NHS
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NHS Foundation Trust

HPFT

Safe Use of Lithium Guidelines

HPFT Guidelines

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Document on a Page

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3.0	29/01/2024	29/01/2027	Shoaib Rashid, Principal Clinical Pharmacist
Staff need to know about this policy because (complete in 50 words)	In 2009, NHS Improvement (formerly known as the National Patient Safety Agency, NPSA) published 'Safer Lithium Therapy'. Service users prescribed lithium must be monitored in both primary and secondary care, with results shared between sectors and with the service user. Lithium requires therapeutic drug monitoring (TDM) and is noted as a high risk medication in the Trust. This guideline aims to ensure the safe use of lithium and to ensure all clinical staff are aware of their responsibilities when handling lithium.		
Staff are encouraged to read the whole policy but I (the Author) have chosen three key messages from the document to share:	1. All staff that handles lithium are responsible for ensuring that lithium is prescribed and monitored according to this guideline. 2. All staff must ensure that information is provided to the service user, including using the Lithium Therapy booklet or MindMeds app (downloaded onto smartphones). 3. Action must be taken if the lithium plasma level is not within the reference range ensuring that previous levels are checked for trends especially an upward trend.		
Summary of significant changes from previous version are:	• Format change • Update on relevant resources • How to utilise MindMeds App & how to obtain Lithium Therapy booklet • Documenting when providing a Lithium Therapy booklet and counselling including signs and symptoms of lithium toxicity. • Update of Appendix 8: Lithium poster		

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PART 1 – Preliminary Issues:

1. Introduction

These guidelines are to ensure the safe use of lithium in adults in Hertfordshire Partnership University NHS Foundation Trust (HPFT) services.

In 2009, NHS Improvement (formerly known as the National Patient Safety Agency (NPSA))[1] published 'Safer Lithium Therapy'. This stated that service users prescribed lithium must be monitored in primary and secondary care, with results shared between sectors and the service user.[1] All healthcare organisations in the NHS where lithium therapy is initiated, prescribed, dispensed and monitored should ensure that:

- Service users prescribed lithium are monitored in accordance with NICE guidance.[2]
- There are reliable systems in place to ensure blood test results are communicated between labs and prescribers.
- At the start of lithium therapy and throughout their treatment, service users receive appropriate ongoing verbal and written information and a record to track lithium plasma levels and relevant clinical tests.
- 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.
- Systems are in place to identify and deal with medicines that might adversely interact with lithium therapy.

Service users should be informed of common adverse effects, drug interactions and symptoms of lithium toxicity. There are many clinically significant interactions with over-the-counter (OTC) medicines, alternative and prescription medicines. Maintaining an adequate fluid and salt intake is important as this can affect lithium plasma levels. Lithium has the potential to interfere with kidney and thyroid function.

At the start of treatment, patients should be given suitable information on lithium and means to keep a record of their plasma lithium levels, via lithium treatment booklet or provide instructions for the Service User to download the recommended medication management app, e.g. MindMeds app..

Lithium treatment booklets can be ordered by emailing: hpft.medsmanagement@nhs.net.

For any additional lithium treatment booklets required in primary care for our service users, the request can be fulfilled via the same email as mentioned earlier.

There is also an app called MindMeds app which can be downloaded onto smartphones. With the app, users can:

- Record lithium treatment and levels
- Set health check reminders
- Record and email health check results
- Record medications
- Record mood and sleep
- Record blood tests
- Store emergency contacts and information
- Access a learning section with FAQs and Dos and Don'ts
- Password protect the app and their information

Download the Apple iPhone version of the Lithium App here:
MindMeds on the App Store (apple.com)

Download the Android version of the Lithium App here:
MindMeds - Apps on Google Play

The App can be used instead of the Lithium treatment booklet.

Indications[3, 4]
The licensed indications for lithium are:

- Treatment and prophylaxis of mania (acute manic and hypomanic episodes).
- Treatment and prophylaxis of bipolar disorder.
- Treatment and prophylaxis of recurrent depression where treatment with other antidepressants has been unsuccessful.
- Treatment and prophylaxis of aggressive or intentional self-harming behaviour.

