

# Protecting Your Skin When Using Insulin Pumps and Continuous Glucose Monitors

## Paediatric Diabetes Department

### Introduction

Wearing an insulin pump, continuous glucose monitor (CGM) or Closed Loop system all require having a device constantly stuck to the skin. Many children and young people (CYP) and their families worry about irritation, scarring, skin infections and allergic reactions to the adhesives used for these devices. We know that these complications can be a barrier to young people using a device and a reason for

stopping the pump and/or CGM. The advice in this leaflet may help minimise or prevent these allergic reactions.




### Hypersensitivity skin reactions

Hypersensitivity reactions (also called an allergic reaction) are an abnormal reaction where the body's immune system reacts to something. Reactions are generally described as one of four types:

**Type 1 hypersensitivity** is the most widely known allergic reaction and is an immediate reaction - often occurring within minutes. Type 1 hypersensitivity reactions include food allergies (e.g., peanuts) and bee stings. Symptoms include urticaria (hives), swelling of the face and anaphylaxis.

**Type 2 hypersensitivity** and **Type 3 hypersensitivity** are not typical to diabetes device wearing.



**Type 4 hypersensitivity** is a delayed reaction, taking several days to develop and is the most common form of reaction.

These reactions may occur in response to chemicals in the adhesives used in the CGM and insulin infusion set. Once a person becomes sensitive to the chemical, the reaction may become worse and appear more quickly each time the sensor or infusion set is put on.

## Contact dermatitis

Contact dermatitis is a broad term describing both a Type 4 hypersensitivity reaction and irritant contact dermatitis. When the skin comes into contact with a particular substance, there is an inflammatory reaction that causes the skin to become itchy, blistered, dry and cracked.

The type of adhesive used in a device also plays a key role in developing allergic contact dermatitis.

## Scarring


Scarring can also be a complication from wearing an insulin infusion set or CGM. It is unclear as to whether scarring can affect how accurate the glucose sensor is or how the insulin is absorbed. However, it may interfere with how the sensor or cannula is inserted and therefore scarred areas should be avoided.


## Device placement considerations

- Common areas for insertion in children and young people include the upper buttocks, abdomen (tummy) and upper arm
- Regardless of location, if there is not enough subcutaneous tissue (the deepest layer of your skin made up of fat cells and connective tissue), the cannula/ sensor will feel uncomfortable
- Consider a young person's sleeping position - for example side or back sleeping positions
- Sensors are less likely to be accidentally dislodged if they are placed on a 'flat' part of the body (that does not bend or fold during normal activities), such as upper buttocks, upper arm and upper abdomen
- Choose a sensor site that is at least 2.5 cm (1 inch) away from an insulin injection/insulin infusion site
- Rotate sites. Previous insertion sites should be given a minimum of one week to heal before new tape/adhesive agents are placed over sites
- Avoid scarred areas and insert one to two inches away from the tummy button
- Avoid the waistline to prevent discomfort, irritation or unintended removal
- Place insulin infusion sets with tubing oriented strategically (e.g., if placed on buttocks, position tubing upwards to allow for easy disconnection)

## Site tips

Once you decide where to insert the sensor/insulin infusion set, thinking about the following may minimise the risk of hypersensitivity reactions and irritant contact dermatitis. What works best for one person, may not be the best for another. You may need to try several different products.



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- Clean the skin with an oil free soap and dry thoroughly. Do not use an oil-containing moisturiser on the area
  - Do not place immediately after a shower/bath or in a steamy bathroom – minimise humidity with hairdryer or apply in a dry environment
  - Solid or spray antiperspirant (unscented) may help with skin prone to sweating. Apply a thin layer, wait 10–15 minutes, wipe off excess and prepare the site
  - A possible solution to previously known hypersensitivity reactions has been the off-label use of over-the-counter nasal steroid sprays being applied topically to the skin. There have been no studies looking at the long-term effect of nasal steroids applied topically. Anecdotally, 1–2 puffs should be applied to the skin and let dry completely before inserting infusion set / CGM
  - Barrier films may help prevent mild skin irritation from adhesives, although glucose sensor manufacturers recommend not using barrier creams and patches as it may affect how the sensor works. However, anecdotal evidence suggests this is done where the family make a small circle in the film, for the CGM or infusion set to be inserted through
  - If you are having skin reactions, contact the diabetes team to discuss this. In addition, report the skin reaction to the device manufacturer and to MHRA through the Yellow Card scheme <https://yellowcard.mhra.gov.uk>

## Adhesives and removal


Adhesive patches or supplemental tapes can be applied over the CGM/ infusion set to keep it stuck to the skin for the duration of the device life. Enhancing adhesion can be important for a variety of device wearers, especially children (with curvy site surfaces and high activity levels), swimmers and athletes (due to increased perspiration and movement).

The two main types of adhesive patches are:

1. The transparent hypoallergenic films (also used as barrier film)
2. Kinesiology tape like products - these come in a variety of pre-cut sizes and shapes, as well as rolls for custom cutting.

It is very important to think about the technique used to remove these patches/tapes. This will reduce the chance of causing contact dermatitis and injury to the skin. Adhesive tapes should be removed slowly and with low energy – remember ‘low and slow’. You may also want to consider using a product to help remove the sensor e.g., baby oil or an adhesive remover.

## Promoting healing

- After devices have been removed, look at the skin carefully. If skin is intact and not bothersome, moisturising lotion may be applied to sooth and protect skin
  - If skin is intact but irritated, additional anti-inflammatory or anti-itch compounds may be applied to the skin
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- Broken skin should be frequently monitored for development of infection. Look out for worsening of pain and itching, spreading redness, heat, pus, formation of pustules, or a burning sensation. If concerned, seek advice from your GP.

## Contact Details

### Paediatric Diabetes Nursing Team:

Office hours (excluding Bank & Public Holidays) **Monday - Friday (08:00 - 16:00)**

Telephone: **01932 723314**

All email enquiries: [asp-tr.generalpaeddiabetes@nhs.net](mailto:asp-tr.generalpaeddiabetes@nhs.net)

Further information and fact sheets can be found on our Children and Young People's Diabetes web page at:

<https://www.ashfordstpeters.net/diabetes/paediatrics/index.html>

## Reference

Messer, LH., Berget, C. and Beatsone, C. et al (2018) Preserving skin integrity with chronic device use in diabetes. Diabetes Technology and Therapeutics 20 (Supplement 2)

With thanks to University College London Hospitals, CYP Diabetes Service

## Further Information

We endeavour to provide an excellent service at all times, but should you have any concerns please, in the first instance, raise these with the Matron, Senior Nurse or Manager on duty. If they cannot resolve your concern, please contact our Patient Experience Team on 01932 723553 or email [asp-tr.patient.advice@nhs.net](mailto:asp-tr.patient.advice@nhs.net). If you remain concerned, the team can also advise upon how to make a formal complaint.

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