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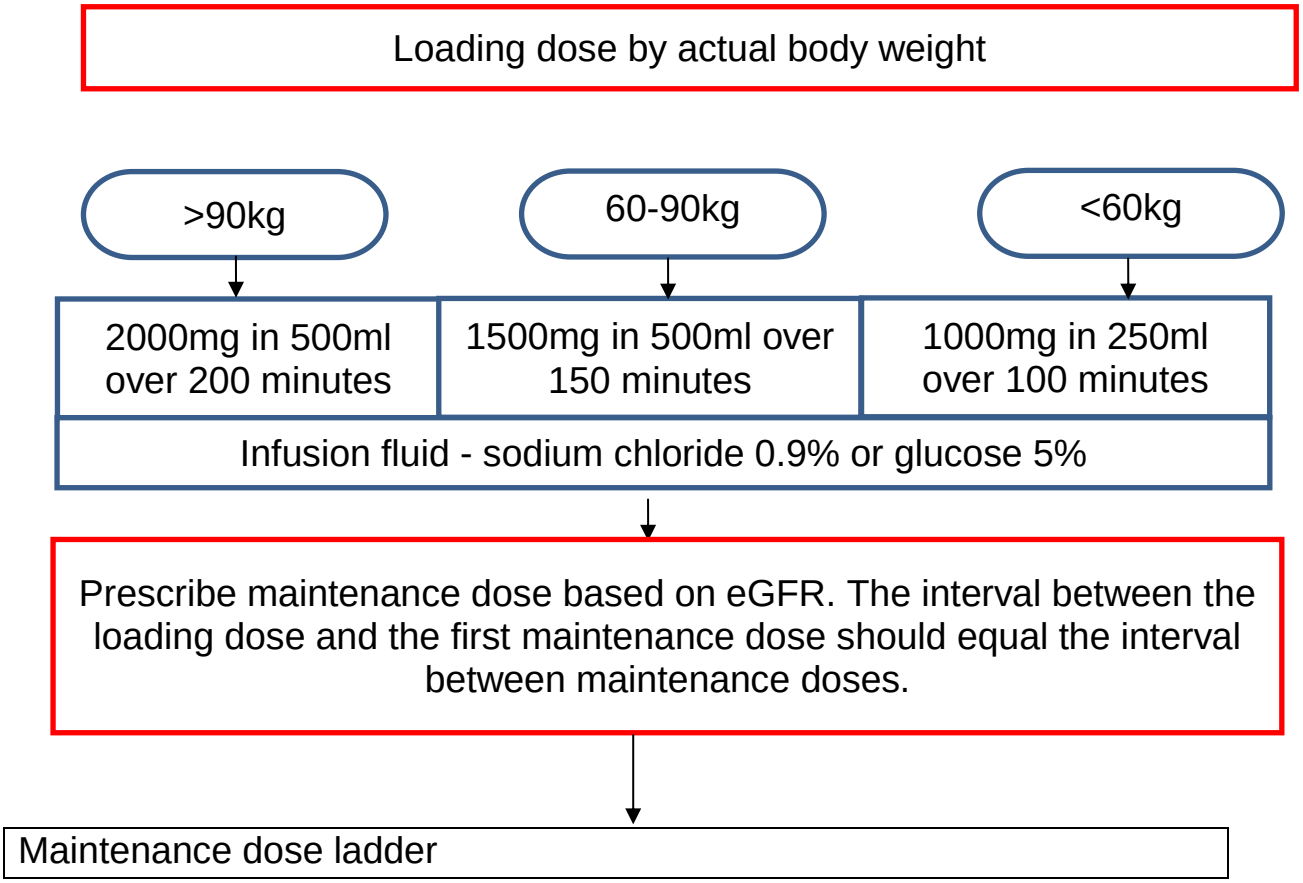
Royal Cornwall Hospitals NHS Trust

