

Adrenal Function Testing for Children on Long-term Glucocorticoid Therapy for Respiratory Conditions

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Contents

1. [Background](#)
2. [Who Needs a Synacthen Test?](#)
3. [Corticosteroid Doses, Steroid Safety Cards and Synacthen Testing](#)
4. [Synacthen Test Protocol](#)
5. [General Management After the Synacthen Test](#)
6. [Management of Specific Situations](#)
7. [Long-term Management](#)
8. [Patient Information](#)
9. [Individual Patient Management Plan](#)
10. [Patient Information Leaflet: Having a Synacthen Test](#)
11. [Appendix – Commonly Prescribed Inhaled Steroids](#)
12. [References](#)

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Aim of Guideline

This is designed to be a regional guideline, to ensure standardised care across primary and secondary services in North Central London. The master guideline can then be amended for local use. This was produced by the UCLP Asthma Network and modified for local use at the Whittington.

Criteria for Use

This guideline gives details of:

- When and why Synacthen testing is needed for children on high-dose inhaled corticosteroid therapy
- How to perform a Synacthen test
- Interpretation of Synacthen test results
- Managing children with suboptimal responses to Synacthen testing
- Patient information resources

We would recommend that where children have shown suboptimal responses to Synacthen testing, their treatment should be guided by their named Consultant.

1) Background

Children taking high dose inhaled corticosteroids, long-term oral steroids or a combination of oral, inhaled, nasal and topical steroids are at risk of adrenal insufficiency.

This can cause a life-threatening adrenal crisis during an intercurrent illness or surgery.

These children may be identified with the use of a Synacthen test and should be assessed regularly.

2) Who needs a Synacthen Test

Synacthen testing is recommended for children who are taking:

- **High dose inhaled steroid therapy of over 1000 micrograms/day beclomethasone equivalent** (see Corticosteroid Dose Equivalents and Commonly Prescribed Inhaled Corticosteroids on page 18). It is important to check their adherence to medication. There may be a discrepancy between what is prescribed and what they are taking.
- **Oral glucocorticoids for more than 3 months**

Children who are regularly taking oral steroids greater than 10 mg/m²/day hydrocortisone equivalent are likely to have a degree of adrenal suppression and should be given a Sick Day and Emergency Plan. This would include doubling their steroid dose during intercurrent illnesses and provision of intramuscular hydrocortisone and Glucogel in case of emergencies. These children should have an Emergency Card and a Medic Alert bracelet.

When a child is being weaned off oral steroid therapy, synacthen testing is required when the child's dose has been reduced to the equivalent of 10mg/m²/day hydrocortisone (page 5). Please refer to the Department of Health guidance on withdrawing oral corticosteroid doses set out in the British National Formulary - (BNF-C Section 6.3.2, August 2014).

Synacthen testing should **also** be considered for:

- Children who are taking intermediate doses of inhaled steroids in addition to nasal and topical steroids. This is at their Consultant's discretion.
- Any child on inhaled glucocorticoid therapy who has **unexplained hyponatraemia, hypoglycaemia or collapse**

3) Corticosteroid Dose Equivalents

Assess the patient's total daily dose of corticosteroid. Consider nasal and topical as well as inhaled and oral steroids.

1. Oral Steroid dose equivalents

Name of steroid	Equivalent dose
Prednisolone	1 mg
Betamethasone	150 micrograms
Dexamethasone	150 micrograms
Hydrocortisone	4 mg
Methylprednisolone	800 micrograms
Triamcinolone	800 micrograms
Deflazacort	1.2 mg

Children taking more than 10mg/m²/day of hydrocortisone equivalent for three months or longer are likely to have adrenal suppression and require sick day and emergency plans to cover for intercurrent illnesses and surgery.

When their steroids are being weaned, they should undergo Synacthen testing once their dose has been reduced to below 10mg/m²/day of hydrocortisone equivalent.

A steroid safety card is recommended for children taking oral steroids for more than three weeks.

2. Inhaled steroid dose equivalents: BDP equivalent doses

Name of inhaled steroid	Equivalent dose
Beclomethasone dipropionate	400 micrograms
Budesonide	400 micrograms
Fluticasone	200 micrograms
Mometasone	200 micrograms

A Synacthen test is recommended for children taking more than the equivalent of 1000 micrograms/day beclomethasone dipropionate.

For a quick reference guide to the steroid load from commonly prescribed inhaled steroids, please see [Appendix 1](#) (page 18).

