, Reinehr T, Holl RW. Phenotypical aspects of Maturity-onset diabetes of the young (MODY diabetes) in comparison to Type 2 diabetes mellitus (T2DM) in children and adolescents. Experience from a large multicenter data base. *Diabet Med* 2009; 26: 466–473
- [533] Schoenle EJ, Schoenle D, Molinari L, Largo RH. Impaired intellectual development in children with Type I diabetes: association with HbA(1c), age at diagnosis and sex. *Diabetologia* 2002; 45: 108–114. EK III
- [534] Schultz CJ, Konopelska-Bahu T, Dalton RN, Carroll TA, Stratton I, Gale EA, Neil A, Dunger DB. Microalbuminuria prevalence varies with age, sex, and puberty in children with type 1 diabetes followed from diagnosis in a longitudinal study. Oxford Regional Prospective Study Group. *Diabetes Care* 1999; 22: 495–502. EK III
- [535] Schultz CJ, Neil HA, Dalton RN, Konopelska BT, Dunger DB. Blood pressure does not rise before the onset of microalbuminuria in children followed from diagnosis of type 1 diabetes. Oxford Regional Prospective Study Group. *Diabetes Care* 2001; 24: 555–560. EK III
- [536] Schwab KO, Doerfer J, Marg W, Schober E, Holl RW. Characterization of 33 488 children and adolescents with type 1 diabetes based on the gender-specific increase of cardiovascular risk factors. *Pediatr Diabetes* 2010; 11: 357–363
- [537] Schwartz DD, Cline VD, Axelrad ME, Anderson BJ. Feasibility, acceptability, and predictive validity of a psychosocial screening program for children and youth newly diagnosed with type 1 diabetes. *Diabetes Care* 2011; 34: 326–331. EK III
- [538] Schwarzenberg SJ, Thomas W, Olsen TW, Grover T, Walk D, Milla C, Moran A. Microvascular complications in cystic fibrosis-related diabetes. *Diabetes Care* 2007; 30: 1056–1061. EK III
- [539] Scott A, Whitcombe S, Bouchier D, Dunn P. Diabetes in children and young adults in Waikato Province, New Zealand: outcomes of care. *N Z Med J* 2004; 117: U1219. EK III
- [540] Scottish Intercollegiate Guidelines Network (SIGN) SIGN 50: A guideline developer's handbook. Quick reference guide. 2014;
- [541] Scottish Study Group for the Care of the Young Diabetic Factors influencing glycemic control in young people with type 1 diabetes in Scotland: a population-based study (DIABAUD2). *Diabetes Care* 2001; 24: 239–244. EK IIa

- [542] Scrimgeour L, Cobry E, McFann K, Burdick P, Weimer C, Slover R, Chase HP. Improved glycemic control after long-term insulin pump use in pediatric patients with type 1 diabetes. *Diabetes Technol Ther* 2007; 9: 421–428. EK IIb-III
- [543] Shah RP, Spruyt K, Kragie BC, Greeley SA, Msall ME. Visuomotor performance in KCNJ11-related neonatal diabetes is impaired in children with DEND-associated mutations and may be improved by early treatment with sulfonylureas. *Diabetes Care* 2012; 35: 2086–2088
- [544] Shepherd M, Hattersley AT. 'I don't feel like a diabetic any more': the impact of stopping insulin in patients with maturity onset diabetes of the young following genetic testing. *Clin Med* 2004; 4: 144–147
- [545] Sherr JL, Tauschmann M, Battelino T et al. ISPAD Clinical Practice Consensus Guidelines 2018: Diabetes technologies. *Pediatr Diabetes* 2018; 19: (Suppl.27) 302–325
- [546] Shichiri M, Kishikawa H, Ohkubo Y, Wake N. Long-term results of the Kumamoto Study on optimal diabetes control in type 2 diabetic patients. *Diabetes Care* 2000; 23: Suppl 2 B21–B29