Vancomycin Prescribing and Therapeutic Drug Monitoring Clinical Guideline

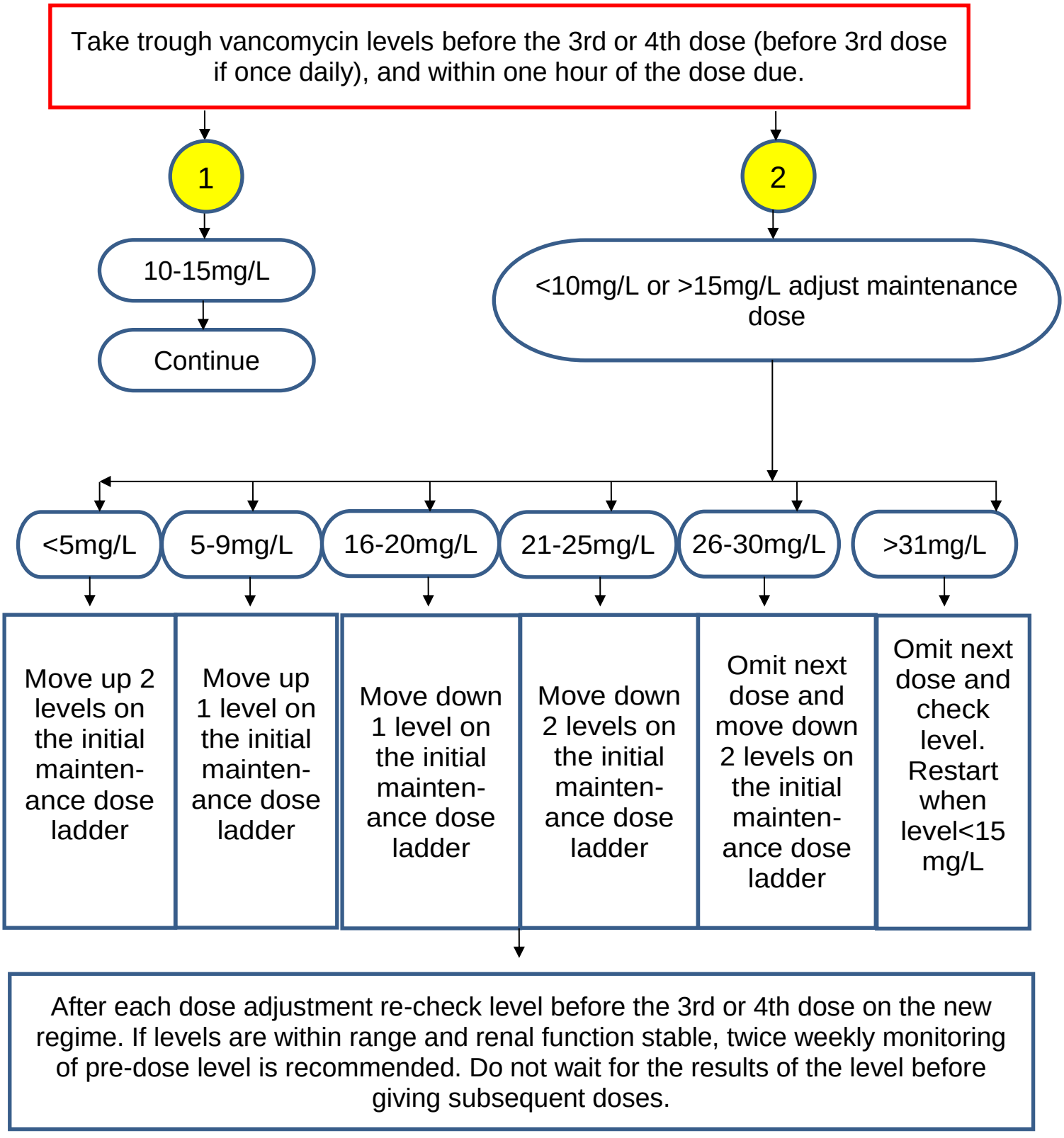
V6.0

June 2019

Summary



eGFR (ml/min)	Dose (mg)	Fluid (normal saline 0.9% or glucose 5%)	Infusion period
>90	1500 BD	500ml	150 minutes
75-89	1000 BD	250ml	100 minutes
55-74	750 BD	250ml	75 minutes
40-54	500 BD	250ml	50 minutes
30-39	750 OD	250ml	75 minutes
20-29	500 OD	250ml	50 minutes
<20 (not on dialysis)	500 every 48 hours	250ml	50 minutes


Take trough vancomycin levels before the 3rd or 4th dose (before 3rd dose if once daily), and within one hour of the dose due.
1
10-15mg/L
Continue
2
<10mg/L or >15mg/L adjust maintenance dose
<5mg/L
5-9mg/L
16-20mg/L
21-25mg/L
26-30mg/L
>31mg/L
Move up 2 levels on the initial mainten-ance dose ladder
Move up 1 level on the initial mainten-ance dose ladder
Move down 1 level on the initial mainten-ance dose ladder
Move down 2 levels on the initial mainten-ance dose ladder
Omit next dose and move down 2 levels on the initial mainten-ance dose ladder
Omit next dose and check level. Restart when level<15 mg/L
After each dose adjustment re-check level before the 3rd or 4th dose on the new regime. If levels are within range and renal function stable, twice weekly monitoring of pre-dose level is recommended. Do not wait for the results of the level before giving subsequent doses.

