Kent and Medway
NHS and Social Care Partnership Trust

Lithium Policy

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Author	Lola Ogungbangbe Dr. Soundararajan Munuswamy
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DOCUMENT TRACKING SHEET

Lithium Policy

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0.1	Draft	31.07.2019	D&T for review	Approved
1.0	Final	29.10.2019	Trust Wide Patient Safety and Mortality Review Group	Ratified
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RELATED POLICIES/PROCEDURES/protocols/forms/leaflets

Medicines Management Policy	KMPT.CliG.08
Physical Health & Examination Policy	KMPT.CliG.026

Venepuncture Policy	KMPT.CliG.079
Care Pathway and CPA Policy	KMPT.CliG.001
Consent to Examination or Treatment	KMPT.CliG.049
DNA Policy	KMPT.CliG.014
Standard Universal Precautions	KMPT.CliG.089
Infection Prevention & Control Policy	KMPT.CliG.005

SUMMARY OF CHANGES

Date	Author	Page	Changes (brief summary)
October 2020	Lola Ogungbangbe	3-4	Guidance on maintenance therapy added
October 2020	Lola Ogungbangbe	6-7	Information on side effects and managing lithium toxicity added
October 2020	Lola Ogungbangbe	9-12	Outline of the responsibilities of healthcare professionals in both inpatient and outpatient settings added
October 2020	Lola Ogungbangbe	13	New guidance around discharging lithium patients to primary care added
October 2020	Lola Ogungbangbe	16	New appendix 1: Lithium counselling checklist
October 2020	Lola Ogungbangbe	17	New appendix 2: Interpreting lithium levels
October 2020	Lola Ogungbangbe	18	New appendix 3: A quick reference guide/flowchart for what to do when lithium levels are at different levels.
October 2020	Lola Ogungbangbe	19	New appendix 4: lithium side effect scale.
October 2020	Lola Ogungbangbe	20	New appendix 5 lithium monitoring requirements
July 2021	Lola Ogungbangbe	24	New appendix 7 aid for the management of patients on lithium therapy in acute hospitals
August 2022	Lola Ogungbangbe	5	More frequent tests should be carried out if there is evidence of poor fluid intake
August 2022	Lola Ogungbangbe	8, 11 and 16	Advise patient to maintain adequate fluid intake (at least 8 glasses of water per day)
August 2022	Jag Bahia	26	New appendix 8: Hot weather advice for patients on lithium
February 2023	Jag Bahia	23	Appendix 6 updated highlighting the significant interaction between Sodium-glucose co-transporter 2 (SGLT2) inhibitors (e.g. dapagliflozin, empagliflozin) with lithium

CONTENTS

1 INTRODUCTION

1.1 Lithium is a well-established drug in the treatment of bipolar disorder, it is recommended as a first line long-term treatment for bipolar disorder by the National Institute for Health and Care Excellence (NICE CG 185). It is also licensed for the treatment and prophylaxis of recurrent depression, and aggressive or self-harming behaviour, and used off-license in the treatment of cluster headaches.

2 WHO DOES THIS POLICY APPLY TO?

2.1 This policy applies to all clinical staff.

3 PURPOSE

3.1 This policy has been developed to provide guidance to clinical staff on all aspects of lithium therapy. It also gives the necessary tools for effective compliance with the monitoring requirements of lithium therapy.

3.2 It provides information on the safe management of patients on lithium therapy in both inpatient and outpatient settings.

3.3 It outlines the responsibilities of medical, nursing and pharmacy staff.

4 DUTIES

4.1 The trust board is accountable for

4.1.1 Delegating responsibility to the trust wide Clinical Governance group to ensure that the lithium policy is in force, current and reviewed regularly.

4.2 The Drugs and Therapeutics group is responsible for:

4.2.1 Development and monitoring of the lithium policy to reflect current practice within the Trust and national guidelines.

4.3 Chief Executive:

4.3.1 Has overall responsibility for the safe and secure handling of medicines.

4.4 Medical Director:

4.4.1 Is executive lead for medicines management.

4.4.2 Is responsible for reporting to the Trust Board on performance in relation to medicines management.

4.5 Chief Pharmacist:

4.5.1 Is accountable for establishing and maintaining a safe and secure system for medicines management throughout the Trust.

4.5.2 Is responsible for reporting to Trust wide Clinical Governance Group in relation to medicines management.

4.6 Clinical Directors/Leads and Service Directors/Leads

4.6.1 Are responsible for ensuring that their staff are aware.

5 BACKGROUND

5.1 Lithium is a naturally occurring alkali metal. Its salts; namely lithium carbonate and lithium citrate, are commonly used to treat a wide range of mental illnesses.

5.2 Lithium salts have a narrow therapeutic range and therefore dosing is governed by lithium serum levels and clinical response. Inadequate monitoring of lithium serum levels can result in lithium toxicity, which can cause significant harm to patients.

5.3 The National Patient Safety Agency (NPSA) in 2009, now known as NHS Improvement, identified sub-optimal monitoring and poor patient education on lithium side effects and symptoms of toxicity as key issues affecting the safe management of patients on lithium therapy. In its patient safety alert, titled “safer lithium therapy” it made a number of recommendations:

5.3.1 Patients prescribed lithium are monitored in accordance with NICE guidance.

5.3.2 There are reliable systems to ensure blood test results are communicated between laboratories and prescribers.

5.3.3 At the start of lithium therapy and throughout their treatment patients receive appropriate ongoing verbal and written information and a record book to track lithium blood levels and relevant clinical tests.

5.3.4 Prescribers and pharmacists check that blood tests are monitored regularly and that it is safe to issue a repeat prescription and/or dispense the prescribed lithium.

5.3.5 Systems are in place to identify and deal with medicines that might adversely interact with lithium therapy.

6 STARTING LITHIUM THERAPY

6.1 All patients being considered for lithium therapy should be provided with written and verbal information on lithium; encompassing the monitoring requirements, side effects, and potential therapeutic benefits, to allow the patient to engage in the decision-making process.

6.2 Patients and carers (where applicable) should have a clear understanding of who will be responsible for their care and carrying out the monitoring requirements.

6.3 Prior to prescribing lithium, the following baseline tests and measurements should be carried out:

6.3.1 Renal Function Tests i.e. eGFR or CrCL

6.3.2 Urea and Electrolytes (U&Es) including corrected calcium

6.3.3 Thyroid Function Tests (TFTs)

6.3.4 Full Blood Count (FBC)

6.3.5 Fasting blood glucose, glycosylated haemoglobin (HbA1c) and blood lipid profile

6.3.6 Weight, BMI and waist circumference

6.3.7 ECG to be done for people with cardiovascular disease or risk factors for it

6.4 Before prescribing lithium, check the Summary of Product Characteristics (SPC) to ensure there are no contraindications to the patient starting lithium.

