

## Immuno-Oncology Agent Immune-Related Adverse Event Clinical Guideline

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<b>Author(s):</b>	Dr Victoria Woodcock, Medical Oncology SpR Prof Mark Middleton, Clinical Director, University of Oxford Department of Oncology Dr Miranda Payne, Consultant Medical Oncologist Kristen Moorhouse, Specialist Cancer Pharmacist
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## Introduction

1. Immuno-oncology (I-O) agents are being increasingly used in the treatment of cancers including melanoma, lung cancer and bladder cancer. These agents are associated with immune-related adverse events that can differ in nature, severity and duration from adverse events caused by other classes of anti-cancer therapy. Early recognition of symptoms and treatment of potential immune-related adverse events is critical to ensuring appropriate management and in some cases may require the use of immunosuppressants

## Scope

2. This document applies to all patients treated with immuno-oncology agents within the Oxford Cancer Centre and other cancer centres who are admitted to OUH.
3. Exceptions are those patients being treated with immuno-oncology agents within a clinical trial in which case any trial specific adverse event guidance should be followed.

## Aim

4. The purpose of this guideline is to ensure:
  - 4.1. Early recognition of symptoms of potential immune-related adverse events
  - 4.2. Appropriate and timely initiation of management of immune-related adverse events

## Definitions

5. The terms in use in this document are defined as follows:
  - 5.1. Immuno-oncology (I-O) agent – Any monoclonal antibody treatment targeting immune checkpoints including CTLA-4 (e.g. Ipilimumab) or PD-1/PD-L1 (e.g. Pembrolizumab or Nivolumab).
  - 5.2. Immune-related adverse event – Any immune-related adverse reaction potentially caused by an immuno-oncology agent.

## Responsibilities

6. The patient's treating Consultant has overall responsibility for their care whilst receiving treatment with immuno-oncology agents
7. Individual medical and nursing staff are responsible for informing the patient's treating Consultant or nominated deputy as soon as reasonably practical if a patient receiving an immuno-oncology agent is suspected of having or being treated for an immune-related adverse event.
8. Normal on-call arrangements for escalation apply out-of-hours or if the treating Consultant is not available.

## Immune-Related Adverse Event Identification Guide

9. Immune-related adverse events can occur a number of months after initiation of I-O agents, even after discontinuation.
10. Patients receiving I-O agents should be assessed for potential immune-related adverse events prior to each dose of drug and at follow-up visits
11. Some immune-related adverse events are common in patients with cancer and it can be difficult to distinguish between non-drug related causes (e.g. infection or progression of disease) and a possible I-O agent related toxicity
12. If a patient develops any of the following signs or symptoms or if they have worsening of baseline symptoms, they should undergo medical assessment

<b>Pulmonary</b> <ul style="list-style-type: none"> <li>• Shortness of breath</li> <li>• Dyspnoea on exertion</li> <li>• Reduced oxygen saturations</li> <li>• Cough</li> <li>• Wheezing</li> </ul>	<b>Gastrointestinal</b> <ul style="list-style-type: none"> <li>• Change in normal bowel habit</li> <li>• Diarrhoea</li> <li>• Blood or mucous in stool</li> <li>• Constipation</li> <li>• Stomach pain/cramps</li> <li>• Nausea</li> <li>• Vomiting</li> </ul>	<b>Endocrine</b> <ul style="list-style-type: none"> <li>• Headache</li> <li>• Visual field defects</li> <li>• Fatigue/weakness</li> <li>• Hypotension</li> <li>• Shock</li> <li>• Electrolyte abnormalities</li> <li>• Polyuria/polydipsia</li> <li>• Hyperglycaemia</li> </ul>
<b>Hepatic</b> <ul style="list-style-type: none"> <li>• Liver function test (LFT) abnormalities, including elevations in AST, ALT and Bilirubin</li> <li>• Jaundice</li> </ul>	<b>Ocular</b> <ul style="list-style-type: none"> <li>• Inflammation of the tissues of the eye (conjunctivitis, uveitis, iritis, episcleritis)</li> </ul>	<b>Constitutional</b> <ul style="list-style-type: none"> <li>• Fever</li> <li>• Fatigue</li> <li>• Weight loss</li> </ul>
<b>Skin</b> <ul style="list-style-type: none"> <li>• Pruritus</li> <li>• Rash</li> <li>• Vitiligo (melanoma patients only)</li> <li>• Increased sensitivity to radiotherapy</li> </ul>	<b>Neurological</b> <ul style="list-style-type: none"> <li>• Sensory neuropathy</li> <li>• Motor neuropathy</li> </ul>	<b>Renal</b> <ul style="list-style-type: none"> <li>• Increase in serum creatinine</li> <li>• Other abnormal kidney function tests</li> <li>• Decreased urine output</li> </ul>