1. Aim/Purpose of this Guideline

1.1 To provide guidance to RCHT staff on the appropriate prescription and therapeutic drug monitoring of vancomycin therapy.

1.2. **Data Protection Act 2018 (General Data Protection Regulation – GDPR) Legislation**

The Trust has a duty under the DPA18 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed and documented. We can't rely on Opt out, it must be Opt in.

DPA18 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the DPA18 please see the 'information use framework policy', or contact the Information Governance Team rch-tr.infogov@nhs.net

2. The Guidance

2.1 Staff adherence to this guidance will ensure safe prescribing and monitoring of vancomycin.

2.2 Prescribing and monitoring of vancomycin at the Royal Cornwall Hospital NHS Trust

2.2.1. Vancomycin has bactericidal activity against aerobic and anaerobic gram positive organisms.

2.2.2. For **Indications** refer to the Trust's antibiotic guideline.

2.2.3. Oral vancomycin may be used for the treatment of antibiotic associated colitis. Oral vancomycin is **not** effective for the treatment of systemic infections. Likewise intravenous vancomycin is not effective for the treatment of antibiotic associated colitis.

2.2.4. Vancomycin has a potentially toxic side effect profile. Side effects include:

- nephrotoxicity
- ototoxicty
- anaphylaxis

2.2.5. Vancomycin should be used with caution in any patients with an impaired renal function. Due to a reduced rate of drug clearance and the potential for accumulation, this group of patients are particularly susceptible to the adverse effects of vancomycin therapy.

2.2.6. This policy is not designed for the following patients;

- pregnant

- breast feeding
- < 16 years of age
- CAPD peritonitis

2.2.7. The initial loading dose is based on the patient's **actual weight**. Use the following table to determine the loading dose:

Loading dose			
Actual body weight (kg)	Loading dose (mg)	Fluid (sodium chloride 0.9% or glucose 5%)	Infusion period
>90	2000mg	500ml	200 minutes
60-90	1500mg	500ml	150 minutes
<60	1000mg	250ml	100 minutes

2.2.8. The vancomycin maintenance dose will be dependent on the patient's eGFR

2.2.9. Use the following table to determine the maintenance dose:

Initial Maintenance dose ladder				
eGFR	Dose (mg)	Start time after loading and future dosing interval (hr)	Fluid (normal saline 0.9% or glucose 5%)	Infusion period
>90	1500	12	500ml	150 minutes
75-89	1000	12	250ml	100 minutes
55-74	750	12	250ml	75 minutes
40-54	500	12	250ml	50 minutes
30-39	750	24	250ml	75 minutes
20-29	500	24	250ml	50 minutes
<20 (not on dialysis)	500	48	250ml	50 minutes

NB: The interval between the loading dose and the first maintenance dose should equal the interval between maintenance doses.

2.2.10. The maintenance dose should be reviewed and adjusted if necessary according to the results of pre-dose (trough) serum vancomycin levels.

2.2.11. Monitoring of serum pre-dose (trough) vancomycin levels is routinely carried out to minimise the risk of toxicity and maximise clinical efficacy. There is no need to measure post-dose levels.

- Take blood sample within one hour of the dose due.

- Blood samples should not be taken from intravenous cannulas.

- Level to be taken before the 3rd or 4th dose (before 3rd dose if once daily) to determine the trough level. Do not wait for the results of the level before giving the next dose

- Trough reference range 10-15mg/L

- If the trough is outside this reference range alter the dose according to the table below.

- Omit dose if trough >25mg/L

- After each dose adjustment re-check level before the 3rd or 4th dose on the new regime.

- If levels are within range and renal function stable, twice weekly monitoring of pre-dose level is recommended. Do not wait for the results of the level before giving the next dose.