3. Nasal and Topical Steroids

Although, used alone, nasal and topical steroids are unlikely to cause adrenal suppression, they do contribute to the total daily dose of steroids and should be taken into account. Some children on a combination of inhaled, nasal and topical steroids may need a Synacthen test.

To assist with decision-making, the relative potency of nasal and topical steroids is listed below:

a) Nasal steroids, trade names and potency

Steroid name	Trade names
Triamcinolone	Nasacort
Beclomethasone	Beconase
Budesonide	Rhinocort
Mometasone	Nasonex
Fluticasone	Flonase

Fluticasone and mometasone have greater anti-inflammatory potency than beclomethasone and budesonide, which are more potent than triamcinolone.

b) Topical steroids by potency

Potency	Steroid name	Trade names
Mild	Hydrocortisone 0.5% to 2.5%	Efcortelan, Mildison, Dioderm
	Fluocinolone 0.0025%	Synalar (same name used for different strengths)
Moderate	Alclometasone dipropionate 0.05%	Modrasone
	Betamethasone valerate 0.025%	Betnovate
	Clobetasone butyrate 0.05%	Eumovate
	Fluocinolone acetonide 0.00625%	Synalar (same name used for different strengths)
Potent	Beclomethasone dipropionate 0.025%	Propaderm
	Betamethasone dipropionate 0.05%	Diprosone
	Betamethasone valerate 0.1%	Betnovate
	Diflucortolone valerate 0.1%	Nerisone
	Fluocinolone acetonide 0.025%	Synalar (same name used for different strengths)
	Mometasone furoate 0.1%	Elocon
Very potent	Clobetasol propionate 0.05%	Dermovate
	Diflucortolone valerate 0.3%	Nerisone
	Halcinonide 0.1%	Halciderm

4) Synacthen test Protocol

This page and the next should be printed and added to the notes

Name:	
Date of birth:	
Hospital number:	
Weight (kg):	
Consultant:	

Introduction

Children taking high dose inhaled corticosteroids, long-term oral steroids or a combination of oral, inhaled, nasal and topical steroids are at risk of adrenal insufficiency. This can cause a life-threatening adrenal crisis during an intercurrent illness or surgery. These children may be identified with the use of a Synacthen test and should be assessed regularly.

Cautions:

1. There is a risk of a severe allergic reaction to Synacthen, particularly in children with a history of asthma or allergy. These reactions are very rare.
2. ***The dose of Synacthen used may not detect minor degrees of adrenal suppression.***
3. The test is unreliable if performed within 4 weeks of pituitary surgery.
4. If the child is unwell, and needs to continue taking their steroids, the test should be postponed.

Before the day of the test:

1. **Order the Synacthen from Pharmacy at least 24 hours before the test.**

Dose of Synacthen (ACTH):

Under 1 year old: 36 micrograms/kg (max 250 micrograms) IV or IM injection
Over 1 year old: 250 micrograms IV or IM injection

Child's weight:	
Dose of Synacthen:	

Prescribe the Synacthen on an outpatient prescription and let Pharmacy know about the test. If a recent weight is not available, use an estimated weight and correct this on the day.

2. When should steroids be stopped before the test?:

Steroid therapy can affect the Synacthen test result. In general, it is helpful to know whether a child has adrenal suppression whilst taking their long-term therapy.

Children on inhaled corticosteroids should continue taking their medication as normal.

Those on long-term oral corticosteroids should stop taking their steroids the night before the test, and should be admitted to hospital for observation overnight. They should have four hourly observations and have their blood glucose and blood pressure checked first thing in the morning.

Children who are on a short course of prednisolone should not have a Synacthen test until they have been back on their maintenance therapy for at least three days.

On the day:

- 1. The test should be performed at 9am. If they are late (more than 1 hour) the test should be rebooked for another time. The child does not need to fast for the test.**

Children should come to Daycare at 8am to have EMLA/Ametop applied and a cannula inserted in good time for a 9am start time.

- 2. Obtain verbal consent from the child and carer for the Synacthen test. The family should be given the patient information leaflet to read (section 10)**

Consent obtained? (please circle) Yes No

- 3. Perform some baseline observations**

Temperature		Blood pressure	
Heart rate		Peak flow rate	
Respiratory rate		Oxygen saturations	

- 4. If your department has an Allergy Box including Anaphylaxis medication and protocols, ensure it is to hand**

- 5. Prescribe Synacthen according to the child's actual weight.**

- 6. Insert a cannula (preferably one you can easily take blood from) and allow the child to rest for 30 minutes**

- 7. Take the first blood sample for cortisol from the cannula then give Synacthen IV and flush with 5 ml of 0.9% sodium chloride.** Use plain top Paediatric bottles or gold top Adult bottles for the cortisol assay.