13. This list is not exclusive and any other symptoms of concern should prompt evaluation.

## Select Immune-Related Adverse Event Management Algorithms

14. **All patients with Grade 3 or persistent Grade 2 (> 7 days) immune-related side effects should be managed in conjunction with the relevant site speciality team e.g. gastroenterology, hepatology, endocrine, dermatology etc**
15. These guidelines constitute general guidance for the evaluation and management of potential immune-related side-effects. Differential diagnoses should be evaluated according to standard medical practice and non-inflammatory aetiologies considered and treated appropriately.
16. Corticosteroids are the primary therapy for immune-related drug related adverse events. The choice of corticosteroids used in this guideline are extrapolated to coincide with Trust and national guidance for similar immune conditions.
17. Patients on IV steroids may be switched to an equivalent oral dose of oral corticosteroids (e.g. prednisolone) at start of tapering or earlier, once sustained clinical improvement is observed.
18. Prior to starting systemic corticosteroids, a baseline cortisol level should be confirmed, wherever feasible, to ascertain pituitary function, given the endocrinopathy effect of I-Os.
19. The frequency and severity of the side-effects covered by these algorithms will depend on the immuno-oncology agent or regimen being used.
20. Patients who are treated with prolonged courses of systemic steroids are also susceptible to developing steroid-induced diabetes and should have their blood glucose monitored periodically for this.
21. Oral steroids should be co-prescribed with a proton pump inhibitor for gastric protection only if gastric symptoms (such as dyspepsia or gastro-oesophageal reflux) develop. Ensure proton pump inhibitors are discontinued after the cessation of steroids.
22. In patients who require prolonged immunosuppression (more than 20mg oral prednisolone for more than 4 weeks), consider PCP prophylaxis with co-trimoxazole.
23. All admissions due to the suspicion of an immune-related adverse event secondary to immune – oncological agents, should be reported to the MHRA Yellow Card Scheme, available online: [www.yellowcard.mhra.gov.uk](http://www.yellowcard.mhra.gov.uk)

### Gastrointestinal Immune-Related Adverse Event Management Algorithm

Grade of Diarrhoea/ Colitis (NCI CTCAE v4.03)	Management	Follow-up
<p><b>Grade 1 Diarrhoea: &lt;4 stools/day over baseline</b></p>	<ul style="list-style-type: none"> <li>Continue I-O therapy</li> <li>Check baseline bloods: FBC, CRP, U&amp;E, LFT, full TFT</li> <li>Check temperature and pulse rate</li> <li>Consider stool culture (MC&amp;S and CDT)</li> </ul>	<ul style="list-style-type: none"> <li>Early review within 1-2 weeks</li> <li>Monitor closely and advise patient to report worsening symptoms immediately</li> <li>Ensure patient is completing stool diary</li> </ul> <p><b>If worsens or persists ( more than 7 days):</b></p> <ul style="list-style-type: none"> <li>Treat as G2 or 3/4</li> </ul>
<p><b>Grade 2 Diarrhoea: 4-6 stools per day over baseline;</b></p> <ul style="list-style-type: none"> <li>May be blood in stool</li> <li>May be abdominal pain associated with defaecation</li> </ul> <p><b>If bloody diarrhoea with systemic compromise then treat as grade 3/ 4:</b></p> <ul style="list-style-type: none"> <li>Tachycardia – over 90bpm</li> <li>Fever – over 37.8°C</li> </ul> <p>Also consider treating as grade 3/4 if:</p> <ul style="list-style-type: none"> <li>Rising CRP or CRP more than 30 if previously normal</li> <li>Falling Hb or Hb less than 105g/L if previously normal</li> <li>Falling albumin or low albumin if previously normal</li> </ul>	<ul style="list-style-type: none"> <li>Delay I-O therapy</li> <li>Check temperature and pulse rate</li> <li>Start oral prednisolone 1mg/kg/day (maximum 60mg OD)</li> <li>Send FBC, CRP, U&amp;E, LFT, full TFT</li> <li>Send stool cultures (MC&amp;S and CDT)</li> <li>Consider flexible sigmoidoscopy</li> <li>Stool chart</li> </ul>	<p><b>Review in 2 weeks.</b></p> <p><b>If improves to G1:</b></p> <ul style="list-style-type: none"> <li>Taper oral steroids over at least 2 months as per tapering regimen below.</li> <li>Resume I-O therapy</li> </ul> <p><b>If worsens or persists more than 7 days with steroids:</b></p> <ul style="list-style-type: none"> <li>Treat as G3/4</li> <li>Involve Gastroenterology</li> </ul>