6.4.1 Start lithium carbonate at 400mg daily for adults, for elderly patients, those with conditions, or taking medications, that put them at high risk of lithium toxicity consider starting lithium carbonate at 200mg-250mg daily.

6.5 When prescribing lithium, ensure brand name and formulation are specified, as not all brands are bioequivalent.

6.5.1 specify if the preparation is modified release.

6.6 Note tablet formulations contain lithium carbonate and the liquid formulations contain lithium citrate

6.6.1 **Lithium carbonate 200mg tablet** is approximately equivalent to **509mg/520mg lithium citrate liquid.**

6.7 Ensure the patient is given a lithium booklet, and their target serum level is specified in the booklet.

6.8 On starting lithium, measure lithium serum levels weekly until stable serum levels are achieved.

6.8.1 Levels can be done after 5 days if preferable.

6.9 Dose of lithium may be adjusted at weekly intervals in accordance with serum lithium levels, until the desired therapeutic serum levels or clinical response is achieved.

6.10 Serum lithium levels should be measured weekly after each dose change until stable levels are achieved.

6.11 Record the serum lithium level result in the patient's lithium booklet and in patient's notes.

6.12 Serum lithium levels between 0.6 and 0.8 mmol/l should be targeted in patients being treated with lithium for the first time.

6.12.1 In elderly patients, lower serum lithium levels (e.g. <0.6mmol) may be adequate and the target range should be based on response.

6.13 Consider maintaining serum lithium levels at 0.8–1.0 mmol per litre for a trial period of at least 6 months for people who:

6.13.1 Have had a relapse while taking lithium in the past or

6.13.2 Are taking lithium and have subthreshold symptoms with functional impairment.

7 MAINTENANCE LITHIUM THERAPY

7.1 Once a stable lithium serum level has been achieved for a specific dose, lithium serum levels should be monitored every 3 months for the first year of treatment, then every 6 months thereafter.

7.2 For patients in the following groups, NICE recommends serum lithium levels are measured at 3-monthly intervals:

7.2.1 Older people

7.2.2 People taking drugs that interact with lithium

7.2.3 People who are at risk of impaired renal or thyroid function, raised calcium levels or other complications

7.2.4 People who have poor symptom control

7.2.5 People with poor adherence

7.2.6 People whose last serum lithium level was 0.8 mmol/l or higher

7.3 A therapeutic range of 0.6–0.8 mmol/L should be aimed for in patients being treated with lithium for the first time. Lithium levels above 0.8mmol/L are associated with an increased risk of renal impairment (BAP 2016)

7.3.1 In elderly patients, lower serum lithium levels (e.g. <0.6mmol) may be adequate and the target range should be based on response.

7.4 Consider maintaining serum lithium levels at 0.8–1.0 mmol per litre for a trial period of at least 6 months for people who:

7.4.1 Have had a relapse while taking lithium in the past or

7.4.2 Are taking lithium and have subthreshold symptoms with functional impairment.

7.5 Serum lithium levels above 1mmol/l require medical review, particularly if this has not been explicitly stated as a desired therapeutic lithium range.

7.6 Where a consultants deems a level above 1mmol/l is clinically appropriate for a patient, this must be care planned and documented in the patient's notes; providing a clear rationale for the target range and the risks associated with lithium levels above 1mmol/l.

7.7 Such patients should be counselled on the signs of lithium toxicity and provided with a clear care pathway, in the event symptoms of toxicity arise.

7.8 In these patients, lithium levels should be monitored more frequently e.g. monthly and upper acceptable limits should be clearly defined in the patient's notes and recorded in the patient's lithium booklet.

7.9 When reviewing patients on lithium, the following steps should take place:

7.9.1 Review the latest lithium serum levels

7.9.2 Review Lithium booklet and update the booklet where required

7.9.3 Issue a booklet if the patient does not have one

7.9.4 Ensure all monitoring requirements are being complied with

7.9.5 Check for interactions with newly prescribed medication

7.9.6 Screen for lithium toxicity symptoms e.g. neurotoxicity, including paraesthesia, ataxia, tremor and cognitive impairment

7.9.7 Reiterate the key counselling points to patients

7.9.8 Check patient's understanding of lithium therapy and address any knowledge gaps

7.9.9 Check for newly diagnosed illnesses

7.10 When patients become physically ill or when they are started on medications with propensity to affect the clearance of lithium, extra vigilance and increased monitoring is required.

7.11 Carry out a side effects assessment every 6 months (see appendix 4 for the Liser scale)

8 MONITORING REQUIREMENTS OF LITHIUM THERAPY

8.1 Serum lithium level

8.1.1 Serum lithium levels should be measured weekly on initiation of treatment and following a dose change, until a stable serum level is achieved, then every 3 months, after a year on lithium therapy serum levels can be carried out every 6 months, except for certain groups of patients (refer to section 7.2).

8.1.2 More frequent tests should be carried out if there is evidence of clinical deterioration, abnormal results, poor fluid intake, a change in sodium intake, or symptoms suggesting abnormal renal or thyroid function such as unexplained fatigue, if the patient is starting medication such as Angiotensin-Converting Enzyme Inhibitors (ACEIs) (e.g. ramipril), Non-steroidal anti-inflammatory drugs (NSAIDs) (e.g. ibuprofen) or diuretics (e.g. furosemide).

8.1.3 Monitor serum lithium levels more frequently if urea levels and creatinine levels become elevated, or eGFR falls over 2 or more tests, and assess the rate of deterioration of renal function.

8.1.4 If a patient is switched from one brand of lithium to another, baseline serum lithium level should be taken prior to switching and serum lithium levels should be monitored closely in a similar fashion to initiation of treatment (i.e. weekly until levels stabilised) and the patient should be monitored for signs of relapse and adverse effects in the initial period.

8.1.5 Lithium serum levels should be measured 12 hours post dose (range 11-13 hours post-dose). This is usually in the morning for a night time dosing.

8.1.6 For patients on a twice daily regimen, sample should be taken before the morning dose is taken.

8.1.7 For most patients, a serum level between 0.6-0.8mmol/l will be adequate, however some patients may require levels closer to 1mmol/l. Likewise, some patients may respond to levels below 0.6mmol/l.

8.1.8 For interpretation of serum lithium levels, see appendix 2

8.2 The following tests/measures should be conducted every 6 months during maintenance treatment:

8.2.1 Renal function tests (e-GFR or CrCL)

8.2.2 Urea & Electrolytes including corrected calcium

8.2.3 Thyroid function tests

8.2.4 Weight or BMI

8.3 Conduct above tests more often if there is evidence of impaired renal or thyroid function, raised calcium levels or an increase in mood symptoms that might be related to impaired thyroid function.

8.4 The following tests/measures should be conducted at least every year during maintenance treatment:

- Fasting blood glucose, glycosylated haemoglobin (HbA1c)
- blood lipid profile

- cardiovascular status, including pulse and blood pressure
  - ECG for people with cardiovascular disease or risk factors for it.