- [547] Shimazaki T, Kadowaki T, Ohyama Y, Ohe K, Kubota K. Hemoglobin A1c (HbA1c) predicts future drug treatment for diabetes mellitus: a follow-up study using routine clinical data in a Japanese university hospital. *Transl Res* 2007; 149: 196–204. EK II
- [548] Shorer M, David R, Schoenberg-Taz M, Levavi-Lavi I, Phillip M, Meyerovitch J. Role of parenting style in achieving metabolic control in adolescents with type 1 diabetes. *Diabetes Care* 2011; 34: 1735–1737. EK III
- [549] Sideraviciute S, Gailiniene A, Visagurskiene K, Vizbaraitė D. The effect of long-term swimming program on glycemia control in 14 – 19-year aged healthy girls and girls with type 1 diabetes mellitus. *Medicina (Kaunas)* 2006; 42: 513–518. EK IIb
- [550] Siebenhofer A, Plank J, Berghold A, Jeitler K, Horvath K, Narath M, Gfrerer R, Pieber TR. Short acting insulin analogues vs. regular human insulin in patients with diabetes mellitus. *Cochrane Database Syst Rev* 2006; CD003 287. EK Ia
- [551] Silverstein J, Klingensmith G, Copeland K, Plotnick L, Kaufman F, Laffel L, Deeb L, Grey M, Anderson B, Holzmeister LA, Clark N. Care of children and adolescents with type 1 diabetes: a statement of the American Diabetes Association. *Diabetes Care* 2005; 28: 186–212. EK IV
- [552] Silverstein J, Klingensmith G, Copeland K, Plotnick L, Kaufman F, Laffel L, Deeb L, Grey M, Anderson B, Holzmeister LA, Clark N. Care of children and adolescents with type 1 diabetes: a statement of the American Diabetes Association. *Diabetes Care* 2005; 28: 186–212
- [553] Simpson D, McCormack PL, Keating GM, Lyseng-Williamson KA. Insulin lispro: a review of its use in the management of diabetes mellitus. *Drugs* 2007; 67: 407–434
- [554] Skogsberg L, Fors H, Hanas R, Chaplin JE, Lindman E, Skogsberg J. Improved treatment satisfaction but no difference in metabolic control when using continuous subcutaneous insulin infusion vs. multiple daily injections in children at onset of type 1 diabetes mellitus. *Pediatr Diabetes* 2008; 9: 472–479. EK1b
- [555] Slama G, Haardt MJ, Jean-Joseph P, Costagliola D, Goicolea I, Bornet F, Elgrably F, Tchobroutsky G. Sucrose taken during mixed meal has no additional hyperglycaemic action over isocaloric amounts of starch in well-controlled diabetics. *Lancet* 1984; 2: 122–125. EK Ib
- [556] Slingerland AS, Hurkx W, Noordam K, Flanagan SE, Jukema JW, Meiners LC, Bruining GJ, Hattersley AT, Hadders-Algra M. Sulphonylurea therapy improves cognition in a patient with the V59M KCNJ11 mutation. *Diabet Med* 2008; 25: 277–281. EK III
- [557] Slover RH, Welsh JB, Criego A, Weinzimer SA, Willi SM, Wood MA, Tamborlane WV. Effectiveness of sensor-augmented pump therapy in children and adolescents with type 1 diabetes in the STAR 3 study. *Pediatr Diabetes* 2012; 13: 6–11. EK Ib
- [558] Smart CE, Annan F, Bruno LP, Higgins LA, Acerini CL. ISPAD - Clinical Practice Consensus Guidelines 2014. Nutritional management in children and adolescents with diabetes. *Pediatr Diabetes* 2014; 15: Suppl 20 135–153. EK IV
- [559] Smith-Palmer J, Brandle M, Trevisan R, Orsini FM, Liabat S, Valentine W. Assessment of the association between glycemic variability and diabetes-related complications in type 1 and type 2 diabetes. *Diabetes Res Clin Pract* 2014; 105: 273–284
- [560] Sochett EB, Poon I, Balfe W, Daneman D. Ambulatory blood pressure monitoring in insulin-dependent diabetes mellitus adolescents with and without microalbuminuria. *J Diabetes Complications* 1998; 12: 18–23. EK IIa