Grade of Diarrhoea/ Colitis (NCI CTCAE v4.03)	Management	Follow-up
<p><b>Grade 3 – 4 Diarrhoea : more than 7 stools per day over baseline;</b></p> <ul style="list-style-type: none"> <li>Severe or continuous abdominal pain</li> <li>Fever 37.8°C</li> <li>Tachycardia over 90bpm</li> </ul> <p>Consider:</p> <ul style="list-style-type: none"> <li>Rising CRP or CRP over 30 if previously normal</li> <li>Falling Hb or Hb less than 105g/L if previously normal</li> <li>Falling albumin or low albumin if previously normal</li> </ul>	<ul style="list-style-type: none"> <li><b>Urgent referral to gastroenterologist (on call available out of hours)</b></li> <li>Admit to hospital</li> <li>1mg/kg methylprednisolone sodium succinate IV</li> <li>IV fluid replacement if clinically indicated</li> <li>Bloods – FBC, U&amp;E, LFTs, and CRP (days 1, 3 and 5)</li> <li>Send stool cultures (MC&amp;S and CDT)</li> <li>Abdominal x-ray</li> <li>CT abdomen if persistent pain, signs of peritonism, or fever</li> <li>Flexible sigmoidoscopy</li> <li>Accurate stool chart</li> <li>Discontinue I-O therapy</li> </ul>	<p><b>If symptoms resolving:</b></p> <ul style="list-style-type: none"> <li>Continue IV for at least 3-5 days then switch to PO prednisolone 1mg/kg OD (maximum 60mg OD) and taper over at least 2 months as per tapering regimen below</li> </ul> <p><b>If persists more than 3-5 days or recurs after improvement: Under ongoing guidance of gastroenterology:</b></p> <ul style="list-style-type: none"> <li>Add infliximab (as per current recommended brand) 5mg/kg (if no contraindication)</li> </ul> <p>NOTE: infliximab should not be used in cases of perforation or sepsis.</p> <p><b>If persists more than 3-5 days or worsens after infliximab:</b></p> <ul style="list-style-type: none"> <li>Consider colectomy</li> </ul>

### Renal Immune-Related Adverse Event Management Algorithm

Grade of Creatinine Elevation (NCI CTCAE v4.03)	Management	Follow-up
<b>Grade 1</b> Creatinine greater than baseline and ULN but less than or equal to 1.5 x baseline	<ul style="list-style-type: none"> <li>Continue I-O therapy</li> <li>Monitor creatinine weekly</li> </ul>	<b>If returns to baseline:</b> <ul style="list-style-type: none"> <li>Resume routine creatinine monitoring</li> </ul> <b>If worsens:</b> <ul style="list-style-type: none"> <li>Treat as G2 or 3/4</li> </ul>
<b>Grade 2</b> Creatinine 1.5 – 3 x ULN or more than 1.5 x baseline	<ul style="list-style-type: none"> <li><b>Refer to nephrologist and consider renal biopsy</b></li> <li>Delay I-O therapy</li> <li>Monitor creatinine every 2-3 days</li> <li>Urinanalysis</li> <li>Exclude other causes</li> <li>1mg/kg/day oral prednisolone</li> </ul>	<b>If improves to G1:</b> <ul style="list-style-type: none"> <li>Taper oral steroids over at least 2 months</li> <li>Consider resuming I-O if creatinine returns to baseline and steroid treatment complete</li> </ul> <b>If elevations persists more than 7 days or worsens after initial improvement</b> <ul style="list-style-type: none"> <li>Treat as G3/4</li> </ul>
<b>Grade 3 – 4</b> Creatinine more than 3 x ULN, or more than 3 x baseline	<ul style="list-style-type: none"> <li><b>Refer to nephrologist and consider renal biopsy</b></li> <li>Discontinue I-O therapy</li> <li>Admit patient</li> <li>Urinanalysis</li> <li>Exclude other causes</li> <li>Fluid balance and daily weight</li> <li>Monitor creatinine daily</li> <li>2mg/kg methylprednisolone sodium succinate IV</li> </ul>	<b>If improves to G1:</b> <ul style="list-style-type: none"> <li>Switch to oral prednisolone 1mg/kg OD (Max 60mg OD)</li> <li>Taper oral steroids over at least 2 months</li> </ul>



