

ESPE Patient Information on COVID-19 and Pediatric Endocrine Diseases

This information is based on current knowledge of COVID-19 and will be updated as additional scientific evidence is released.

Disease specific information and advice: Type 1 Diabetes Mellitus (T1DM)

This flyer aims to provide guidance on prevention and treatment of COVID-19 in patients with a pediatric endocrine disease. It summarizes fast facts about COVID-19, and what children with endocrine diseases and their parents need to know regarding their health and wellbeing. These recommendations are based on the latest knowledge and expert opinion. If, after reading, you still have concerns or questions, please contact your physician or healthcare provider.

What is COVID-19?

Infection by the SARS-coronavirus 2 (SARS-CoV2) can lead to the disease COVID-19. People affected with COVID-19 may have mild to severe respiratory illness with fever, coughing and shortness of breath. Additional symptoms include fatigue, chills, muscle pain, headache, sore throat, loss of taste or smell, nausea, vomiting or diarrhea, skin rash, or discoloration of fingers or toes. Symptoms may appear 2–14 days after exposure to the virus. Risk for severe course of COVID-19 is associated with older age, male gender, obesity, cardiovascular risk factors, type 2 diabetes mellitus, or other chronic underlying conditions or comorbidities.

Children and COVID-19

Children can be infected with the SARS-CoV2, can get sick and can spread the SARS-CoV2 to others. Fewer children have been sick with COVID-19 compared to adults. Most children with COVID-19 have mild symptoms or have no symptoms at all.

Most often no special treatment is required, besides simple supportive measures (adequate water intake, use of paracetamol, when needed). Few children have severe complaints that render hospitalization necessary.

Children do not seem to be more susceptible to the new variant of concern for SARS-CoV-2 initially detected in the United Kingdom, which seems to be more transmissible in both children and adults.

Are children with Type 1 Diabetes Mellitus at increased risk of COVID-19 infection or severe course of COVID-19?

Currently, there is no evidence indicating that children and young adults with type 1 diabetes (T1DM) are at increased risk for COVID-19 infection.

So far, the evidence suggests that children with T1DM infected with SARS-CoV-2 have similar disease outcomes as peers without diabetes.

It is well known that uncontrolled hyperglycemia impairs immune function. It is likely that patients with T1DM if not well controlled, could have an increased risk of infection. The risk of getting very sick from COVID-19 is likely to be lower if diabetes is well-managed and intensifying glycemic control could serve as a means of primary prevention.

What should children with T1DM do in case of infection with COVID-19?

In general, when a child with diabetes develops a viral infection, it can make their blood sugar levels more challenging to regulate leading to complications such as hypoglycemia (low blood glucose levels) and diabetic ketoacidosis (DKA).

Whenever children with T1DM develop symptoms suspicious for COVID-19, they need to follow the plan provided by their diabetes team for “sick day management”

The main steps of this plan include

1. More frequent measurements of glucose and ketones. The range of glucose should be 70-180mg/dl (3.9-10.0 mmol/L) and the ketones in blood <0.6 mmol/L.
2. Never omitting or stopping injecting insulin. In fact, insulin requirements usually increase during infections.
3. Keeping well hydrated
4. Providing symptomatic treatment (i.e antipyretics for fever relief)
5. Contact diabetes care team for further instructions

The family should not hesitate to seek immediate medical care or advice in case of severe symptoms, including:

- persistent fever,
- vomiting or weight loss (indicative of severe dehydration),
- exhaustion,
- confusion,
- fruity breath odor or breathing difficulty
- severe abdominal pain.

All these may indicate diabetic ketoacidosis, an emergency situation that requires direct communication with the diabetes team and transition to the emergency department.

Children, with or without underlying conditions, can develop Multisystem inflammatory syndrome in children (MIS-C), a complication where different body parts can become inflamed, including the heart, lungs, kidneys, brain, skin, eyes, or gastrointestinal organs. MIS-C can be serious and potentially life threatening. Most children who were diagnosed with this condition have gotten better with medical care. In the case child with T1DM develops difficulty breathing, shortness of breath or persistent pain or pressure in the chest, new confusion or inability to arouse, bluish discoloration of lips or face, sudden rash or inability to stay awake, it is of must to **seek emergency medical care immediately** as this could be the symptom of impending MIS-C.