- [561] Soffer B, Zhang Z, Miller K, Vogt BA, Shahinfar S. A doubleblind, placebo-controlled, dose-response study of the effectiveness and safety of lisinopril for children with hypertension. *Am J Hypertens* 2003; 16: 795–800. EK Ib
- [562] Sood ED, Pendley JS, Delamater AM, Rohan JM, Pulgaron ER, Drotar D. Mother-father informant discrepancies regarding diabetes management: associations with diabetes-specific family conflict and glycemic control. *Health Psychol* 2012; 31: 571–579. EK III
- [563] Stachow R, Schiel R, Koch S, Fiedler S, Hermann T, Holl RW. Effekte der stationären Rehabilitation von Kindern und Jugendlichen mit Diabetes mellitus Typ-1. *Monatsschr Kinderheilkd* 2013; 161: 727–734. EK III
- [564] Stachow R, Schiel R, Koch S, Fiedler S, Hermann T, Holl RW. Langfristige Effekte der Rehabilitation für Kinder und Jugendliche mit Diabetes mellitus Typ 1. *Diabetologie und Stoffwechsel* 2013; 8: FV17. EK III
- [565] Stachow R, Schultz A, Kurzinsky U, Petermann F, Hampel P. Anti-Streß-Training für Kinder und Jugendliche mit Diabetes während der stationären Rehabilitation. *Kindheit Entwicklung* 2001; 10: 226–239. EK III
- [566] Stachow R, Wolf J, Kromeyer-Hauschild K, Dost A, Wabitsch M, Grabert M, Holl RW. Übergewicht und Adipositas bei Kindern und Jugendlichen mit Diabetes mellitus Typ 1. Prävalenz und Einflussfaktoren. *Monatsschr Kinderheilkd* 2003; 149: 209–216. EK III
- [567] Stahl A, Strassburger K, Lange K, Bachle C, Holl RW, Giani G, Rosenbauer J. Health-related quality of life among German youths with early-onset and long-duration type 1 diabetes. *Diabetes Care* 2012; 35: 1736–1742. EK IIb
- [568] Stahl-Pehe A, Strassburger K, Castillo K, Bachle C, Holl RW, Lange K, Rosenbauer J. Quality of life in intensively treated youths with early-onset type 1 diabetes: a population-based survey. *Pediatr Diabetes* 2014; 15: 436–443. EK IIb
- [569] Stanger C, Ryan SR, Delhey LM, Thrailkill K, Li Z, Li Z, Budney AJ. A multicomponent motivational intervention to improve adherence among adolescents with poorly controlled type 1 diabetes: a pilot study. *J Pediatr Psychol* 2013; 38: 629–637. EK III
- [570] Stanik J, Gasperikova D, Paskova M, Barak L, Javorkova J, Jancova E, Ciljakova M, Hlava P, Michalek J, Flanagan SE, Pearson E, Hattersley AT, Ellard S, Klimes I. Prevalence of permanent neonatal diabetes in Slovakia and successful replacement of insulin with sulfonylurea therapy in KCNJ11 and ABCC8 mutation carriers. *J Clin Endocrinol Metab* 2007; 92: 1276–1282
- [571] Stoy J, Edghill EL, Flanagan SE, Ye H, Paz VP, Pluzhnikov A, Below JE, Hayes MC, Cox NJ, Lipkind GM, Lipton RB, Greeley SA, Patch AM, Ellard S, Steiner DF, Hattersley AT, Philipson LH, Bell GI. Insulin gene mutations as a cause of permanent neonatal diabetes. *Proc Natl Acad Sci U S A* 2007; 104: 15 040–15 044. EK III
- [572] Stride A, Vaxillaire M, Tuomi T, Barbetti F, Njolstad PR, Hansen T, Costa A, Conget I, Pedersen O, Sovik O, Lorini R, Groop L, Froguel P, Hattersley AT. The genetic abnormality in the beta cell determines the response to an oral glucose load. *Diabetologia* 2002; 45: 427–435. EK IIb

- [573] Sullivan-Bolyai S, Bova C, Lee M, Gruppuso PA. Mentoring fathers of children newly diagnosed with T1DM. *MCN Am J Matern Child Nurs* 2011; 36: 224–231. EK Ib