### ***Pulmonary Immune-Related Adverse Event Management Algorithm***

<b>Grade of Pneumonitis (NCI CTCAE v4.03)</b>	<b>Management</b>	<b>Follow-up</b>
<b>Grade 1</b> Radiographic changes only	<ul style="list-style-type: none"> <li>Consider delay of I-O therapy</li> <li>Monitor for symptoms every 2-3 days</li> <li>Consider HRCT</li> </ul>	<ul style="list-style-type: none"> <li>Re-image at least every 2 weeks</li> </ul> <b>If worsens:</b> <ul style="list-style-type: none"> <li>Treat as G2 or 3/4</li> </ul>
<b>Grade 2</b> Mild to moderate new symptoms	<ul style="list-style-type: none"> <li>Delay I-O therapy</li> <li>Consider admission</li> <li>HRCT</li> <li>Consult Respiratory and ID teams</li> <li>Monitor symptoms daily with twice weekly clinical examination reviews</li> <li>Prednisolone 1mg/kg OD (maximum 60mg OD)</li> <li>Consider bronchoscopy, lung biopsy</li> </ul>	<ul style="list-style-type: none"> <li>Re-image every 1-3 days</li> </ul> <b>If improves:</b> <ul style="list-style-type: none"> <li>When symptoms return to baseline, taper steroids over at least 1 month</li> <li>Consider resuming I-O therapy when resolved</li> </ul> <b>If not improving after 2 weeks or worsening</b> <ul style="list-style-type: none"> <li>Treat as G3-5</li> </ul> <b>If recurrent G2 pneumonitis:</b> <ul style="list-style-type: none"> <li>Discontinue I-O therapy</li> </ul>
<b>Grade 3 – 4</b> Severe new symptoms; New/worsening hypoxia; life-threatening	<ul style="list-style-type: none"> <li>Discontinue I-O therapy</li> <li>Hospitalise</li> <li>HRCT</li> <li>Consult Respiratory and ID teams</li> <li>2mg/kg/day methylprednisolone sodium succinate IV</li> <li>Perform chest x-ray every 1-3 days</li> <li>Consider bronchoscopy, lung biopsy</li> </ul>	<b>If improves to baseline:</b> <ul style="list-style-type: none"> <li>Taper steroids over at least 6 weeks</li> </ul> <b>If not improving after 48 hours or worsening:</b> <ul style="list-style-type: none"> <li>Add additional immunosuppression under ongoing respiratory team guidance</li> </ul>

### Hepatic Immune-Related Adverse Event Management Algorithm

Grade of Liver Test Elevation (NCI CTCAE v4.03)	Management	Follow-up
<b>Grade 1</b> AST or ALT greater than ULN – 3 x ULN and/or Bilirubin greater than ULN – 1.5 x ULN	<ul style="list-style-type: none"> <li>Continue I-O therapy</li> </ul>	<ul style="list-style-type: none"> <li>Continue routine LFT monitoring</li> </ul> <b>If worsens:</b> <ul style="list-style-type: none"> <li>Treat as G2 or 3-4</li> </ul>
<b>Grade 2</b> AST or ALT greater than 3 to less than or equal to 5 x ULN and/or Bilirubin greater than 1.5 to less than or equal to 3 x ULN	<ul style="list-style-type: none"> <li>Delay I-O therapy</li> <li>Increase frequency of monitoring to every 3 days</li> <li>Investigations               <ul style="list-style-type: none"> <li>US liver</li> <li>Viral screen:                   <ul style="list-style-type: none"> <li>Hep A IgM</li> <li>Hep B surface antigen and cAb</li> <li>Hep E IgM</li> <li>CMV IgM</li> <li>EBV IgM</li> </ul> </li> </ul> </li> <li>Exclude:               <ul style="list-style-type: none"> <li>Other drug causes</li> <li>Metastases</li> <li>Biliary Obstruction/ Gallstones</li> <li>Pre-existing liver disease.</li> </ul> </li> </ul>	<b>If returns to baseline:</b> <ul style="list-style-type: none"> <li>Resume routine monitoring and I-O therapy.</li> </ul> <b>If elevations persist more than 5-7 days or worsen:</b> <ul style="list-style-type: none"> <li>1mg/kg oral prednisolone (maximum 60mg OD) for 1 week then taper as per tapering regimen below</li> <li>Resume I-O therapy after course of steroids completed and liver biochemistry has returned to baseline</li> </ul> <b>If flare on steroid wean or no improvement</b> <ul style="list-style-type: none"> <li><b>Refer to hepatology</b></li> <li>Increase prednisolone dose by 10mg then slowly taper (maximum 60mg OD)</li> </ul>
<b>Grade 3-4</b> AST or ALT greater than 5 x ULN and/or Bilirubin greater than 3 x ULN  Or evidence of decompensated liver disease e.g. Jaundice Prolonged PT greater than 15 Encephalopathy	<ul style="list-style-type: none"> <li>Investigations as above</li> <li>Discontinue I-O therapy</li> <li><b>Urgent hepatologist referral (on call available out of hours)</b></li> <li>Increase frequency of monitoring to every 1-2 days</li> <li>1mg/kg methylprednisolone sodium succinate IV</li> <li>Daily bloods</li> <li>Admit to hospital</li> </ul>	<b>If improvement after 72 hours intravenous steroids:</b> <ul style="list-style-type: none"> <li>prednisolone 1mg/kg (max 60mg OD) and taper steroids (as described below and with guidance from hepatologist)</li> </ul> <b>If not improving after 3-5 days, worsens or rebounds:</b> <ul style="list-style-type: none"> <li>Continued discussion with hepatologist</li> <li>Add mycophenolate mofetil 1g BD PO (if side effects reduce to 500mg BD) – under guidance of hepatology only</li> <li>If no response within 3-5 days, consider tacrolimus (as per current recommended brand) 0.1-0.15mg/kg daily – under guidance of hepatology only</li> <li>Consider prophylactic antibiotics</li> </ul>