9 LITHIUM TOXICITY

9.1 Lithium toxicity tends to occur when serum levels exceed 1mmol/L but can also occur within the normal therapeutic range, especially in the elderly. Signs and symptoms of toxicity are reliably seen at levels ≥1.5mmol/l and can be life threatening, symptoms include:

- Fine tremor increasing to coarse tremor
- Blurred vision
- Ataxia
- Slurred speech
- Vomiting and diarrhoea
- Severe polyuria
- Confusion
- Seizures
- Renal damage may also occur

9.2 If any of these symptoms are experienced by a patient, lithium therapy should be stopped immediately and lithium levels checked urgently.

9.3 Restarting lithium after lithium toxicity:

9.3.1 Assess the likelihood of another lithium toxicity event.

9.3.2 If lithium toxicity occurred as a result of overdose, assess if patient still at high risk of overdose and evaluate if the potential benefit of lithium outweighs risk, considering the severity of the patient's illness.

9.3.3 Explore steps that can be taken to reduce the risk or impact of another overdose event (e.g. limit supply of medication or medication in custody of carers).

9.3.4 Before restarting lithium, ensure level has fallen below a toxic level, ideally to a mid-range therapeutic level (e.g.0.7mmol/l).

9.3.5 Consider re-starting at a dose lower than the previous dose and monitor serum lithium level weekly until level stabilised. This may not be necessary if toxicity is due to overdose

9.3.6 Avoid or minimise the impact of drugs that may contribute to lithium toxicity e.g. Diuretics, NSAIDs, ACEIs

9.3.7 Advise patient to report any changes in physical health status e.g. diarrhoea, vomiting, UTI

9.3.8 Consider an increased monitoring frequency e.g. monthly for the first three months before switching to 3-monthly serum level monitoring.

10 SIDE EFFECTS OF LITHIUM

10.1 Lithium has a wide range of side effects. Many of these are related to the serum levels, and it may be possible to manage some of these by adjusting the dose. It is important the patient is counselled on these side effects when lithium is initiated and advised to speak to a healthcare professional if they have any concerns. Lithium side effects include:

- Mild gastrointestinal upset
- Fine tremor
- Weight gain
- Ankle oedema
- Metallic taste
- Nephrogenic diabetes insipidus, resulting in polydipsia and polyuria
- Renal toxicity – reduction in glomerular filtration rate
- Hypothyroidism
- Exacerbation of skin conditions, including psoriasis and acne
- Change in renal function

10.2 For a full list of side effects see the summary of product characteristics for lithium.

10.3 If there is a suspicion of lithium toxicity, serum lithium levels should be measured as soon as possible, preferably within 24hrs and the request should be marked as urgent.

11 LITHIUM IN PREGNANCY AND BREASTFEEDING

11.1 Lithium has teratogenic effects. Women of child-bearing age should be advised about the importance of effective contraception whilst on lithium, particularly patients with bipolar disorder, given the greater risk of unplanned pregnancy in this population.

11.2 All women on lithium who become pregnant should be referred to MIMHS as soon as feasible following confirmation of pregnancy.

11.3 Advise all pregnant women to take folate supplement.

11.4 Discuss the risk of harm to the woman and the foetus associated with her mental health problem.

11.5 Discuss risk associated with lithium in pregnancy. With pregnant women, exposure to lithium during the first trimester is associated with a 0.05–0.1% risk of cardiovascular anomalies including Ebstein's anomaly (BAP 2016).

11.6 Discuss the risk or harm to the woman and the child associated with stopping lithium or changing the treatment.

11.6.1 52% of women who discontinued lithium during pregnancy relapsed and 70% of the women who remained stable after lithium discontinuation during pregnancy relapsed in the post-partum period (BAP 2016).

11.7 Do not start lithium in women who are planning a pregnancy or are pregnant, unless antipsychotic medication has not been effective.

11.8 Lithium should be avoided in the first trimester of pregnancy, unless benefit outweighs risk.

11.9 If a woman whose symptoms are well controlled becomes pregnant, consider stopping lithium gradually over a 4-week period. Explain to the woman that this may not remove the risk of cardiac defects in the foetus and there is a risk of relapse, particularly in the postnatal period.

11.10 For a pregnant woman that is not well or is at high risk of relapse, consider switching gradually to an antipsychotic, or stop lithium and restart it in the second trimester, provided the woman is not planning to breastfeed and her symptoms have responded better to lithium than to other drugs in the past.

11.11 If antipsychotic is likely to be ineffective you may consider continuing with lithium.

11.12 If a woman continues taking lithium during pregnancy:

- 11.12.1 Check serum levels every 4 weeks, then weekly from the 36th week, and less than 24 hours after childbirth
- 11.12.2 Adjust the dose to keep serum levels towards the lower end of the therapeutic range
- 11.12.3 Advise patient to maintain adequate fluid intake (at least 8 glasses of water per day)
- 11.12.4 Women taking lithium should deliver in hospital and be monitored during labour by the obstetric team.
- 11.12.5 Monitoring should include checking serum lithium levels and fluid balance, because of the risk of dehydration and lithium toxicity

11.13 Lithium should be withheld during labour and for 24-48hrs before a pre-planned caesarean section.

11.14 Serum lithium levels should be checked 12 hours after the last dose.

11.15 High concentrations of lithium are found in breastmilk and as a result, is not recommended in women who are breastfeeding.

12 DRUG –DRUG AND DRUG- DISEASE INTERACTIONS

12.1 Certain drugs may increase the risk of lithium toxicity; these include ACEIs, Angiotensin Receptor Blockers (ARBs), diuretics, NSAIDs, metronidazole. See appendix 6 for a list of drugs that commonly interact with lithium.

12.2 Certain disease state and physical health factors are associated with increase in the risk of lithium toxicity; these include renal failure, reduced sodium intake, increased sodium loss (e.g. diarrhoea and vomiting), dehydration, and urine tract infections.

13 STOPPING LITHIUM THERAPY

13.1 Sudden discontinuation of lithium in bipolar affective disorder is associated with relapse in up to 50% of patients (DHSC 2020)

13.2 Where possible, lithium should be discontinued gradually unless there is a high risk of harm to the patient, such as in lithium toxicity.

13.3 When stopping lithium, reduce the dose gradually over at least 4 weeks, preferably up to 3 months, even if the person has started taking another anti-manic drug.

13.4 Ensure the patient's GP and any other relevant persons are informed lithium has been discontinued as soon as feasible.

13.5 Advise patient that discontinuation of lithium therapy in bipolar prophylaxis can lead to relapse.

13.6 During dose reduction and for 3 months after lithium treatment is stopped, monitor the person closely for early signs of mania and depression.

13.7 Monitoring of symptoms, mood and mental state should continue for 2 years after lithium has been stopped entirely. This may be undertaken in primary care (NICE CG 185).