- 8. After 30 minutes, take a second blood sample for cortisol from the cannula.** It is best to obtain all blood samples from the cannula. However, if the cannula does not bleed back, a repeat venesection or fingerprick sample is acceptable. Intramuscular Synacthen can also be used where cannulation attempts fail.

- 9. After the test, the child can be discharged home. Follow-up should be arranged before they leave.** Has follow-up been arranged with the child's Consultant (please circle)? Yes
No

Email the named Consultant to let them know that the Synacthen test has been performed.

We would also recommend that a record of patients undergoing Synacthen testing be kept for audit purposes.

Results

Child's basal cortisol level	
Child's 30 min cortisol level	

See [Management](#) section for advice about the interpretation and management of test results. A suboptimal (impaired or flat) response to Synacthen must be acted on **urgently**. Otherwise, results should be discussed with the child and their carers in person in their follow-up appointment with their named Consultant.

5) General Management after the Synacthen Test

1. Children with a good response to Synacthen testing

Definition: Cortisol at 30 minutes: At least 400 nmol/L

What this means:

A normal Synacthen test suggests that the child is not at risk of an adrenal crisis during subsequent illnesses or surgery. However, they should not stop taking their steroids suddenly, and if they are still taking regular high dose steroid medication, they will need another Synacthen test in a year's time.

Retesting:

The child should undergo a repeat Synacthen test in a year's time if they are still on high dose steroid treatment.

2. Children with an impaired response to Synacthen testing

Definition: Cortisol at 30 minutes: 200 – 399 nmol/L

What this means:

The child will need steroid cover for illnesses and stresses such as surgery. This continues until they have had a normal response to Synacthen in subsequent tests.

When steroids should be given:

- The child does not need daily hydrocortisone supplementation, but would need cover for illnesses and surgery.
- Hydrocortisone cover is not required for very minor illnesses such as a runny nose, if the child is otherwise completely well.
- Hydrocortisone is required for any illness more significant than this, and any illness with a fever.
- If the child is vomiting and unable to take oral steroids, they need admission and treatment with IV hydrocortisone.

Dose of steroids to give:

- Sick day hydrocortisone: 16 mg/m² surface area per day in three divided doses
- Give for 2-3 days or until the child is better
- No need to taper the dose afterwards.

Emergencies: (see section 6 for more information)

- Intramuscular hydrocortisone (Solucortef) should be given to the child if they suffer a serious injury, are seriously unwell, or are vomiting and unable to tolerate their oral hydrocortisone.
- Glucogel should be given in addition to Solucortef if the child has symptoms of hypoglycaemia (e.g. pale, sweaty, drowsy, confused, not responding normally)
- In both these situations, an ambulance should be called.

Emergency Card and Medic Alert Bracelet:

The child should be given an Emergency card and should wear an identity bracelet or necklace stating they are at risk of adrenal insufficiency. Medic Alert bracelets can be obtained from <https://www.medicalert.org.uk>, tel: 01908 951045

Patient and carer information:

This should be discussed at the next follow-up appointment and the child and their carers should be given a leaflet about adrenal insufficiency (see [Patient Information](#)).

Retesting: The child should undergo a repeat Synacthen test in six months.

3. Children with a flat response to Synacthen testing

Definition: Cortisol at 30 minutes: Under 200 nmol/L

What this means:

The child has adrenal insufficiency and needs regular oral hydrocortisone, with an increased dose for illness and stress. This needs to continue until they mount a normal cortisol response during a Synacthen test.



Steroid treatment is the most likely reason for adrenal insufficiency, but if there is a family history of Addison's disease or autoimmune disorders, another endocrine deficiency, or the problem is out of keeping with the steroid doses used, consider a Paediatric Endocrinology referral.

When steroids should be given:

- Oral hydrocortisone needs to be taken daily
- Increased hydrocortisone doses are required for any illness more significant than a runny nose, if the child has a fever, and in times of stress.
- If the child is vomiting and unable to take oral steroids, they need admission and treatment with IV hydrocortisone.