- [574] Sullivan-Bolyai S, Deatrick J, Gruppuso P, Tamborlane W, Grey M. Constant vigilance: mothers' work parenting young children with type 1 diabetes. *J Pediatr Nurs* 2003; 18: 21–29. EK III
- [575] Summers LK, Fielding BA, Bradshaw HA, Ilic V, Beysen C, Clark ML, Moore NR, Frayn KN. Substituting dietary saturated fat with polyunsaturated fat changes abdominal fat distribution and improves insulin sensitivity. *Diabetologia* 2002; 45: 369–377. EK Ib
- [576] Sundelin J, Forsander G, Mattson SE. Family-oriented support at the onset of diabetes mellitus: A comparison of two group conditions during 2 years following diagnosis. *Acta Paediatr* 1996; 85: 49–55. EK III
- [577] Sundelin J, Forsander G, Mattson SE. Family-oriented support at the onset of diabetes mellitus: A comparison of two group conditions during 2 years following diagnosis. *Acta Paediatr* 1996; 85: 49–55. EK Ib
- [578] Svensson J, Johannesen J, Mortensen HB, Nordly S. Improved metabolic outcome in a Danish diabetic paediatric population aged 0–18 yr: results from a nationwide continuous Registration. *Pediatr Diabetes* 2009; 10: 461–467. EK III
- [579] Svoren BM, Butler D, Levine BS, Anderson BJ, Laffel LM. Reducing acute adverse outcomes in youths with type 1 diabetes: A randomized, controlled trial. *Pediatrics* 2003; 112: 914–922. EK Ib
- [580] Svoren BM, Volkening LK, Butler DA, Moreland EC, Anderson BJ, Laffel LM. Temporal trends in the treatment of pediatric type 1 diabetes and impact on acute outcomes. *J Pediatr* 2007; 150: 279–285. EK IIa
- [581] Swift PG. Diabetes education. ISPAD clinical practice consensus guidelines 2006 – 2007. *Pediatr Diabetes* 2007; 8: 103–109. EK IV
- [582] Swift PG, Skinner TC, de Beaufort CE, Cameron FJ, Aman J, Aanstoot HJ, Castano L, Chiarelli F, Daneman D, Danne T, Dorchy H, Hoey H, Kaprio EA, Kaufman F, Kocova M, Mortensen HB, Njolstad PR, Phillip M, Robertson KJ, Schoenle EJ, Urakami T, Vanelli M, Ackermann RW, Skovlund SE. Target setting in intensive insulin management is associated with metabolic control: the Hvidoere childhood diabetes study group centre differences study 2005. *Pediatr Diabetes* 2010; 11: 271–278. EK III
- [583] Taha D, Umpaichitra V, Banerji MA, Castells S. Type 2 diabetes mellitus in African-American adolescents: impaired beta-cell function in the face of severe insulin resistance. *J Pediatr Endocrinol Metab* 2006; 19: 135–142. EK Ib
- [584] Takii M, Uchigata Y, Komaki G, Nozaki T, Kawai H, Iwamoto Y, Kubo C. An integrated inpatient therapy for type 1 diabetic females with bulimia nervosa: A 3-year follow-up study. *J Psychosom Res* 2003; 55: 349–356. EK III
- [585] Tansey MJ, Tsalikian E, Beck RW, Mauras N, Buckingham BA, Weinzimer SA, Janz KF, Kollman C, Xing D, Ruedy KJ, Steffes MW, Borland TM, Singh RJ, Tamborlane WV. The effects of aerobic exercise on glucose and counterregulatory hormone concentrations in children with type 1 diabetes. *Diabetes Care* 2006; 29: 20–25. EK Ib
- [586] Temple IK, Gardner RJ, Mackay DJ, Barber JC, Robinson DO, Shield JP. Transient neonatal diabetes: widening the understanding of the etiopathogenesis of diabetes. *Diabetes* 2000; 49: 1359–1366. EK III
- [587] Temple IK, Shield JP. Transient neonatal diabetes, a disorder of imprinting. *J Med Genet* 2002; 39: 872–875. EK IV
- [588] Thalange N, Deeb L, Iotova V, Kawamura T, Klingensmith G, Philotheou A, Silverstein J, Tumini S, Ocampo Francisco AM, Kinduryte O, Danne T. Insulin degludec in combination with bolus insulin aspart is safe and effective in children and adolescents with type 1 diabetes. *Pediatr Diabetes* 2015; 16: 164–176. EK Ib