2.2.12. Altering the regime according to trough levels (aim trough 10-15mg/L)

Pre-dose (trough level)	Maintenance dose adjustment
Less than 5mg/L	Move up 2 levels on the initial maintenance dose ladder from current dosing schedule.
5-9mg/L	Move up 1 level on the initial maintenance dose ladder from current dosing schedule.
10-15mg/L	Continue. If 15-20mg/L dose range required – on microbiology advice- then move up one level on the initial maintenance dose ladder from current dosing schedule.
16-20mg/L	Move down 1 level on the initial maintenance dose ladder from current dosing schedule without omitting any doses unless this is the required level.
21-25mg/L	Move down 2 steps on maintenance dose ladder without omitting any doses. (1 step if target is 15-20mg/L).
26-30mg/L	Omit next dose and decrease 2 levels on the initial maintenance dose ladder from current dosing schedule.
>31mg/L	Omit next dose and check level. Restart when vancomycin level<15mg/L

2.2.13. Here is an example of altering a vancomycin dose using the maintenance dose ladder. Patient is on vancomycin 1g bd and the trough level comes back as 4.5mg/L. You therefore will need to increase the dose by moving 2 levels up the maintenance dose ladder. The new vancomycin dose will be 1.5g bd (this is only one level but the maximum dose in these guidelines). It is important to ensure the vancomycin level was taken at the correct time (i.e within one hour of the next dose).

2.3. General Information

2.3.1. Specimens for vancomycin assays should:

- be sent to Clinical Chemistry.
- be sent in a clearly labelled vacutainer (Gold top tube).
- be 5mls of clotted blood (adequate also for all routine chemistry)
- available 24/7

2.3.2. The following details are essential:

- time specimen taken
- dose and frequency of vancomycin therapy

2.3.3. Levels do not need to be completed for those patients receiving oral vancomycin

2.4. Contact Numbers

Microbiology
Office hours (9am – 5pm) – 01872 254900
Out-of-Hours – on call microbiologist contact via switchboard

Clinical Chemistry (analytical enquiries only)
Office hours (9am – 5 pm) 01872 252540
Out of Hours – on call BMS contact via switchboard

Pharmacy
Antibiotic Pharmacist bleep 3248
Ward Pharmacist – contact via bleep (available via pharmacy)
Pharmacy Treliske (8.30am – 5.00pm Monday-Sunday) 01872 252588
Medicines Information (8.30am – 5.00pm Monday – Friday) 01872 252587
Out-of-Hours – on call pharmacist contact via switchboard
West Cornwall Pharmacy (8.30am – 5.00pm Monday-Friday) 01736 874183

Remember sensible antibiotic prescribing saves lives, saves money, minimises adverse effects and reduces problems with resistant organisms.

3. Monitoring compliance and effectiveness

Element to be monitored	Appropriate initial doses of vancomycin and subsequent therapeutic drug monitoring. Appropriate dose tailoring in response to therapeutic drug monitoring levels.
Lead	Antibiotic pharmacist
Tool	Audit tool currently in development by pharmacy
Frequency	Monitored 6 monthly
Reporting arrangements	Report to the Antimicrobial Stewardship Management Committee (ASMC) Reported back to divisions via the ASMC
Acting on recommendations and Lead(s)	Divisional representatives at the ASMC
Change in practice and lessons to be shared	Practice changes will be implemented via divisional representatives at the ASMC and the lessons learned fed back to all relevant stakeholders via this route.

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the 'Equality, Inclusion & Human Rights Policy' or the Equality and Diversity website.

4.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.

Appendix 1. Governance Information

Document Title	Vancomycin Prescribing and Therapeutic Drug Monitoring Clinical Guideline V6.0					
Date Issued/Approved:	June 2019					
Date Valid From:	June 2019					
Date Valid To:	June 2022					
Directorate / Department responsible (author/owner):	Neil Powell, Antibiotic Pharmacist					
Contact details:	01872 252588					
Brief summary of contents	Guidance on the safe and effective prescribing and monitoring of intravenous vancomycin.					
Suggested Keywords:	Vancomycin, TDM, glycopeptides					
Target Audience	RCHT	CFT	KCCG			
	✓					
Executive Director responsible for Policy:	Medical Director					
Date revised:	21/05/2019					
This document replaces (exact title of previous version):	Vancomycin prescription and therapeutic drug monitoring guideline V5.0					
Approval route (names of committees)/consultation:	Antimicrobial Stewardship Management Committee Medicines Practice Committee					
Care Group Manager confirming approval processes	Iain Davidson- interim CD for Clinical Support					
Name and Post Title of additional signatories	Not required					
Name and Signature of Divisional/Directorate Governance Lead confirming approval by specialty and divisional management meetings	{Original Copy Signed}					
	Kevin Wright					
Signature of Executive Director giving approval	{Original Copy Signed}					
Publication Location (refer to Policy on Policies – Approvals and Ratification):	Internet & Intranet	✓	Intranet Only			