Dose of steroids to give:

- Daily hydrocortisone: 8 mg/m² surface area per day in three divided doses
- Sick day hydrocortisone - in times of stress/illness:
 - o Increase the hydrocortisone dose to double the normal dose for 2-3 days or until the child is better.
 - o An additional dose of hydrocortisone should be given at 4am, as this is the risk time for hypoglycaemia. The dose used should be double the normal pre-breakfast dose. This does not replace the doubled pre-breakfast dose, which should also be given.
- The child will also need higher hydrocortisone cover for surgery – see below.

Emergencies: (see section 6 for more information)

- Intramuscular hydrocortisone (Solucortef) should be given to the child if they suffer a serious injury, are seriously unwell, or are vomiting and unable to tolerate their oral hydrocortisone.
- Glucogel should be given in addition to Solucortef if the child has symptoms of hypoglycaemia (e.g. pale, clammy, drowsy, confused, glazed, not responding normally)
- In both these situations, an ambulance should be called.

Emergency Card and Medic Alert Bracelet:

The child should be given an Emergency card and should wear an identity bracelet or necklace stating they are at risk of adrenal insufficiency. Medic Alert bracelets can be obtained from <https://www.medicalert.org.uk>, tel: 01908 951045

Patient and Carer Information:

This should be discussed at the next follow-up appointment and the child and their carers should be given a leaflet about adrenal insufficiency (see [Patient Information](#)).

Retesting:

The child should undergo a repeat Synacthen test when their asthma is well controlled, treatment is being stepped down, and replacement hydrocortisone therapy is being weaned to below 10 mg/m²/day hydrocortisone or equivalent.

6) Management of Specific Situations

1. Emergency hydrocortisone:

If a child has evidence of adrenal insufficiency on Synacthen testing (an impaired or flat response), they should be offered an emergency supply of IM hydrocortisone to administer if the child is very unwell or unresponsive.

In these situations, the family should call an ambulance immediately and give the IM hydrocortisone while they wait for the ambulance.

This is especially important if:

- The child is travelling abroad
- They live a long way from hospital
- The child has had hypoglycaemia in the past
- They have other medical problems

Doses of emergency hydrocortisone (Solucortef) to give:

- 0-1 years: 25 mg IM
- 1-5 years: 50 mg IM
- Over 5 years: 100 mg IM

2. Giving IV hydrocortisone in hospital:

If the child cannot tolerate their oral medication and is unwell, give IV hydrocortisone 2mg/kg every 6 hours, gradually reducing to replacement doses and changing to oral treatment when possible.

3. Surgery

These guidelines apply to children with an impaired or flat response following Synacthen testing.

If elective surgery is planned, the anaesthetist must be informed that the child requires steroid replacement well in advance.

The child should preferably be placed first on the surgical list in the morning. The normal evening and morning doses of steroids should be given, and hourly blood glucose monitoring from 6am. If the child is on the afternoon list, they should receive their usual morning steroid dose.

A dextrose-saline infusion should be commenced from the time of fasting pre-operatively and continued until the child is tolerating oral fluids.

The child will need a dose of IV hydrocortisone 2mg/kg at induction and again at 4 hours if the surgery exceeds 4 hours in length. If the procedure is prolonged and post-operative recovery is likely to be slow, consider a hydrocortisone infusion.

If they are unwell and/or unable to tolerate oral medication after surgery, give IV hydrocortisone 2mg/kg every 6 hours. Following major surgery, when the child is switched to oral steroids, this should be continued at twice the normal dose for 48 hours before returning to their usual hydrocortisone regimen.



Hydrocortisone has significant mineralocorticoid activity. Where fluid retention is a disadvantage, e.g. in cerebral oedema, dexamethasone should be used instead.

4. Chickenpox

Unless they have had chickenpox, children receiving oral or parenteral corticosteroids for purposes other than replacement should be considered as being at risk of severe chickenpox.

According to the Department of Health (Green Book, 2013 – Varicella, chapter 34), this includes children who, in the last three months, have received the equivalent of:

- 2 mg/kg/day prednisolone for at least 1 week
- 40 mg/day prednisolone for at least 1 week
- 1 mg/kg/day prednisolone for at least 4 weeks

Passive immunisation with varicella-zoster immunoglobulin is needed for exposed non-immune children receiving oral corticosteroids or for those who have used them within the previous three months. Corticosteroids should not be stopped and the dose may need to be increased.

Topical, inhaled or rectal corticosteroids are less likely to be associated with an increased risk of severe chickenpox.