- [589] Thisted H, Johnsen SP, Rungby J. An update on the longacting insulin analogue glargine. *Basic Clin Pharmacol Toxicol* 2006; 99: 1–11. EK Ia
- [590] Thompson SJ, Auslander WF, White NH. Comparison of single-mother and two-parent families on metabolic control of children with diabetes. *Diabetes Care* 2001; 24: 234–238. EK IIa
- [591] Thomsen C, Storm H, Holst JJ, Hermansen K. Differential effects of saturated and monounsaturated fats on postprandial lipemia and glucagon-like peptide 1 responses in patients with type 2 diabetes. *Am J Clin Nutr* 2003; 77: 605–611. EK Ib
- [592] Thorpe CT, Fahey LE, Johnson H, Deshpande M, Thorpe JM, Fisher EB. Facilitating healthy coping in patients with diabetes: a systematic review. *Diabetes Educ* 2013; 39: 33–52. EK Ia
- [593] Thurber BW, Carmody D, Tadie EC, Pastore AN, Dickens JT, Wroblewski KE, Naylor RN, Philipson LH, Greeley SA. Age at the time of sulfonylurea initiation influences treatment outcomes in KCNJ11-related neonatal diabetes. *Diabetologia* 2015; 58: 1430–1435. EK III
- [594] Tiberg I, Katarina SC, Carlsson A, Hallstrom I. Children diagnosed with type 1 diabetes: A randomized controlled trial comparing hospital vs. home-based care. *Acta Paediatr* 2012; 101: 1069–1073. EK Ib
- [595] Toeller M. (nach Mann et al. 2004) Evidenz-basierte Ernährungsempfehlungen zur Behandlung und Prävention des Diabetes mellitus. *Diabet Stoffw* 2005; 14: 75–94. EK Ia-IV
- [596] Toni S, Reali MF, Barni F, Lenzi L, Festini F. Managing insulin therapy during exercise in type 1 diabetes mellitus. *Acta Biomed* 2006; 77: Suppl 1 34–40. EK IIa-III
- [597] Triolo TM, Armstrong TK, McFann K, Yu L, Rewers MJ, Klingensmith GJ, Eisenbarth GS, Barker JM. Additional autoimmune disease found in 33% of patients at type 1 diabetes onset. *Diabetes Care* 2011; 34: 1211–1213. EK III
- [598] Tsalikian E, Kollman C, Tamborlane WB, Beck RW, Fiallo-Scharer R, Fox L, Janz KF, Ruedy KJ, Wilson D, Xing D, Weinzimer SA. Prevention of hypoglycemia during exercise in children with type 1 diabetes by suspending basal insulin. *Diabetes Care* 2006; 29: 2200–2204. EK Ib
- [599] Tsioli E, Alexopoulos EC, Stefanaki C, Darviri C, Chrousos GP. Effects of diabetes-related family stress on glycemic control in young patients with type 1 diabetes: Systematic review. *Can Fam Physician* 2013; 59: 143–149. EK Ib
- [600] Tubiana-Rufi N, Coutant R, Bloch J, Munz-Licha G, Delcroix C, Montaud-Raguideau N, Ducrocq R, Limal JM, Czernichow P. Special management of insulin lispro in continuous subcutaneous insulin infusion in young diabetic children: a randomized cross-over study. *Horm Res* 2004; 62: 265–271. EK Ib
- [601] Tuomilehto J, Lindstrom J, Eriksson JG, Valle TT, Hamalainen H, Lanne-Parikka P, Keinanen-Kiukkaanniemi S, Laakso M, Louheranta A, Rastas M, Salminen V, Uusitupa M. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med* 2001; 344: 1343–1350. EK Ib
- [602] Tupola S, Komulainen J, Jaaskelainen J, Sipila I. Post-prandial insulin lispro vs. human regular insulin in prepubertal children with Type 1 diabetes mellitus. *Diabet Med* 2001; 18: 654–658. EK Ib
- [603] UK Prospective Diabetes Study (UKPDS) Group Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes (UKPDS 34). *UK Prospective Diabetes Study (UKPDS) Group. Lancet* 1998; 352: 854–865. EK Ib