14 MANAGEMENT OF PATIENTS ON LITHIUM IN INPATIENT SETTINGS

14.1 For patients initiated on lithium during admission, follow the steps outlined in section 6 of this policy.

14.2 All healthcare professionals involved in the care of patients on lithium should be aware of the common signs and symptoms of lithium toxicity.

14.3 All healthcare professionals should ensure patients prescribed lithium have a lithium booklet.

Doctors and Prescriber's Responsibilities
(refer to section 8 in addition to below)

14.4 Ask newly admitted patients on lithium, during admission clerk in, for their booklet to gain an overview of serum lithium level history and to ensure compliance with mandatory monitoring requirements.

14.5 Check history of compliance with lithium.

14.6 Confirm lithium dose, brand and formulation using at least two sources (e.g. patient, SCR, electronic patient notes, carers) and prescribe accordingly.

14.7 Serum lithium levels should be measured within 24 hours of admission or the next working day; the sample should be taken 12 hours after the patient's last dose.

14.8 Where there's a suspicion of lithium toxicity, a sample should be taken urgently irrespective of the time of last dose, and lithium withheld until the result is available.

14.8.1 Collect sample in yellow top bottles, and mark sample as urgent where toxicity is suspected

14.9 If the patient hasn't had a dose for over 12 hours, the sample should be taken as soon as possible. The time that has elapsed since patient's last dose of lithium should be taken into consideration when interpreting the result.

14.10 In addition to the serum lithium level, carry out the other required mandatory tests/measurements for lithium therapy. These include

- U&Es including Ca^{2+}
- TFT,
- RFT

14.11 Test results should be promptly chased up by the requesting practitioner, or handed over to the practitioner next on duty to follow up, and recorded in patient's notes. For interpretation of lithium levels see appendix 2

14.12 Be aware of conditions that may predispose the patient to lithium toxicity

14.13 Consider initiating a fluid chart for patients on lithium therapy to encourage adequate fluid intake, where there are issues with fluid intake.

14.13.1 Patients on lithium therapy should take at least 8 glasses of water or other suitable fluid per day.

14.14 Be aware of the common signs and symptoms of lithium toxicity and screen for lithium toxicity during each consultation.

14.15 At discharge, ensure the following is included in the discharge summary:

14.15.1 latest serum lithium levels.

14.15.2 frequency of serum lithium monitoring and other mandatory tests

14.15.3 target therapeutic lithium range.

14.15.4 brand of lithium the patient takes

Pharmacy staff responsibilities

14.16 Pharmacy team to obtain latest serum lithium levels result when carrying out medicines reconciliation on admission and document in the relevant section of the medicines reconciliation form.

14.17 Review the drug chart (or electronic prescription where in use) and ensure lithium has been prescribed correctly on the drug chart, highlight any discrepancies to doctors or non-medical prescriber (NMP)

14.18 Check for drug interactions and discuss any concerns with ward doctors or NMP

14.19 Check if lithium booklet has been updated with admission blood and therapeutic target range specified in booklet.

14.20 Pharmacy staff to ensure all mandatory monitoring requirements are being complied with.

14.21 Endorse the drug chart or electronic prescription with the latest serum lithium level.

14.22 Issue a lithium booklet to all patients who do not have one and endorse chart to indicate lithium booklet has been supplied.

14.23 Pharmacy team to counsel patients on lithium therapy and record consultation in patient's notes; highlighting the key points discussed during consultation (see appendix 1)

14.24 Pharmacy team to ensure lithium booklet is updated with relevant results prior to discharge.

Nursing Staff Responsibilities

14.25 Nursing team to note down any safety concerns (e.g. poor fluid intake, outstanding monitoring) about patients on lithium in their ward management plan (e.g. Meridian) and highlight to the medical team.

14.26 Encourage patients on lithium therapy to maintain adequate fluid intake (at least 8 glasses of water per day)

14.27 Be aware of the common signs and symptoms of lithium toxicity and side effects (see **section 9 and 10**)

14.28 The information that a patient is on lithium should be added to their MEWS chart so that health care assistants can look out for signs of toxicity during observation.

14.29 Do not interchange brands of lithium; ensure the brand prescribed is administered.

14.30 If there is a suspicion of lithium toxicity, the nursing staff should contact the doctor on duty immediately.

14.31 When patients are transferred to a different ward/unit/hospital, information that they are on lithium and its monitoring requirements, along with the patient's lithium booklet should be handed over.

14.32 At discharge, contact should be made with the relevant Community Mental Health Team (CMHT) lithium lead to advise of discharge.

14.33 Nursing team to ensure patients are given their lithium booklets on discharge.

15 MANAGEMENT OF PATIENTS ON LITHIUM IN OUTPATIENT SETTINGS

15.1 All CMHTs should have an appointed lithium lead

15.2 It is the responsibility of the service manager for each CMHT to ensure the lithium lead has been adequately trained.

Responsibilities of Lithium Leads

15.3 CMHT lithium leads will proactively identify patients under the care of their respective CMHT prescribed lithium.

15.4 The lead will develop and maintain a register of all patients prescribed lithium under their CMHT

15.5 Keep a record of all the mandatory tests including serum lithium levels carried out for patients on lithium and ensure this is recorded in the appropriate section on RiO.

15.6 Liaise with responsible clinician/prescriber to coordinate the blood test and physical health monitoring with every CPA review meeting if the client is on CPA care pathway.

15.7 Highlight all abnormal results (e.g. renal function, U&Es, TFT and serum levels) to patient's consultant or prescriber.

15.8 Liaise with local laboratory to establish a clear line of communication in case of abnormal results relating to lithium therapy.

15.9 Obtain access to the pathology system of their local acute trust.

Responsibilities of Consultant

15.10 Refer to section 6 for patients being initiated on lithium therapy

15.11 Refer to section 7 for ongoing therapy

15.12 Ensure all patients prescribed lithium have a six-monthly review with a CMHT prescriber.

15.13 Communicate all dose changes to lithium lead and patient's GP and document in patient's notes

Responsibilities of Care Coordinator

15.14 Advise the lithium lead of patients under their care that is prescribed lithium.

15.15 Be aware of the common signs and symptoms of lithium toxicity and side effects (**see section 9 and 10**)

15.16 Monitor patient for adherence to lithium therapy.

15.17 Highlight any concerns about lithium therapy to prescriber or consultant

16 TRANSFER OF CARE

16.1 There should be handover of patient's lithium related details when a patient is being transferred from one care setting to another.

16.2 Prior to transfer, the receiving team should check if the required brand of lithium is in stock. If not, arrangements should be made to obtain this promptly.

16.3 When a patient is admitted to a non-psychiatric in-patient facility, the respective liaison psychiatry where available or medical team should be informed of the patient's admission and relevant information about their lithium treatment is handed over.