Children who are on replacement doses of hydrocortisone will usually not require zoster immunoglobulin.

In cases of uncertainty, discuss with the Microbiologist on call.

7) Long term management

Patients on long-term oral steroid therapy should have:

- Fasting blood glucose checked every three months
- Bone mineral density care – in liaison with Paediatric Endocrinologists:
 - o Vitamin D supplementation (but evidence base limited)
 - o Regular assessments of bone mineral density (DEXA scans)
 - o Bisphosphonates are the only agents of proven benefit in the management of steroid-induced osteoporosis – but this should only be undertaken in conjunction with a Paediatric Endocrinologist
 - o Symptoms of back pain should be investigated for vertebral collapse
- Monitoring of blood pressure and plasma electrolytes, particularly in patients on high dose steroids

Other complications of long-term steroid therapy:

- Growth arrest and short stature
- Immunosuppression
- Masked symptoms of infection, especially fever and inflammation
- Gastritis and gastric ulcers
- Increased appetite and weight gain
- Osteoporosis and fractures
- Hypercalciuria
- Bruising and poor wound healing
- Cataracts
- Psychosis

8) Patient Information

The patient and family should be empowered to manage their child's steroid therapy at home and when they become unwell.

During their follow-up appointment, when the results of their Synacthen test are discussed, they should receive training including a written plan about:

- The results of their Synacthen test and what it means
- When to take steroid medication (if appropriate)
- When to take (or give) intramuscular hydrocortisone (if appropriate)
- What to do if their child is exposed to chickenpox

Patient Information Resources

The Great Ormond Street Hospital website provides access to a series of helpful leaflets for patients and staff including:

Cortisol deficiency

<http://www.gosh.nhs.uk/medical-conditions/search-for-medical-conditions/cortisol-deficiency/cortisol-deficiency-information/> (Date Access – Feb 2015)

Cortisol deficiency and Steroid Replacement Therapy

<http://www.gosh.nhs.uk/medical-conditions/medicines-information/cortisol-deficiency/> (Date Access – Feb 2015)

Emergency Pack for Children with Cortisol Deficiency

<http://www.gosh.nhs.uk/medical-conditions/medicines-information/emergency-pack-for-children-with-cortisol-deficiency/> (Date Access – Feb 2015)

Giving Emergency Hydrocortisone Injections

<http://www.gosh.nhs.uk/medical-conditions/medicines-information/how-to-give-an-emergency-injection-of-efcortisol/> (Date Access – Feb 2015)

9) Individual Management Plan

Adrenal Insufficiency in Children Taking Regular Steroid Medication

Patient name:

Date of birth:

Hospital number:

Named Consultant:

Synacthen test result:

Normal

Impaired response

Flat response

(Circle as appropriate)

What the test result means:

Impaired response: The child's body produces enough cortisol to deal with day-to-day situations but in the event of stress, such as a feverish illness, or surgery, they will not be able to make enough cortisol to cope and they are at risk of an adrenal crisis. They will need to take hydrocortisone in these situations.

Flat response: The child's body produces some cortisol, but not enough to deal with day-to-day situations, so they need to take hydrocortisone regularly. In the event of stress, such as a feverish illness or surgery, they will not be able to make enough cortisol to cope and they are at risk of an adrenal crisis. They will need to take double their usual dose of hydrocortisone in these situations.

Need for steroid cover:

Every day

During times of stress

Circle as appropriate

Regular oral hydrocortisone dose (if needed):

Sick day oral hydrocortisone dose:

Emergency intramuscular hydrocortisone (Solucortef) dose for severe illness:

- 0-1 years: 25 mg IM
- 1-5 years: 50 mg IM
- Over 5 years: 100 mg IM

Emergency Glucogel 20g for hypoglycaemia

Contact details for advice and further information

Within working hours

Outside working hours

Emergency card given?

Yes

No

Medic Alert Bracelets are a great way of ensuring that your child's condition is known to medical staff in an emergency and can be obtained from <https://www.medicalert.org.uk>, tel: 01908 951045

Steroid treatment card

I am a patient on **steroid** replacement medication, which must not be stopped suddenly.

- If you have been taking this medicine for more than three weeks, the dose should be reduced gradually when you stop taking steroids unless your doctor says otherwise.
- Read the patient information leaflet given with the medicine
- Always carry this card with you and show it to anyone who treats you (for example, a doctor, nurse, pharmacist or dentist). For one year after you stop the treatment you must mention that you have taken steroids.
- If you become ill, or if you come into contact with anyone who has an infectious disease, consult your doctor promptly. If you have never had chickenpox, you should avoid close contact with people who have chickenpox or shingles. If you do come into contact with chickenpox, see your doctor urgently.
- Make sure that the information on this card is kept up to date.