### Endocrinopathy Immune-Related Adverse Event Management Algorithm

Endocrinopathy	Management	Follow-up
<p>Symptomatic ACTH/ adrenal insufficiency (e.g. severe dehydration, hypotension, shock)</p> <p><b>MEDICAL EMERGENCY</b></p>	<ul style="list-style-type: none"> <li>Take cortisol level</li> <li>Stress dose of IV steroids (Hydrocortisone 100mg IV) After cortisol level sent to lab</li> <li>Rule out sepsis</li> <li>Urgently contact endocrine SpR on-call</li> <li>Delay I-O therapy</li> </ul>	<p>When stable:</p> <ul style="list-style-type: none"> <li>Consider resuming I-O therapy alongside physiological steroid replacement (standard dosing hydrocortisone 10mg OM, 5mg at lunch, 5mg PM but may require higher doses)</li> <li>Refer to endocrinology for follow-up</li> </ul>
<p>ACTH/ adrenal insufficiency (may be asymptomatic/ tiredness)</p>	<ul style="list-style-type: none"> <li>Urgent cortisol/ ACTH ideally fasting (9am)</li> <li>Full endocrine profile</li> <li>Commence oral hydrocortisone 20mg OM, 10mg at lunch, 10mg PM</li> <li>Endocrine review</li> </ul>	<p>When stable:</p> <ul style="list-style-type: none"> <li>Continue I-O therapy alongside physiological steroid replacement (standard dose hydrocortisone 10mg OM, 5mg at lunch, 5mg PM)</li> <li>Ensure patient carries steroid card</li> <li>Ensure patient knows about 'sick day' rules</li> <li>Refer to endocrinology for follow-up</li> </ul>
<p><b>Diabetic ketoacidosis</b> Be aware that patients may present with DKA without a known history of Type I diabetes</p>	<ul style="list-style-type: none"> <li>Refer to Trust guidance for the acute management of DKA and contact inpatient diabetic team</li> </ul>	<ul style="list-style-type: none"> <li>Routine monitoring of blood sugars (finger prick test).</li> <li>Liaise with diabetes team regarding further management of insulin</li> <li>Refer to diabetes service for follow-up</li> </ul>
<p><b>Hyperglycaemia (Type I diabetes)</b></p>	<ul style="list-style-type: none"> <li>Discuss insulin requirements with diabetes team</li> <li>Delay I-O therapy until glycaemic control achieved</li> </ul>	<p>Refer to inpatient/ outpatient diabetes service</p>

Endocrinopathy	Management	Follow-up
<b>Symptomatic hyperthyroidism</b> (Often transient thyroiditis followed by long term hypothyroidism)	<ul style="list-style-type: none"> <li>Initiate propranolol 40mg TDS +/- carbimazole as required (although not often needed)</li> <li>Take TSH receptor antibodies, TPO antibodies</li> <li>Refer for outpatient endocrinology review</li> <li>If acute severe thyroiditis is suspected consider holding I-O therapy and initiating 1-2mg/kg/day IV methylprednisolone sodium succinate or oral equivalent</li> </ul>	<ul style="list-style-type: none"> <li>Repeat TFTs prior to each cycle of treatment</li> <li>Re-instate I-O therapy after corticosteroid taper if needed</li> <li>Monitor for development of hypothyroidism</li> </ul>
<b>Acute hypophysitis</b> <b>Symptomatic:</b> (Headaches, visual field abnormalities) <b>Non-symptomatic:</b> (non-specific tiredness)	<ul style="list-style-type: none"> <li>Refer for endocrine review</li> <li>Full pituitary profile and endocrine profile</li> <li>Initiate hormone replacement as required</li> <li>MRI pituitary</li> <li>Hold I-O therapy</li> <li>Consider 1-2mg/kg/day IV methylprednisolone sodium succinate or oral equivalent if symptomatic and/or pituitary mass</li> </ul>	<b>If improves (with or without hormone replacement):</b> <ul style="list-style-type: none"> <li>Taper steroids over at least 2 months. See example below.</li> <li>Resume I-O therapy</li> <li>Refer to endocrinology for follow up</li> </ul>
<b>Asymptomatic hypophysitis</b>	<ul style="list-style-type: none"> <li>Initiate hormone replacement as required</li> <li>Continue I-O therapy</li> </ul>	Refer to endocrinology for follow up
<b>Asymptomatic thyroid abnormalities</b> TSH less than 0.15 munit/L or TSH greater than 8 munit/L or outside of normal range on 2 subsequent measurements  <i>Note hypothyroidism often follows transient hyperthyroidism</i>	<ul style="list-style-type: none"> <li>Refer to endocrinology for outpatient review</li> <li>Continue I-O therapy</li> <li>Check free T3, T4 and full pituitary profile. Ensure cortisol is normal</li> <li>If hypothyroid initiate levothyroxine 50 micrograms OD</li> <li>Check for thyroid peroxidase antibodies</li> </ul>	<ul style="list-style-type: none"> <li>Repeat TFTs prior to each cycle of treatment and if on levothyroxine, repeat every 6 weeks.</li> <li>Aim for T4 15 – 20 pmol/L and TSH on lower end of normal range if on levothyroxine replacement (usual replacement dose levothyroxine 125 micrograms OD)</li> <li>Note: steady state of levothyroxine is achieved 6 weeks after any dose adjustments</li> <li>Endocrine outpatient follow-up</li> </ul>