17 DISCHARGING PATIENTS ON LITHIUM TO PRIMARY CARE

17.1 Establish a care arrangement with the patient's GP for prescribing lithium and monitoring adverse effects where possible.

17.2 For all patients prescribed lithium who are discharged to primary care, the following information must be communicated to their GP:

17.2.1 Tests and monitoring required, together with care pathway document, care plan and risk assessment

17.2.2 Information on patient lithium record booklet

17.3 Agree the conditions under which the patient should be referred back to secondary care, examples include:

17.3.1 there is a poor or partial response to treatment

17.3.2 the person's functioning declines significantly

17.3.3 treatment adherence is poor

17.3.4 the person develops intolerable or medically important side effects from medication

17.3.5 comorbid alcohol or drug misuse is suspected

17.3.6 the person is considering stopping any medication after a period of relatively stable mood

17.3.7 a woman with bipolar disorder is pregnant or planning a pregnancy.

17.4 When discharging a patient to primary care, agree a care plan with the patient, which includes:

17.4.1 clear, individualised social and emotional recovery goals

17.4.2 a crisis plan indicating early warning symptoms and triggers of both mania and depression relapse and preferred response during relapse, including liaison and referral pathways

17.4.3 an assessment of the person's mental state

17.4.4 a medication plan with a date for review by primary care, frequency and nature of monitoring for effectiveness and adverse effects, and what should happen in the event of a relapse. Give the person and their GP a copy of the plan, and encourage the person to share it with their carers

17.4.5 encourage and support the person to visit their GP and discuss the care plan before discharge and transfer.

18 PATIENT INFORMATION

18.1 The Choice and Medication patient information leaflet should be provided to all patients on lithium. Staff will ensure that patient information in relation to this policy

is readily available in accessible formats. This should also be given to relatives, carers and advocates where applicable.

19 GUIDANCE FOR PATIENTS TAKING LITHIUM IN THE ACUTE TRUST

19.1 All patients prescribed lithium in the Acute Trust should remain open to the liaison psychiatry team for ongoing monitoring. Guidance has been produced for ward staff and pharmacy staff in the acute Trust on how to manage patients safely admitted on clozapine. **(See appendix 7)**

20 IMPLEMENTATION INCLUDING TRAINING AND AWARENESS

20.1 Managers will ensure that all relevant staff receive the appropriate training and are aware of the policy and procedure to be followed.

20.2 All issues relation to the safety of a patient on lithium should be reported using the Trust incident reporting policy.

21 STAKEHOLDER, CARER AND USER INVOLVEMENT

21.1 Members of Drugs and Therapeutics Group - development, consultation and approval

21.2 Members of Trust Wide Patient Safety Group – consultation and ratification

21.3 Implementation by Global e mail/Team Brief/Medication Matters Newsletter

21.4 Changes to be notified by Policy manager via team brief, Intranet, “Medication Matters” Newsletter

22 EQUALITY IMPACT ASSESSMENT SUMMARY

22.1 The Equality Act 2010 places a statutory duty on public bodies to have due regard in the exercise of their functions. The duty also requires public bodies to consider how the decisions they make, and the services they deliver, affect people who share equality protected characteristics and those who do not. In KMPT the culture of Equality Impact Assessment will be pursued in order to provide assurance that the Trust has carefully considered any potential negative outcomes that can occur before implementation. The Trust will monitor the implementation of the various functions/policies and refresh them in a timely manner in order to incorporate any positive changes.

23 HUMAN RIGHTS

23.1 The Human Rights Act 1998 sets out fundamental provisions with respect to the protection of 24.1individual human rights. These include maintaining dignity, ensuring confidentiality and protecting individuals from abuse of various kinds. Employees and volunteers of the Trust must ensure that the trust does not breach the human rights of any individual the trust comes into contact with.

24 MONITORING COMPLIANCE WITH AND EFFECTIVENESS OF THIS DOCUMENT

24.1 An audit will be undertaken a year following implementation and as needed, using the Trust Standards and a report submitted Clinical Effectiveness and Outgroup and Patient Safety Group.

What will be monitored	***How will it be monitored***	***Who will monitor***	***Frequency***	***Evidence to demonstrate monitoring***	***Action to be taken in event of non-compliance***
Appropriate Prescribing of Lithium Therapy	Screening of prescription	Pharmacy Team	Ongoing	Screened drug charts	Provide training if required
Compliance with lithium monitoring requirements e.g. serum, eGFR	Audit of patients' record	Lithium Lead/ consultant/ pharmacy / team manager	As dictated by POMH-UK	Completed audits Audit Report	Provide training if required

25 EXCEPTIONS

25.1 There are no exceptions

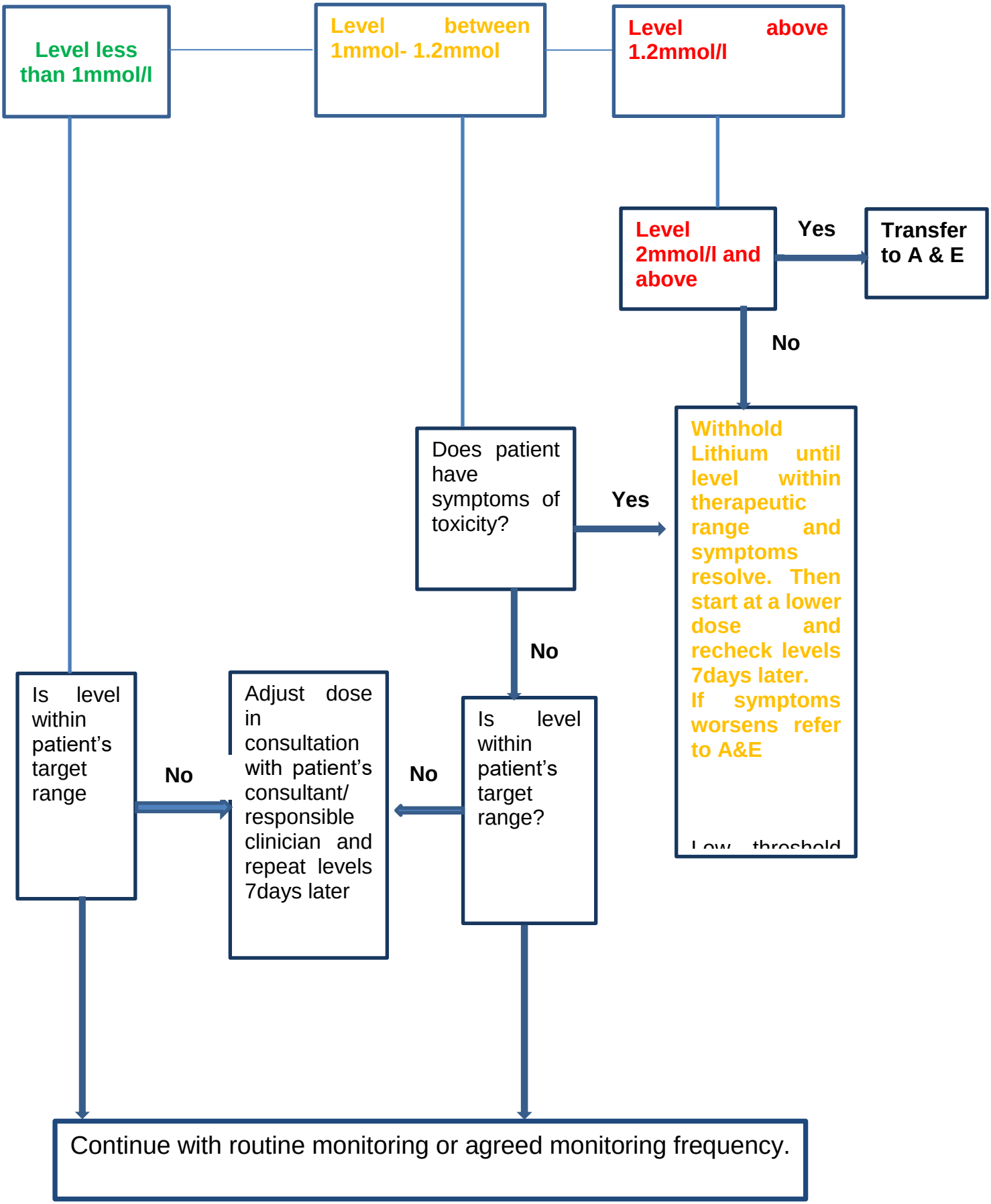
APPENDIX 1: LITHIUM COUNSELLING CHECKLIST