10) Patient Information Leaflet

Having a Synacthen Test

1. What is a Synacthen Test?

Cortisol is the body's natural steroid hormone and is important in helping us deal with stress as well as maintaining normal blood sugar and blood pressure levels.

It is made by the adrenal glands, which are found on top of the kidneys. The adrenal glands make the cortisol in response to a hormone known as ACTH.

Synacthen is a synthetic version of ACTH. The Synacthen test gives us a measure of the body's ability to produce cortisol normally and in times of stress.

2. Why does my child need a Synacthen Test?

Sometimes when children take long-term steroid medication for conditions such as asthma, eczema and hayfever, their adrenal glands stop making their own cortisol. This is because the child has enough steroids on board to switch off their adrenal gland's cortisol production.

However, when things change, for example, a person is under emotional or physical stress, the adrenal glands cannot produce more cortisol to cope with the new situation. This can cause an adrenal crisis and can make children seriously ill.

This can be treated by giving the child replacement cortisol, most commonly in the form of hydrocortisone. To find out whether this applies to your child, your doctor has arranged for them to have a Synacthen test.

3. What are the benefits of the Synacthen test?

The Synacthen test will tell us if your child's body produces enough cortisol and whether they are at risk of an adrenal crisis. This will help your doctor plan their treatment.

4. What are the risks of the Synacthen test?

The Synacthen test is generally very safe. Allergic reactions have been reported, but these are very rare. Just in case, the test is carried out in hospital, under observation, with the necessary equipment and medication available.

5. How should we prepare for the test?

Your child can eat and drink as normal before the test. They should continue taking their steroid inhalers as normal, including on the day of the test. Children who are taking regular oral steroid medication may be asked to stop taking their medication the night before the test and be observed overnight in hospital.

We have a playroom and play specialists but feel free to bring your child's favourite toy or comforter with you.

6. On the day, please arrive at 8am.

Please arrive on time. If you arrive late we may not be able to perform the test and it will have to be rebooked. You will have to spend the full morning in hospital. When you arrive, the nurse will

check a few details, such as your child's name and date of birth. They will ask about your child's health and whether they have any medical problems or been unwell recently. They will check your child's temperature, heart rate and breathing rate, oxygen saturation level and blood pressure.

Do not worry if your child becomes upset during the test, this is normal and will depend on your child's age and how much they understand about what is happening.

Your child can eat and drink as normal during the test.

7. What does the test involve?

1. Your child's weight will be measured, so we can work out the right amount of Synacthen to give.
2. 'Magic cream' will be placed on the back of their hands and the inside of their elbows. This is a local anaesthetic cream, which numbs the area so it won't hurt when they have a cannula inserted.

A cannula is a small plastic tube that allows us to do blood tests and give the Synacthen.

The cream takes about 20 – 30 minutes to work so a dressing is placed over it to keep it in place.

Sometimes cold spray is used to numb the skin instead.

3. A doctor or nurse will put in the cannula. Your child may get anxious or upset when the cannula is inserted. It will help if you stay with them to comfort them.
4. Your child will then need to play quietly or rest for 30 minutes
5. The nurse will then take a small sample of blood from the cannula and give the Synacthen into the cannula.
6. After 30 minutes a further sample of blood will be taken from the cannula
7. The blood samples will be sent away for testing in the laboratory

8. After the test

You will be able to go home once the cannula has been removed. Your child can eat and drink as normal when they go home.

9. When will we get the results and what might they show?

Your doctor will discuss your child's test results with you at your next clinic appointment or earlier if there is a significant abnormality in cortisol production.

The results will tell us whether your child produces enough cortisol to cope with everyday activities and with additional stresses and if they need supplementation.

10. How to find us

Department Contact Details:

If you are unable to attend the appointment please call the department to let us know.

11) Appendix – Commonly Prescribed inhaled Steroids

The potency of inhaled steroids is considered in terms of equivalence to beclomethasone dipropionate.

Name of inhaled steroid	Equivalent dose
Beclomethasone dipropionate	400 micrograms
Budesonide	400 micrograms
Fluticasone	200 micrograms
Mometasone	200 micrograms

Adrenal function testing in the form of a Synacthen test is recommended for children taking over 1000 micrograms/day of beclomethasone dipropionate (or equivalent).