Document Library Folder/Sub Folder	Clinical / Pharmacy
Links to key external standards	None
Related Documents:	None
Training Need Identified?	No

Version Control Table

Date	Version No	Summary of Changes	Changes Made by *(Name and Job Title)*
10 Jun 10	V1.0	Initial Issue	Neil Powell
18 Dec 13	V2.0	Addition of Monitoring Compliance table.	Neil Powell
25/08/14	V3	Dosing guidance revised	Neil Powell
02/09/14	V4	Loading dose added and increase in maintenance doses. Guidance on dose adjustments when levels	Neil Powell
16/06/15	V4.1	Added 20-25mg/L in to the “altering the dosage regime” table.	Neil Powell
19/10/15	V4.2	Replaces CrCl with eGFR. Removed CrCl 90-110 mls/min aa not possible with eGFR.	Neil Powell
22/11/18	V5.0	No changes	Neil Powell
21/05/19	V6.0	Added in to omit next dose in summary table if levels 26-30mg/L. Updated contact details: antibiotic pharmacist and Treliske Pharmacy	Ronan Sheehan

Appendix 2. Initial Equality Impact Assessment Form

<table>
<tr><td colspan="6">Name of Name of the strategy / policy /proposal / service function to be assessed
Vancomycin Prescribing and Therapeutic Drug Monitoring Clinical Guideline V6.0</td></tr>
<tr><td colspan="3">Directorate and service area:
Pharmacy</td><td colspan="3">New or existing Policy:
Existing</td></tr>
<tr><td colspan="3">Name of individual completing assessment:
Neil Powell</td><td colspan="3">Telephone:
01872 252588</td></tr>
<tr><td>1. Policy Aim*

Who is the strategy / policy / proposal / service function aimed at?</td><td colspan="5">To provide guidance to RCHT staff on the appropriate prescription and therapeutic drug monitoring of vancomycin therapy</td></tr>
<tr><td>2. Policy Objectives*</td><td colspan="5">To provide guidance to RCHT staff on the prescription and therapeutic drug monitoring for vancomycin therapy</td></tr>
<tr><td>3. Policy – intended Outcomes*</td><td colspan="5">Safe and effective prescribing of vancomycin</td></tr>
<tr><td>4. *How will you measure the outcome?</td><td colspan="5">Six monthly vancomycin audits</td></tr>
<tr><td>5. Who is intended to benefit from the policy?</td><td colspan="5">All prescribers and nurses administering vancomycin</td></tr>
<tr><td rowspan="3">6a Who did you consult with

b). Please identify the groups who have been consulted about this procedure.</td><td>Workforce</td><td>Patients</td><td>Local groups</td><td>External organisations</td><td>Other</td></tr>
<tr><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Please record specific names of groups

Medication Practice Committee</td></tr>
<tr><td>What was the outcome of the consultation?</td><td colspan="5">Guideline agreed</td></tr>
</table>

7. The Impact
Please complete the following table. **If you are unsure/don't know if there is a negative impact you need to repeat the consultation step**.

Are there concerns that the policy **could** have differential impact on:

Equality Strands:	Yes	No	Unsure	Rationale for Assessment / Existing Evidence
Age		**No**		
Sex (male, female, trans-gender / gender reassignment)		**No**		
Race / Ethnic communities /groups		**No**		
Disability - Learning disability, physical impairment, sensory impairment, mental health conditions and some long term health conditions.		**No**		
Religion / other beliefs		**No**		
Marriage and Civil partnership		**No**		
Pregnancy and maternity		**No**		
Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian		**No**		

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:

- You have ticked "Yes" in any column above and
- No consultation or evidence of there being consultation- this excludes any *policies* which have been identified as not requiring consultation**. or**
- Major this relates to service redesign or development

8. Please indicate if a full equality analysis is recommended.	**Yes**		**No**	**X**

9. If you are **not** recommending a Full Impact assessment please explain why.

Not indicated.

Signature of policy developer / lead manager / director		Date of completion and submission
Neil Powell		22.11.2018
Names and signatures of members carrying out the Screening Assessment	1. Neil Powell 2. Human Rights, Equality & Inclusion Lead	

Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead
c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD

This EIA will not be uploaded to the Trust website without the signature of the Human Rights, Equality & Inclusion Lead.

A summary of the results will be published on the Trust's web site.

Signed: Ronan Sheehan

Date: 21.5.2019