Counselling points	✓ **Tick ( )**
Indication and potential benefits	
Plasma level monitoring and other monitoring requirements	
Side effects and symptoms of toxicity	
Lithium in pregnancy ➢ Importance of contraception ➢ Cardiac defects e.g. Ebstein's anomaly ➢ Inform their doctor if pregnant or are planning a pregnancy.	
Importance of Adherence	
Report any changes in disease symptoms	
Conditions which could affect their lithium levels e.g. dehydration	
Seek medical attention if diarrhoea, vomiting or become acutely ill for any reason e.g. UTI	
Drug – Drug interaction ➢ Avoid OTC NSAIDs e.g. Ibuprofen ➢ Inform their pharmacist when started on new medication or buying OTC	
The importance of taking the lithium booklet to all appointments and the pharmacy when prescriptions are dispensed	
Importance of always taking the same brand to the patient and taking medication the same time of the day	
Lifestyle advice: ➢ maintain adequate fluid intake (at least 8 glasses of water), particularly after sweating, in hot climates or if they have a fever. **(Please see appendix 8 hot weather advice for patients on lithium)** ➢ Avoid drastic change in salt intake	

APPENDIX 2: INTERPRETING LITHIUM SERUM LEVELS

Lithium Serum levels	Interpretation	Comments/ Action required
Less than 0.4mmol/l	**Sub-therapeutic level**	Note elderly patient may respond to these levels
0.4 -0.8mmol/l	Therapeutic range	Adequate for most patients
0.8-1.0mmol/l	Therapeutic range for acute episodes of mania, and for patients who have previously relapsed or have sub-syndromal symptoms.	Consider more frequent serum lithium monitoring
1.0-1.5mmolmol	**High risk of lithium toxicity symptoms**	If no symptoms of lithium toxicity consider other explanations for the high level e.g. dehydration, timing of level i.e. not 12hrs post dose, interacting medicines. correct where possible and recheck level within 24hrs. **If symptoms present withhold lithium.**
Above 1.5 mmol/l	**Toxic level**	Consider other explanations for the high level e.g. dehydration, timing of level i.e. not 12hrs post dose, interacting medicines, correct where possible. **Withhold lithium immediately, repeat levels within 24hrs.** If level still raised, do not restart Lithium until level sufficiently below 1mmol/l and start at a lower dose
2mmol/l and above	**Severe toxicity**	Urgent medical care needed, refer to A and E **STOP LITHIUM**

APPENDIX 3: LITHIUM LEVEL FLOWCHART



APPENDIX 4: LITHIUM SIDE EFFECTS RATING SCALE (LISERS)

Patient name: D.O.B:
Staff Name: Date of Assessment:

		No		Yes		
				Mild	Moderate	Severe
1	Increased appetite	☐		☐	☐	☐
2	Increased thirst	☐		☐	☐	☐
3	Increased output of urine	☐		☐	☐	☐
4	Weight gain	☐		☐	☐	☐
5	Thyroid problems (check fatigue, dry skin, constipation)	☐		☐	☐	☐
6	Metallic Taste	☐		☐	☐	☐
7	Feeling restless	☐		☐	☐	☐
8	Dry Mouth	☐		☐	☐	☐
9	Nausea and feeling sick	☐		☐	☐	☐
10	Dizziness	☐		☐	☐	☐
11	Mild tremor (fine tremor)	☐		☐	☐	☐
12	Muscle pains and tension	☐		☐	☐	☐
13	Difficulties in memory	☐		☐	☐	☐
14	Difficulties with concentration	☐		☐	☐	☐
15	Feeling slowed down in my thinking and creativity	☐		☐	☐	☐
16	Sleep problems	☐		☐	☐	☐
17	Ankle oedema	☐		☐	☐	☐
18	Headaches	☐		☐	☐	☐
19	Excessive sweating	☐		☐	☐	☐
20	Psoriasis	☐		☐	☐	☐
21*	Blurred vision	☐		☐	☐	☐
22*	Palpitations or feeling my heart pounding	☐		☐	☐	☐
23*	Feeling drowsy and lethargic during the day	☐		☐	☐	☐
24*	Diarrhoea / vomiting	☐		☐	☐	☐
25*	Severe tremor (coarse tremor)	☐		☐	☐	☐
26*	Confusion	☐		☐	☐	☐
27*	Muscle weakness/ twitching	☐		☐	☐	☐
28*	Lack of Coordination/ unsteady on feet	☐		☐	☐	☐
29*	Slurred speech	☐		☐	☐	☐
30	Other _____	☐		☐	☐	☐
*indicates possibility of a toxic lithium level, an urgent plasma lithium level should be carried out if any of these symptoms reported						