See tables below for colour-coded inhalers and daily dosage.

Inhaled corticosteroids ≤ 800 micrograms BDP equivalent – low risk

Steroid	Proprietary names	Dose/puff	Daily dose	Total BDP equivalent daily dose
Beclomethasone	Asmabec Clenil	50	2 twice daily	200 micrograms
	Asmabec, Pulvinal, EasyHaler-BDP, Becodisk, Clenil	100	2 twice daily	400 micrograms
	Qvar	50	2 twice daily	200 micrograms
	Qvar	100	2 twice daily	400 micrograms
	Pulvinal, EasyHaler-BDP, Becodisk	200	1 twice daily	400 micrograms
Budesonide	Pulmicort 100 Easyhaler-BD	100	2 twice daily	400 micrograms
Fluticasone	Flixotide 50 Accuhaler Flixotide 50 Evohaler	50	1-2 twice daily	200 - 400 micrograms
	Flixotide 100 Accuhaler	100	1 twice daily	400 micrograms
	Flixotide 125 Evohaler	125	1 twice daily	500 micrograms
Ciclesonide	Alvesco	80	1-4 a day	160-640 micrograms
Mometasone	Asmanex	200	1 once daily	400 micrograms
Beclomethasone HFA & Formoterol	Fostair	100/6	1-2 twice daily	200 – 400 micrograms
Budesonide & Formoterol	Symbicort 100	100/6	2 twice daily	400 micrograms
	Symbicort 200	200/6	1 twice daily	400 micrograms
Fluticasone & Salmeterol	Seretide 50 Evohaler	50/25	2 twice daily	400 micrograms
	Seretide 100 Accuhaler	100/50	1-2 twice daily	400-800 micrograms

Inhaled Corticosteroids 800-1000 micrograms/day – Intermediate risk:

Children taking over 800 micrograms/day BDP equivalent should be given a Steroid Safety Card. Synacthen testing may also be required, particularly if they are also taking oral, topical or nasal steroids. This is at their Consultant's discretion.

Steroid	Proprietary names	Dose/puff	Daily dose	Total BDP equivalent daily dose
Beclometasone	Clenil	200	2 twice daily	800 micrograms
	Qvar	100	3-4 twice daily	600-800 micrograms
Budesonide	Pulmicort 200 EasyHaler- BD Budelin	200	2 twice daily	800 micrograms
	Pulmicort 400 EasyHaler-BD	400	1 twice daily	800 micrograms
Fluticasone	Flixotide 100 Accuhaler	100	2 twice daily	800 micrograms
	Flixotide 125 Evohaler	125	2 twice daily	1000 micrograms
	Flixotide 250 Accuhaler Flixotide 250 Evohaler	250	1 twice daily	1000 micrograms
Ciclesonide	Alvesco	160	2-3 once daily	640-960 micrograms
Mometasone	Asmanex	200	2 once daily	800 micrograms
	Asmanex	400	1 once daily	800 micrograms
Budesonide & Formoterol	Symbicort 200	200/6	2 twice daily	800 micrograms
	Symbicort 400	400/12	1 twice daily	800 micrograms
Fluticasone & Salmeterol	Seretide 125 Evohaler	125/25	2 twice daily	1000 micrograms
	Seretide 250 Accuhaler	250/50	1 twice daily	1000 micrograms

Inhaled corticosteroids > 1000 micrograms (BDP equivalent)/day: Higher Risk

These children are at higher risk of adrenal suppression. They should be given a Steroid Safety card and should undergo Synacthen testing.

Steroid	Proprietary names	Dose/puff	Daily dose	Total BDP equivalent daily dose
Beclometasone	Asmabec Clenil	250	2-4 twice daily	1000-2000 micrograms
	Pulvinal EasyHaler-BDP Becodisk	400	2 twice daily	1600 micrograms
Budesonide	Pulmicort 200 EasyHaler-BDP Budelin	200	3-4 twice daily	1200-1600 micrograms
	Pulmicort 400 EasyHaler-BDP	400	2 twice daily	1600 micrograms
Fluticasone	Flixotide 250 Evohaler	250	2 twice daily	2000 micrograms
	Flixotide 500 Accuhaler	500	1 twice daily	2000 micrograms
Ciclesonide	Alvesco	160	2 twice daily	1280 micrograms
Mometasone	Asmanex	200	2 twice daily	1600 micrograms
	Asmanex	400	1 twice daily	1600 micrograms
Budesonide & Formoterol	Symbicort 200	200/6	3-4 twice daily	1200-1600 micrograms
	Symbicort 400	400/12	2 twice daily	1600 micrograms
Fluticasone & Salmeterol	Seretide 250 Evohaler	250/25	2 twice daily	2000 micrograms
	Seretide 500 Accuhaler	500/50	1 twice daily	2000 micrograms