***Full Endocrine Profile (9am Fasting)***

- Cortisol
- Free T4 and TSH
- Gonadotrophins incl testosterone (male) or estradiol (female)
- Prolactin
- Thyroid peroxidase (TPO) antibodies
- If previous history of Graves – TSH antibodies
- Glucose and HbA1c
- Baseline serum Vitamin D level

***Long term endocrine considerations***

- All patients with endocrine abnormalities e.g. hypothyroidism, diabetes, adrenal/cortisol insufficiency, require a review and follow up in endocrine outpatients for consideration and optimisation of treatment.
- Bone health
- Sex hormones

### Skin Immune-Related Adverse Event Management Algorithm

Grade of Rash (NCI CTCAE v4.03)	Management	Follow-up
<p><b>Grade 1-2</b> Covering less than or equal to 30% BSA (excluding vitiligo)</p>	<ul style="list-style-type: none"> <li>• Symptomatic therapy e.g. long-acting antihistamines (Hydroxyzine 10-25mg TDS), emollients (e.g. Cetraben cream BD-TDS) topical steroids (e.g. Betnovate ointment OD for use on the body and Hydrocortisone 1% ointment for use on the face)</li> <li>• Continue I-O therapy</li> <li>• N.B. Pruritus may develop without a rash and should be managed symptomatically with antihistamines</li> </ul>	<p><b>If persists more than 5 days or recurs:</b></p> <ul style="list-style-type: none"> <li>• Refer to Dermatology on call (Bleep 5044 or via switchboard)</li> <li>• Consider skin biopsy</li> <li>• Delay I-O therapy</li> <li>• Consider superpotent topical steroids as an in-patient</li> <li>• Consider 0.5-1mg/kg/day oral prednisolone</li> <li>• Taper steroids over at least 1 month. Resume I-O therapy once improved</li> <li>• Consider prophylactic antibiotics for opportunistic infections</li> </ul> <p><b>If worsens:</b></p> <ul style="list-style-type: none"> <li>• Treat as G3-4</li> </ul>
<p><b>Grade 3-4</b> Covering greater than 30% BSA or Blistering skin condition, Life-threatening consequences</p>	<ul style="list-style-type: none"> <li>• Delay or discontinue I-O therapy</li> <li>• Urgent Dermatology review</li> <li>• Skin biopsy</li> <li>• Symptomatic therapy as above PLUS</li> <li>• 1-2mg/kg/day IV methylprednisolone sodium succinate</li> </ul>	<p><b>If improves to G1:</b></p> <ul style="list-style-type: none"> <li>• Taper oral steroids over at least 1 month</li> <li>• Continue topical therapies</li> <li>• Consider prophylactic antibiotics for opportunistic infection</li> <li>• Resume I-O therapy</li> </ul>

### Neurological Immune-Related Adverse Event Management Algorithm

Grade of Neurological Toxicity (NCI CTCAE v4.03)	Management	Follow-up
<b>Grade 1</b> Asymptomatic or mild symptoms; intervention not indicated	<ul style="list-style-type: none"> <li>Continue I-O therapy</li> </ul>	<ul style="list-style-type: none"> <li>Continue to monitor the patient</li> </ul> <b>If worsens:</b> <ul style="list-style-type: none"> <li>Treat as G2 or 3/4</li> </ul>
<b>Grade 2</b> Moderate symptoms; limiting instrumental ADL	<ul style="list-style-type: none"> <li>Delay I-O therapy</li> <li>Treat symptoms</li> <li>Consider 0.5 – 1mg/kg/day oral prednisolone</li> </ul>	<b>If improves to baseline:</b> <ul style="list-style-type: none"> <li>When symptoms return to baseline, taper steroids over at least 1 month</li> <li>Consider resuming I-O therapy when resolved</li> </ul> <b>If worsening</b> <ul style="list-style-type: none"> <li>Treat as G3/4</li> </ul>
<b>Grade 3 – 4</b> Severe symptoms; Limiting self-care ADL; Life-threatening	<ul style="list-style-type: none"> <li>Discontinue I-O therapy</li> <li>Neurology review</li> <li>Treat symptoms</li> <li>1-3mg/kg/day IVE methylprednisolone sodium succinate</li> </ul>	<b>If improves to G2:</b> <ul style="list-style-type: none"> <li>Taper steroids over at least 1 month</li> </ul> <b>If worsens or atypical presentation:</b> <ul style="list-style-type: none"> <li>Add additional immunosuppression under ongoing respiratory team guidance</li> </ul>