APPENDIX 5: LITHIUM MONITORING REQUIREMENTS

Test	Clinical reason	Frequency of test	Normal range	What to check for	What to do
Lithium serum level	Serum levels are an indication of clinical efficacy or potential toxicity. Levels should be within target range, not sub therapeutic or toxic. Toxicity has been seen at levels ≥1.2 mmol/L, but it is very dependent on renal function. In elderly renally compromised patients, levels <1 mmol/L have been toxic.	Once blood levels are stable, 'normally' every 3 months. Monitoring should be increased with potential drug – drug interactions, such as the introduction of thiazide diuretics. A change in formulation should be treated as initiation of therapy for monitoring i.e. weekly until stable.	Determined by prescriber and documented in the patient's lithium therapy record book. Potential range between 0.4mmol/L – 1mmol/L. NICE suggests 0.6-0.8 mmol/L as the optimum range. Higher levels are required for patients with acute exacerbations of mania.	Levels below or above the patient's target blood level range. Also, the trend in blood levels. Progressively increasing lithium levels are a consequence of deteriorating renal function. Be more vigilant with elderly patients, or patients experiencing side effects which could be signs of toxicity.	Reassure the patient if tests are unremarkable. Inform consultant/prescriber if out of range Document your actions in the patient's notes Patients with levels above 2mmol/L should be referred to Accident and Emergency.
Thyroid function tests (TFTs)	Lithium is associated with long-term risk of hypothyroidism.	Every 6 months.	Reference range varies between laboratories. Approximate normal reference ranges are: Thyroid-stimulating hormone (TSH) 0.5 – 5.5mU/L Free thyroxine (FT4) 9-19pmol/l FreeT4 is depressed with hypothyroidism. Patients with a sustained increase in TSH of greater than twice the upper limit of 'normal' (~10 mU/L) which is confirmed by repeat testing after 2 weeks should be treated with levothyroxine.	TSH values which are increasing and/or free T4 values that are decreasing.	Reassure the patient if tests are unremarkable. Inform consultant/prescriber if out of range Document your actions in the patient's notes

Test	Clinical reason	Frequency of test	Normal range	What to check for	What to do
			A patient with a TSH which is around double the normal upper limit (~10 mU/L) or between the upper normal limit and double the normal upper limit (~5.0mU/L - ~10mU/L) may require additional monitoring and possible treatment with levothyroxine. Consult with endocrinology if in doubt.		
Estimated glomerular filtration rate (eGFR)	Measures the level of kidney function. Lithium associated with long-term risk of chronic renal impairment.	Every 6 months	Assays vary between laboratories. Values below 60 ml/min/1.73 m^2 are noteworthy, >90 ml/min/1.73 m^2 is considered normal. Renal function deteriorates with age.	An eGFR which is decreasing and/or results imply dosing adjustments should be considered.	Reassure the patient if tests are unremarkable. Inform consultant/prescriber or refer if you have concerns that renal function is deteriorating and no dose adjustments appear to have been made. Document your actions in the patient's note
Urea and Electrolytes including corrected calcium	long-term lithium treatment is associated with persistent hyperparathyroidism and hypercalcaemia. Lithium elimination is linked to sodium levels. There is increased risk of lithium toxicity with low sodium levels.	Every 6months	Refer to local lab reference range	decreasing sodium levels (i.e. below 130mmol/l). Low sodium levels may lead to lithium toxicity. Raised calcium levels may be an indication of hyperparathyroidism. Low potassium levels, as this may cause ECG changes.	Reassure the patient if tests are unremarkable. Inform consultant/prescriber if out of range Document your actions in the patient's notes

Adapted from the NPA SOP for lithium

APPENDIX 6: MANAGING LITHIUM DRUG INTERACTIONS OR DRUG-DISEASE INTERACTION

Drug	**Interaction effects**	**Risk Reduction measures**
ACE inhibitors e.g., enalapril, lisinopril Angiotensin II antagonists e.g., losartan, candesartan, valsartan	• Lithium toxicity due to sodium depletion. • Concurrent use with caution and close monitoring. • With Angiotensin II antagonists case reports of increase in lithium serum level.	• Lithium • level can increase over several weeks. • Monitor closely for signs of lithium toxicity and consider taking lithium serum level more regularly i.e. 1 monthly rather then 3 monthly • May need to reduce lithium dose. • With Angiotensin II antagonists increase monitoring especially during the first couple of months.
Analgesics (NSAIDs) e.g., ibuprofen, diclofenac	• Excretion of lithium reduced.	• Avoid concomitant use. • Note: low dose aspirin 75mg does not affect lithium serum levels significantly.
Anti-arrhythmics e.g., amiodarone	• Increased risk of QT prolongation.	• Avoid concomitant use. • Manufacturer contraindicates combined use.
Domperidone	• Lithium is associated with QT prolongation or torsade de pointes. • Dangerous QT prolongation may occur if it is given with domperidone.	• Contraindicated. Consider an alternative antiemetic.
Hydroxyzine/ mizolastine	• Antihistamines such as hydroxyzine and mizolastine, and lithium are associated with a small increased risk of QT prolongation. • Concurrent use may increase the risk.	• Consider an alternative antihistamine.
Methyldopa	• Neurotoxicity may occur without increasing lithium serum concentration.	• Avoid concomitant use if possible.
Thiazide Diuretics e.g., bendroflumethiazide	• Increase lithium serum levels, therefore increased risk of lithium toxicity. • This is a well-established and potentially serious interaction.	• Avoid if possible. Other diuretics may be safer such as loop diuretics. • Consider a lithium dose reduction and monitor lithium serum levels more regularly.
Alcohol	• Increased tremor/shakiness with chronic alcohol use.	• Alcohol should be avoided in the first month or two after starting lithium. After this alcohol can be drunk in moderation e.g. 1 to 2 units three time a week but ideally advise patient to reduce intake of alcohol as much as possible. This is because lithium and alcohol combination may increase risk of drowsiness.
Antibiotics e.g., metronidazole, tetracycline,	• Reduced lithium excretion leading to increased lithium serum levels.	• Ensure service user is aware of the symptoms of lithium toxicity and report them immediately if they occur.
Anticonvulsants e.g., valproate, carbamazepine, phenytoin	• Increased neurotoxicity of both drugs at therapeutic doses. • Valproate may aggravate tremor.	• If neurotoxicity develops, stop lithium.
Antidepressants e.g., mirtazapine, SSRIs, TCAs and venlafaxine	• Synergistic antidepressant effect in treatment resistant service users may increase lithium tremor.	• Monitor carefully for signs of neurotoxicity.

	• Increase lithium serum level, possible neurotoxicity and serotonergic effects.	
Antipsychotics	• Increased neurotoxicity possible at therapeutic doses in rare cases. • Increased risk of QT prolongation.	• Monitor for risk of QT prolongation. • Monitor for signs of neurotoxicity.
Calcium channel blockers e.g., diltiazem, verapamil	• Increased risk of neurotoxicity with symptoms such as ataxia, confusion and somnolence.	• Monitor for signs of neurotoxicity.
Sodium bicarbonate containing antacids e.g., Gaviscon®	• Excretion of lithium increased by sodium bicarbonate therefore, reduced lithium serum levels.	• Change to an alternative antacid with lower sodium content.
Sodium-glucose co-transporter 2 (SGLT2) inhibitors (e.g. dapagliflozin, empagliflozin)	• These drugs may increase renal lithium excretion and the blood lithium levels may be decreased.	• Serum concentration of lithium should be monitored more frequently after dapagliflozin and empagliflozin initiation and dose changes.
Theophylline/ aminophylline	• Increased excretion of lithium. Reduced lithium serum level. Depressive and/ or manic relapse may occur if the lithium dose is not adjusted.	• Monitor lithium serum levels if theophylline is stopped, started or altered.