- [604] UK Prospective Diabetes Study (UKPDS) Group Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *UK Prospective Diabetes Study (UKPDS) Group. Lancet* 1998; 352: 837–853. EK Ib
- [605] UK Prospective Diabetes Study (UKPDS) Group Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38. *BMJ* 1998; 317: 703–713. EK Ib

- [606] Vaarala O, Klemetti P, Juhela S, Simell O, Hyoty H, Ilonen J. Effect of coincident enterovirus infection and cows' milk exposure on immunisation to insulin in early infancy. *Diabetologia* 2002; 45: 531–534. EK Ib
- [607] Valenzuela JM, Patino AM, McCullough J, Ring C, Sanchez J, Eidson M, Nemery R, Delamater AM. Insulin pump therapy and health-related quality of life in children and adolescents with type 1 diabetes. *J Pediatr Psychol* 2006; 31: 650–660. EK Ib
- [608] van den Berg JM, Morton AM, Kok SW, Pijl H, Conway SP, Heijerman HG. Microvascular complications in patients with cystic fibrosis-related diabetes (CFRD). *J Cyst Fibros* 2008; 7: 515–519. EK III
- [609] Vessby B, Unsitupa M, Hermansen K, Riccardi G, Rivellese AA, Tapsell LC, Nansen C, Berglund L, Louheranta A, Rasmussen BM, Calvert GD, Maffettone A, Pedersen E, Gustafsson IB, Storlien LH. Substituting dietary saturated for monounsaturated fat impairs insulin sensitivity in healthy men and women: The KANWU Study. *Diabetologia* 2001; 44: 312–319. EK Ib
- [610] Viklund G, Ortvist E, Wikblad K. Assessment of an empowerment education programme. A randomized study in teenagers with diabetes. *Diabet Med* 2007; 24: 550–556. EK Ib
- [611] Viner RM, Christie D, Taylor V, Hey S. Motivational/solution-focused intervention improves HbA1c in adolescents with Type 1 diabetes: A pilot study. *Diabet Med* 2003; 20: 739–742. EK III
- [612] von Sengbusch S, Muller-Godeffroy E, Hager S, Reintjes R, Hiort O, Wagner V. Mobile diabetes education and care: intervention for children and young people with Type 1 diabetes in rural areas of northern Germany. *Diabet Med* 2006; 23: 122–127. EK Ib
- [613] Wabitsch M, Hertrampf M, Mayer H, Heinze E. Glucosetoleranz und Insulinresistenz bei Kindern und Jugendlichen mit Adipositas. *Diabet Stoffw* 2002; Suppl 10 34. EK III
- [614] Wagner VM, Grabert M, Holl RW. Severe hypoglycaemia, metabolic control and diabetes management in children with type 1 diabetes in the decade after the Diabetes Control and Complications Trial – a large-scale multicentre study. *Eur J Pediatr* 2005; 164: 73–79. EK Ib-III
- [615] Wagner VM, Kremke B, Hiort O, Flanagan SE, Pearson ER. Transition from insulin to sulfonylurea in a child with diabetes due to a mutation in KCNJ11 encoding Kir6.2–initial and long-term response to sulfonylurea therapy. *Eur J Pediatr* 2009; 168: 359–361
- [616] Waldron S, Rurik I, Madacsy L, Donnasson-Eudes S, Rosu M, Skovlund SE, Pankowska E, Allgrove J. Good practice recommendations on paediatric training programmes for health care professionals in the EU. *Pediatr Diabetes* 2012; 13: Suppl 16 29–38. EK IV
- [617] Wambach JA, Marshall BA, Koster JC, White NH, Nichols CG. Successful sulfonylurea treatment of an insulin-naïve neonate with diabetes mellitus due to a KCNJ11 mutation. *Pediatr Diabetes* 2010; 11: 286–288
- [618] Wang YC, Stewart SM, Mackenzie M, Nakonezny PA, Edwards D, White PC. A randomized controlled trial comparing motivational interviewing in education to structured diabetes education in teens with type 1 diabetes. *Diabetes Care* 2010; 33: 1741–1743. EK Ib