Do the COVID-19 prevention measures differ for children with T1D compared to the general population?

The preventive measures against contamination with the SARS-CoV2 infection are not different for children with T1DM than for healthy children. No extra precautions are needed other than the usual advice. They should participate in school as all other classmates when allowed by the general SARS-CoV2 prevention measures. It is also especially important to continue to have physical activity during the pandemic. Especially children with diabetes are strongly encouraged to integrate physical activity in their daily routine even during lockdowns. Cycling, walking, playing with other family members around the house and in the garden and even participating in house cleaning are all part of being physically active.

What should children with T1DM do to protect themselves?

To prevent corona virus from spreading, there are several general recommendations:

- Children should wash hands frequently with soap and water for 20 seconds or clean hands with an alcohol-based hand sanitizer
- Maintain social distancing according to local recommendation
- Cough or sneeze into a tissue or their elbow
- Avoid touching their face, eyes, and nose
- Don't share food, drinks, utensils, towels, etc.
- Parents need to sanitize surfaces in the home frequently, especially kitchen and bathroom areas
- Wear a mask according to local recommendation. Wearing a mask is **not** a substitute for other everyday prevention actions.

There is still not validated vaccination against SARS-CoV2 for children under 16years old.

It is important for children with diabetes to maintain a good glycemic control and to be aware of the risk and signs of diabetic ketoacidosis.

It is important to have the phone numbers of diabetes care team ready, including how to reach them at night and on weekends or holidays.

For 2020-2021, CDC recommends use of any licensed, age-appropriate flu vaccine as an option for vaccination this season. It is particularly important to consider flu vaccination for children and adolescents with T1DM.

What is the advice on the regular monitoring of children with T1DM?

Even during the pandemic, children with T1DM should not omit their regular outpatient clinics and-if possible-their laboratory workups. If necessary, consultations may be provided by telephone or video-calls. In fact, the use of technology in the management of T1DM has provided the opportunity to create an interactive digital clinic, where the families can send in their data from their meters, their pumps or their sensors via e-mail or by uploading them to the "cloud" and the diabetes team can provide prompt and accurate feedback, reducing thus the need for appointments with physical presence.

Furthermore, it is important for families to ensure that they have enough medical supplies on hand, ideally in larger quantities, if possible. Insulin requirements can significantly increase during an acute infection, as well as the need for intense glucose and ketone control. Access to technical support and back-up plans in case of pump/sensor failure must be ensured.

When will children be able to get the COVID-19 vaccine?

Vaccine to prevent COVID-19 caused by SARS-CoV-2 may prevent from getting COVID-19. They are administered as a 1 or 2-dose series in the muscle.

Pfizer/BioNTech and Moderna are already testing the vaccine in children, and Johnson & Johnson plans to do the same. Currently, the Pfizer/BioNTech COVID-19 vaccine is authorized for use in children 16 years and older, while the Moderna and Johnson & Johnson vaccines are authorized for people 18 years and older.

Pfizer/BioNTech and Moderna are conducting studies, in which the vaccines are tested in groups of children of descending age. Pfizer/BioNTech is currently testing its vaccine in children ages 12 to 15. If all goes well, vaccine trials for children ages 5 to 11 will be next. Moderna is starting to test their vaccine in children ages 12 to 17. They eventually plan to test their vaccine in children as young as 6 months.

Researchers will want to confirm that the vaccines are safe and effective for each age group. They'll also identify the optimal dose, which must be effective, but with tolerable side effects. The FDA and EMA will review the trial data to decide whether to authorize the vaccines for each age group.

Data from the age de-escalation studies might be available by the summer, and it's possible the FDA and EMA could start authorizing the vaccine for children soon after.

Disclaimer: This document is based on literature review and expert opinion. The document should be considered as guidance only; it is not intended to determine an absolute standard of medical care.

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