## Corticosteroid weaning dose

Flare ups have been observed during steroid weaning, therefore it is important to wean patients off steroids appropriately. Below is the suggested weaning regimen:

- Prednisolone 1mg/kg (maximum 60mg) OD (grade 3-4) or 0.5mg/kg OD (grade 2) for one week. If however, there is no improvement or worsening of symptoms during this time, the grading should be escalated and the relevant speciality contacted.
- Reduce by 10mg per week until 20mg OD
- Then slow wean by 5mg per week until zero and stop.
- If signs or symptoms of adrenal suppression, steroids will need to have a prolonged wean by 1mg every 5 days, with regular cortisol levels taken.

Example (60kg patient):

<b><i>Dose</i></b>	<b><i>Duration</i></b>
Prednisolone 60mg OD	7 days (if no improvement then requires speciality involvement)
Prednisolone 50mg OD	7 days
Prednisolone 40mg OD	7 days
Prednisolone 30mg OD	7 days
Prednisolone 20mg OD	7 days
Prednisolone 15mg OD	7 days
Prednisolone 10mg OD	7 days
Prednisolone 5mg OD	7 days
<b>STOP</b>	

## Other Immune-Related Adverse Events

24. Other immune-related adverse events have been reported with I-O agents including but not limited to pancreatitis, uveitis, optic neuritis, myositis, arthritis, rhabdomyolysis, demyelination, Guillain Barre syndrome, Myasthenic syndrome and haemolytic anaemia.
25. These should be managed according to similar principles based on the severity of the adverse event by withholding treatment with the I-O agent, administering corticosteroids and consulting with appropriate specialty teams. Administration of Infliximab 5mg/kg or other immunosuppressive agents may be required in corticosteroid refractory patients for management of other immune-related adverse events.

## Training

26. There is no mandatory training associated with this policy. All Individuals treating patients receiving immuno-oncology agents should familiarise themselves with these guidelines. Individuals' training needs will be identified through annual appraisal and supervision.

## Monitoring Compliance

27. Compliance with the document will be monitored in the following ways.



Aspect of compliance or effectiveness being monitored	Monitoring method	Monitoring Lead	Frequency of monitoring	Group or Committee that will review the findings and monitor completion of any resulting action plan
Compliance with management guidelines	Audit of management of cases of IO toxicity	Audit lead Oncology	Annual	Oncology Directorate

## Review

28. This policy will be reviewed in 3 years, as set out in the *Policy for the Development and Implementation of Procedural Documents*.

## References

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35. National Institute for Clinical Excellence. Ulcerative Colitis: Management. Clinical Guideline No. 166. June 2013. Available at : [www.nice.org.uk/guidance/CG166](http://www.nice.org.uk/guidance/CG166). Accessed 15.02.17
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## Equality Analysis

37. As part of its development, this policy and its impact on equality, diversity and human rights has been reviewed, an equality analysis undertaken (see appendix attached). No adjustments have been identified in order to minimize the potential to discriminate.

## Document History

Date of revision	Version number	Reason for review or update
Feb 2016	1.0	Initial Guideline Development

## Authors and Contributors

Name	Title	Role
Dr Victoria Woodcock	Specialty Registrar in Medical Oncology	Lead Author
Prof Mark Middleton	Consultant in Medical Oncology	Clinical Lead
Dr Miranda Payne	Consultant in Medical Oncology	Secondary Author – Oncology Melanoma Lead
Kristen Moorhouse	Specialist Cancer Pharmacist	Secondary Author
Dr Rubeta Matin	Consultant Dermatologist	Skin Adverse Events
Dr Oliver Brain	Consultant Gastroenterologist	Gastrointestinal Adverse Events
Dr Jeremy Cobbold	Consultant Hepatologist	Hepatic Adverse Events
Dr Helen Turner	Consultant Endocrinologist	Endocrinopathies

## Stakeholders – Who has Been Consulted?

Who? Individuals or Committees	Rationale and/or Method of Involvement
Chemotherapy Operational Group	Departmental Approval
Medicines Management and Therapeutics Committee	Formulary Approval