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To be completed and attached to any procedural document when submitted to the
 appropriate committee for consideration and approval

		Yes/No	Comments
1.	Does the procedural document affect one group less or more favourably than another on the basis of:		
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Culture	No	
	• Religion or belief	No	
	• Sexual orientation including lesbian, gay and bisexual people	No	
	• Age	No	
	• Disability - learning disabilities, physical disability, sensory impairment and mental	No	

		Yes/No	Comments
	health problems		
2.	Is there any evidence that some groups are affected differently?	No	
3.	If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?	No	
4.	Is the impact of the procedural document likely to be negative?	No	
5.	If so can the impact be avoided?	N/A	
6.	What alternatives are there to achieving the procedural document without the impact?	N/A	
7.	Can we reduce the impact by taking different action?	N/A	

If you have identified a potential discriminatory impact of this procedural document, please refer it to the Director of Human Resources, together with any suggestions as to the action required to avoid/reduce this impact.

For advice in respect of answering the above questions, please contact the Director of Human Resources.

Checklist for the Review and Approval of Procedural Document

To be completed and attached to any procedural document when submitted to the relevant committee for consideration and approval.

	Title of document being reviewed:	Yes/No	Comments
1.	Title		
	Is the title clear and unambiguous?	Yes	
	Is it clear whether the document is a guideline, policy, protocol or standard?	Yes	
2.	Rationale		
	Are reasons for development of the document stated?	Yes	
3.	Development Process		
	Is it clear that the relevant people/groups have been involved in the development of the document?	Yes	
	Are people involved in the development?	Yes	
	Is there evidence of consultation with stakeholders and users?	Yes	
4.	Content		
	Is the objective of the document clear?	Yes	
	Is the target population clear and unambiguous?	Yes	
	Are the intended outcomes described?	Yes	
5.	Evidence Base		
	Are key references cited in full?	N/A	
	Are supporting documents referenced?	N/A	
6.	Approval		
	Does the document identify which committee/group will approve it?	Yes	
7.	Dissemination and Implementation		
	Is there an outline/plan to identify how this will be done?	Yes	
8.	Document Control		
	Does the document identify where it will be held?	Yes	
9.	Process to Monitor Compliance and Effectiveness		
	Are there measurable standards or KPIs to support the monitoring of compliance with and effectiveness of the document?	Yes	
	Is there a plan to review or audit compliance with the document?	Yes	
10.	Review Date		
	Is the review date identified?	Yes	
	Is the frequency of review identified? If so is it acceptable?	Yes	
11.	Overall Responsibility for the Document		
	Is it clear who will be responsible for co-ordinating the dissemination, implementation and review of the document?	Yes	

Executive Sponsor Approval

If you approve the document, please sign and date it and forward to the author. Procedural documents will not be forwarded for ratification without Executive Sponsor Approval

Name		Date	
Signature			

Relevant Committee Approval

The Director of Nursing and Patient Experience's signature below confirms that this procedural document was ratified by the appropriate Governance Committee.

Name		Date	
Signature			

Responsible Committee Approval – only applies to reviewed procedural documents with minor changes

The Committee Chair's signature below confirms that this procedural document was ratified by the responsible Committee

Name		Date	
Name of Committee		Name & role of Committee Chair	
Signature			

Tool to Develop Monitoring Arrangements for Policies and guidelines

What key element(s) need(s) monitoring as per local approved policy or guidance?	Who will lead on this aspect of monitoring? Name the lead and what is the role of the multidisciplinary team or others if any.	What tool will be used to monitor/check/observe/Assess/inspect/ authenticate that everything is working according to this key element from the approved policy?	How often is the need to monitor each element? How often is the need complete a report ? How often is the need to share the report?	What committee will the completed report go to?
Element to be monitored	Lead	Tool	Frequency	Reporting arrangements
Use of guideline, threshold for testing	Dr John Moreiras	Audit	Yearly to start with	Paediatric clinical governance group.