Drug-Disease Interaction

- If renal impairment exists, avoid use of lithium (if possible) or reduce dose and closely monitor serum-lithium concentration.
- Cardiac disease and conditions with sodium imbalance (e.g., Addison's disease) will require dose reduction or discontinuation. Similarly, in severe diarrhoea and/or vomiting and in concurrent infection (especially if sweating profusely).
- Psoriasis: risk of exacerbation.
- Addison's disease or other conditions with a sodium imbalance and in severely debilitated or dehydrated service users and in severely debilitated or dehydrated service users.
- Avoid in untreated hypothyroidism.
- Use with caution in service users with myasthenia gravis because exacerbation of this disorder has been reported.
- Previous Neuroleptic Malignant Syndrome (NMS) with lithium as reintroduction has led to recurrences of NMS.

APPENDIX 7: AID FOR THE MANAGEMENT OF PATIENTS ON LITHIUM THERAPY IN ACUTE HOSPITALS

Introduction

Lithium salts are licensed for the management of bipolar disorder, manic or hypomanic episodes, and depressive disorders (where treatment with other antidepressants has been unsuccessful), in the prophylaxis against bipolar affective disorders and for control of aggressive behaviour or intentional self-harm.

Lithium salts have a narrow therapeutic –toxic ratio and therefore dosing is governed by Lithium plasma levels and clinical response.

During Admission

- **The local Liaison psychiatry team should be informed of patients admitted on Lithium therapy**
- Plasma levels should be taken for all patients on Lithium therapy on admission. The sample should be taken 12 hours post dose.
- Check history of compliance with Lithium.
- Confirm Lithium dose, brand and formulation with patient.
- Check if the patient has a lithium booklet, review and amend it as necessary and return it to the patient.
    - If the patient does not have a booklet, one should be issued to them
- Check for drug interactions.
- When patients are transferred to different ward/hospital information that they are on Lithium and its monitoring requirement should be handed over.

Plasma Lithium Levels Monitoring

- Lithium levels should be taken 5-7 days after initiation or dose change, repeating every week until the level is stable, then every 3 months. The sample should be taken 12 hours post dose.
- More frequent tests should be taken if there is evidence of clinical deterioration, abnormal results, a change in sodium intake, or symptoms suggesting abnormal renal or thyroid function such as unexplained fatigue, if the patient is starting medication such as ACE inhibitors, NSAIDs, or Diuretics.
- The Lithium therapeutic range is between 0.4-1.0mmol/L. The lower end of this range is used for elderly and maintenance therapy.
- Toxicity usually occurs at levels ≥1.5mmol/l and can be life threatening, symptoms include:
    - Coarse tremor
    - Blurred vision
    - Muscle weakness
    - Ataxia
    - Slurred speech
    - Vomiting and diarrhoea
    - Severe polyuria
    - Confusion
    - Seizures
    - Renal damage may also occur

- If Lithium level is >1.0mmol/L and patient is showing signs of lithium toxicity – **STOP lithium immediately** and repeat serum lithium, U&Es and creatinine levels and seek advice from the local liaison psychiatry team immediately.
- If lithium level is > 1.0mmol/L and < 1.5mmol/L but no signs of lithium toxicity consider other explanations for the high level e.g. dehydration, timing of level i.e. not 12hrs post dose, interacting medicines, correct where possible and recheck level.
- Levels above 2.0mmol/l represent a clinical emergency, lithium should be stopped immediately
- Certain factors are associated with increase in the risk of Lithium toxicity; these include renal failure, reduced sodium intake, increased sodium loss (e.g. diarrhea and vomiting), dehydration, and UTI.
    - Fluid intake chart should be considered, where poor fluid intake is suspected.
- Certain drugs may increase the risk of Lithium toxicity; these include ACEIs, ARBs, diuretics, NSAIDs, Metronidazole, Steroids and Tetracycline.

Monitoring requirements for Lithium Therapy

- U&Es including corrected calcium, eGFR and TFT every 6 months.
- Weight or BMI or waist circumference every 6 months.
- FBC annually.
- Fasting blood glucose, glycosylated haemoglobin (HbA1c) and blood lipid profile annually.
- ECG to be done for people with cardiovascular disease or risk factors for it.

Patient Counselling Points

- Seek medical attention if they develop diarrhoea or vomiting or become acutely ill for any reason.
- Ensure they maintain their fluid intake, particularly after sweating (for example, after exercise, in hot climates or if they have a fever), if they are immobile for long periods or if they develop a chest infection or pneumonia.
- Talk to their doctor as soon as possible if they become pregnant or are planning a pregnancy.
- Avoid taking over-the-counter non-steroidal anti-inflammatory drugs e.g. Ibuprofen.
- Inform their pharmacist when started on new medication.
- Need for regular blood tests.
- Seek the advice of a healthcare professional if they experience Lithium side effects
- Avoid drastic change in salt intake.

Notes

Brands of lithium are not bioequivalent, and therefore brand must always be specified. The most common brand is Priadel. Other brands include Camcolit, Liskonium

Priadel is available as tablets Lithium carbonate and liquid, great care must be exercised when switching a patient between tablets and liquid. Priadel (Lithium Carbonate) 200mg tablets is equivalent to Priadel (lithium citrate) 520mg/5ml liquid.

APPENDIX 8: Hot weather advice for patients on lithium

Hot weather advice for patients on lithium

In prolonged and very high temperatures, it is doubly important that if you are taking lithium medication you **make sure you drink a lot of fluid**. The reasons for this are: becoming dehydrated or very thirsty may lead to excessively high lithium levels in your blood, which can be dangerous.

Having too much lithium in your blood is called **lithium toxicity** (or lithium poisoning). This can make you very ill. If you experience any of the problems listed below, stop taking your lithium and contact your doctor or another healthcare professional straight away. If this is not possible ring the NHS helpline for advice.

- Severe hand shake (tremor)
- Blurred vision
- Stomach ache along with feeling sick and having diarrhoea
- Being unsteady on your feet
- Difficulty in speaking or slurring of words
- Muscle twitches
- Clumsiness
- Feeling unusually sleepy
- Confusion
- Muscle weakness

Therefore, never ignore a feeling of thirst and drink plenty of fluids, especially if:

- You are sweating a lot for any reason
- The weather is hot
- You are travelling in a hot country
- You are exercising
- You have a high temperature
- You have diarrhoea.

We recommend that you drink at least 8 glasses of water per day.

If you have sickness and/or diarrhoea for more than a day or two, see your doctor to have your lithium level checked.