## Appendix 1: Equality Analysis

<b>Equality Analysis</b>
Policy / Plan / proposal name: Immuno-oncology agent immune-related adverse event clinical guideline
Date of Policy: Feb 2016
Date due for review: Feb 2019
Lead person for policy and equality analysis: Mark Middleton
Does the policy /proposal relate to people? If yes please complete the whole form. YES
<b>1. Identify the main aim and objectives and intended outcomes of the policy.</b> This policy provides guidance on immune-related adverse events in patients treated with immuno-oncology agents, with the aim of improving identification and management of these adverse events in this patient population.
<b>2. Involvement of stakeholders.</b> Clinical Lead for Oncology Chemotherapy Operational Group Medicines management and Therapeutics Committee
<b>3. Evidence.</b> Population information on <a href="http://www.healthprofiles.info">www.healthprofiles.info</a> search for Oxfordshire.
<b>Disability</b> How will this policy affect people who have a disability? No impact.
<b>Disability: learning disability.</b> No impact
<b>Sex</b> How will the policy affect people of different gender? No impact.
<b>Age:</b> How will the policy affect people of different ages – the young and very old? No impact.
<b>Race:</b> How will the policy affect people who have different racial heritage? No impact.
<b>Sexual orientation:</b> How will the policy affect people of different sexual orientation- gay, straight, lesbian, bi-sexual? No impact.
<b>Pregnancy and maternity:</b> How will the policy affect people who are pregnant or with maternity rights? Not applicable to this patient group.
<b>Religion or belief.</b> How will the policy affect people of different religions or belief – or no faith? No impact.
<b>Gender re-assignment.</b> How will the policy affect people who are going through transition or have transitioned? No impact.
<b>Marriage or civil partnerships:</b> How will the policy affect people of different marital or partnership status? No impact.
<b>Carers</b> Remember to ensure carers are fully involved, informed, supported and they can express their concerns. Consider the need for flexible working. How will carers be affected by the policy? No impact.
<b>Safeguarding people who are vulnerable:</b> How has this policy plan or proposal ensured that the organisation is safeguarding vulnerable people? (E.g. by providing communication aids or assistance in any other way.) All vulnerable patients will be assessed appropriately and managed in line with the trust safeguarding guidelines and procedures.
<b>Other potential impacts e.g. culture, human rights, socio economic e.g. homeless people.</b> No impact
<b>Section 4 Summary of Analysis</b>

Does the evidence show any potential to discriminate? No
How does the policy <b>advance equality of opportunity?</b> N/A
How does the policy <b>promote good relations between groups?</b> (Promoting understanding) N/A

## Appendix 2: Document Development Checklist

This checklist is to accompany all newly written or reviewed clinical procedural documents. In order to enable approval, the following criterion is considered to ensure compliance with set standards for document development. Should some elements not be fulfilled, the document author may be asked to make necessary changes prior to resubmission for approval.

<b>Title of Document Being Reviewed:</b>		
<b>Policy reference Number:</b>		<b>Yes/No/ or Not Applicable</b>
	Is the document title clear and unambiguous?	
	Is the document correctly and consistently defined as a Policy, Procedure, Protocol, Guideline or Strategy?	
<b>Rationale</b>		
	Are the reasons for the development of the document stated?	
<b>Document Development Process</b>		
	Has the document been developed using the style and format of the approved template?	
	Do all pages have appropriate branding and header and footer content?	
	Have contributors to the development of the document been identified?	
	Is there evidence that relevant expertise has been used in developing the document?	
	Have links to national guidance and/or CQC Standards been identified?	
	If the document relates to or has implications for medications, has advice and approval be sought from the relevant medicines committee?	
<b>Evidence</b>		
	Is there evidence to support the development of the document?	
	Have all references been cited?	
	Are links to other associated OUH procedural documents or information sources included?	
<b>Content</b>		
	Are definitions of terms used, including abbreviations and acronyms, provided?	
	Is the document clearly and concisely written?	
	Has the target audience been defined?	
	Have the relevant responsibilities been described?	
<b>Dissemination and Implementation</b>		
	Does the document include an implementation plan?	
	Are there processes detailed for monitoring the implementation and effectiveness?	
	Have any training needs been identified and planned for?	

Additional Information		
	Is the Equality Assessment completed and included in the appendices?	
	Has the Version Control been completed?	
	Does the document have a date of issue?	
	Does the document have a review date?	
	Is the review date considered appropriate?	
Approval & Responsibility		
	Does the document clearly state the author(s) by role/position and not name?	
	Does the document identify the relevant committee or group who will approve it?	
	Is the lead Director correctly identified?	
Comments		
Clinical Policy Group or Delegated Group for Approval:		
	If the Clinical Policy Group (CPG) or delegated group for approval is happy to recommend this document for ratification, enter group details below. The Document will then be forwarded to the relevant committee for final ratification prior to publication.	
	<b>Name of Committee:</b>	
	<b>Date of Meeting:</b>	
Final Committee Ratification		
	<b>Name of Committee:</b>	
	<b>Date of Meeting:</b>	