- [619] Warncke K, Frohlich-Reiterer EE, Thon A, Hofer SE, Wiemann D, Holl RW. Polyendocrinopathy in children, adolescents, and young adults with type 1 diabetes: a multicenter analysis of 28 671 patients from the German/Austrian DPV-Wiss database. *Diabetes Care* 2010; 33: 2010–2012. EK III
- [620] Watts GF, Gregory L, Naoumova R, Kubal C, Shaw KM. Nutrient intake in insulin-dependent diabetic patients with incipient nephropathy. *Eur J Clin Nutr* 1988; 42: 697–702. EK III
- [621] Weinzimer SA, Swan KL, Sikes KA, Ahern JH. Emerging evidence for the use of insulin pump therapy in infants, toddlers, and preschool-aged children with type 1 diabetes. *Pediatr Diabetes* 2006; 7: Suppl 4 15–19. EK Ia-III
- [622] Weissberg-Benchell J, Glasgow AM, Tynan WD, Wirtz P, Turek J, Ward J. Adolescent diabetes management and mismanagement. *Diabet Care* 1995; 18: 77–82. EK III
- [623] Weitzel D, Obermann B, Rogge R. Tagesklinische Ersteinstellung des kindlichen und jugendlichen IDDM. *Diabet Stoffw* 1997; 6: 110. EK IV
- [624] Wells T, Frame V, Soffer B, Shaw W, Zhang Z, Herrera P, Shahinfar S. A double-blind, placebo-controlled, dose-response study of the effectiveness and safety of enalapril for children with hypertension. *J Clin Pharmacol* 2002; 42: 870–880. EK Ib
- [625] White NH, Cleary PA, Dahms W, Goldstein D, Malone J, Tamborlane WV. Beneficial effects of intensive therapy of diabetes during adolescence: outcomes after the conclusion of the Diabetes Control and Complications Trial (DCCT). *J Pediatr* 2001; 139: 804–812. EK Ib
- [626] White NH, Sun W, Cleary PA, Danis RP, Davis MD, Hainsworth DP, Hubbard LD, Lachin JM, Nathan DM. Prolonged effect of intensive therapy on the risk of retinopathy complications in patients with type 1 diabetes mellitus: 10 years after the Diabetes Control and Complications Trial. *Arch Ophthalmol* 2008; 126: 1707–1715. EK Ib
- [627] Whittemore R, Jaser S, Chao A, Jang M, Grey M. Psychological experience of parents of children with type 1 diabetes: a systematic mixed-studies review. *Diabetes Educ* 2012; 38: 562–579. EK Ib
- [628] Wiebe DJ, Berg CA, Korbel C, Palmer DL, Beveridge RM, Upchurch R, Lindsay R, Swinyard MT, Donaldson DL. Children's appraisals of maternal involvement in coping with diabetes: Enhancing our understanding of adherence, metabolic control, and quality of life across adolescence. *J Pediatr Psychol* 2005; 30: 167–178. EK III
- [629] Wisting L, Froisland DH, Skriverhaug T, Dahl-Jorgensen K, Ro O. Disturbed eating behavior and omission of insulin in adolescents receiving intensified insulin treatment: a nationwide population-based study. *Diabetes Care* 2013; 36: 3382–3387. EK III
- [630] Wolfsdorf J, Craig ME, Daneman D, Dunger D, Edge J, Lee WR, Rosenbloom A, Sperling MA, Hanas R. Diabetic ketoacidosis. *Pediatr Diabetes* 2007; 8: 28–43. EK IV
- [631] Wolfsdorf J, Allgrove J, Craig ME, Edge J, Glaser N, Jain V, Lee WW, Mungai LN, Rosenbloom AL, Sperling MA, Hanas R. ISPAD Clinical Practice Consensus Guidelines 2014. Diabetic ketoacidosis and hyperglycemic hyperosmolar state. *Pediatr Diabetes* 2014; 15: Suppl 20 154–179. EK IV
- [632] Wolfsdorf J, Glaser N, Agus M et al ISPAD Clinical Practice Consensus Guidelines 2018: Diabetic ketoacidosis and the hyperglycemic hyperosmolar state. *Pediatr Diabetes* 2018; 19: Suppl 27 155–177 doi: 10.1111/pedi.12701. No abstract available.
- [633] Wood JR, Moreland EC, Volkening LK, Svoren BM, Butler DA, Laffel LM. Durability of insulin pump use in pediatric patients with type 1 diabetes. *Diabetes Care* 2006; 29: 2355–2360. EK Ib-III
- [634] World Health Organisation (WHO) Technical Report Series 916. Diet, Nutrition and the Prevention of Chronic Diseases. Report of a Joint FAO/WHO Expert Consultation. WHO; Geneva: 2003. EK IV
- [635] Wühl E, Witte K, Soergel M, Mehls O, Schaefer F. Distribution of 24-h ambulatory blood pressure in children: normalized reference values and role of body dimensions. *J Hypertens* 2002; 20: 1995–2007. EK Ib
- [636] Wysocki T, Greco P, Harris MA, Bubb J, White NH. Behavior therapy for families of adolescents with diabetes: maintenance of treatment effects. *Diabetes Care* 2001; 24: 441–446. EK Ia
- [637] Wysocki T, Harris MA, Buckloh LM, Mertlich D, Lochrie AS, Mauras N, White NH. Randomized trial of behavioral family systems therapy for diabetes: maintenance of effects on diabetes outcomes in adolescents. *Diabetes Care* 2007; 30: 555–360. EK Ib
- [638] Wysocki T, Harris MA, Buckloh LM, Mertlich D, Lochrie AS, Taylor A, Sadler M, White NH. Randomized, controlled trial of Behavioral Family Systems Therapy for Diabetes: maintenance and generalization of effects on parent-adolescent communication. *Behav Ther* 2008; 39: 33–46. EK Ib

- [639] Wysocki T, Harris MA, Greco P, Bubb J, Danda CE, Harvey LM, McDonnell K, Taylor A, White NH. Randomized, controlled trial of behavior therapy for families of adolescents with insulin-dependent diabetes mellitus. *J Pediatr Psychol* 2000; 25: 23–33. EK Ib
- [640] Wysocki T, Lochrie A, Antal H, Buckloh LM. Youth and parent knowledge and communication about major complications of type 1 diabetes: associations with diabetes outcomes. *Diabetes Care* 2011; 34: 1701–1705. EK Ib
- [641] Wysocki T, Lochrie A, Antal H, Buckloh LM. Youth and parent knowledge and communication about major complications of type 1 diabetes: associations with diabetes outcomes. *Diabetes Care* 2011; 34: 1701–1705. EK III
- [642] Wysocki T, Taylor A, Hough BS, Linscheid TR, Yeates KO, Naglieri JA. Deviation from developmentally appropriate self-care autonomy. Association with diabetes outcomes. *Diabet Care* 1997; 19: 121–125. EK IIb
- [643] Yokota Y, Kikuchi N, Matsuura N. Screening for diabetes by urine glucose testing at school in Japan. *Pediatr Diabetes* 2004; 5: 212–218. EK III
- [644] Young V, Eiser C, Johnson B, Brierley S, Epton T, Elliott J, Heller S. Eating problems in adolescents with Type 1 diabetes: a systematic review with meta-analysis. *Diabet Med* 2013; 30: 189–198. EK Ia
- [645] Zeitler P, Fu J, Tandon N, Nadeau K, Urakami T, Barrett T, Maahs D. ISPAD Clinical Practice Consensus Guidelines 2014. Type 2 diabetes in the child and adolescent. *Pediatr Diabetes* 2014; 15: 26–46. EK IV
- [646] Zenlea IS, Mednick L, Rein J, Quinn M, Wolfsdorf J, Rhodes ET. Routine behavioral and mental health screening in young children with type 1 diabetes mellitus. *Pediatr Diabetes* 2014; 15: 384–388. EK III
- [647] Ziegler AG, Rewers M, Simell O et al. Seroconversion to multiple islet autoantibodies and risk of progression to diabetes in children. *JAMA* 2013; 309 (23): 2473–2479
- [648] Ziegler AG, Schmid S, Huber D, Hummel M, Bonifacio E. Early infant feeding and risk of developing type 1 diabetes-associated autoantibodies. *JAMA* 2003; 290: 1721–1728. EK III
- [649] Ziegler R, Heidtmann B, Hilgard D, Hofer S, Rosenbauer J, Holl R. Frequency of SMBG correlates with HbA1c and acute complications in children and adolescents with type 1 diabetes. *Pediatr Diabetes* 2011; 12: 11–17. EK III
- [650] Ziegler R, Neu A. Diabetes in Childhood and Adolescence. *Dtsch Arztebl Int* 2018; Mar 2 115 (9): 146–156 doi: 10.3238/arztebl.2018.0146
- [651] Zung A, Glaser B, Nimri R, Zadik Z. Glibenclamide treatment in permanent neonatal diabetes mellitus due to an activating mutation in Kir6.2. *J Clin Endocrinol Metab* 2004; 89: 5504–5507. EK III