2. Objectives
To provide guidance on the safe use of lithium within Hertfordshire Partnership University NHS Foundation Trust (HPFT).

Please consult relevant national and/or local guidelines or contact Pharmacy for specific advice.

This document does not aim to provide full prescribing guidelines and other relevant sources of information, and HPFT policies should be consulted for guidance on the safe and effective use of lithium.

3. Scope
All staff involved in prescribing, reviewing, supplying and administering lithium therapy.

4. Definitions
- BNF- British National Formulary is designed as a rapid reference. This should be interpreted in the light of professional knowledge and supplemented as necessary by specialised publications and by reference to product literature.
- SPC- Summary of Product Characteristics. This is the basis of information for healthcare professionals on how to use the medicinal product safely and effectively. The SPC forms an intrinsic and integral part of marketing authorisation.
- EPR- Electronic Patient Record- the electronic record of notes for service users.
- OTC- Over The Counter medicines. These are medications that can be sold in community pharmacies.

5. Duties and Responsibilities
Drug and Therapeutics Committee
- Approve and ratify this guideline

Medical Staff
- To ensure pre-initiation counselling of lithium is undertaken.
- To ensure pre-initiation and ongoing monitoring are carried out in line with this guideline.
- To ensure trends in lithium plasma levels are reviewed and appropriate action taken in line with this guideline.

Matrons, Community Clinical Nurse Leads (CCNL) and team leaders
- To ensure this guideline is disseminated and understood by all staff within their sphere of responsibility.

Unregistered nursing staff and Allied Health Professionals
- To ensure awareness of this guideline.

Registered nurses, Nursing Associates and non-nursing staff involved in medicines administration
- To monitor adherence with lithium therapy and inform the prescriber of any concerns.
- Monitor and immediately report any signs of lithium toxicity.

Pharmacists
- To discuss and advise on abnormal lithium plasma levels.
- To provide consultations with service users on lithium therapy when required.

- Inpatient pharmacists to ensure clear documentation on the drug chart of lithium levels and date taken.

Part 2 – What needs to be done and who by

6. Responsibilities

6.1 Pre-initiation considerations of lithium in community and inpatient settings

The service user and other healthcare staff involved in the service user's care must be involved in the decision to start lithium. Consideration must be given to the following:

- Clinical presentation.
- Other co-morbidities, including alcohol and illicit substances.
- Maintaining an adequate food and fluid intake.
- Lithium can cause nephrotoxicity, which can lead to a reduction in eGFR and therefore raise lithium plasma levels.
- Lithium plasma levels >0.8mmol/L are associated with a higher risk of adverse effects and lithium toxicity, particularly in those over 65 years.
- Service user preference.
- Potential adverse effects and impact on service users.
- Concurrent medicines and potential interactions (including OTC medicines and alternative medicines).
- Service user understanding and acceptance of the need for regular blood tests.
- Concordance/ adherence with oral medicines, as lithium is only available in oral formulations.
- Recognition of signs and symptoms of lithium toxicity and actions that need to be taken.
- Discuss contraception with female service users of childbearing age (for women under the age of 55 years).

Baseline monitoring must be completed before starting lithium (see Appendix 1 and Physical Health Policy). Any discussions with the service user (and/ or carer) must be documented on the Electronic Patient Record (EPR), including written and verbal information provided about lithium (see Appendix 2 and 3).

6.2 Initiation and re-titration of lithium in community and inpatient settings*

* Follow initiation guidance for service users who have missed lithium doses for 7 days or more.

Individual/ staff groups	Responsibilities
All clinical staff groups	• Should familiarise themselves with this guideline. • Should familiarise themselves with the Lithium Therapy booklet and lithium app. • Should familiarise themselves with the signs of lithium toxicity and actions to be taken. Inform the service user of the signs and symptoms of lithium toxicity. • When starting lithium, the high-risk alert section on the service user's EPR will need to be updated. • Ensure that there is documentation in the service user's EPR to support providing a Lithium Therapy booklet. • All documentation (including letters and EPR notes) should include the brand name and form of lithium being used. • Inform the service user there is an app that can be downloaded onto smartphones that provides information about lithium and also where lithium plasma levels, kidney checks (eGFR), thyroid function and U&Es can be recorded. • Be aware and inform the service user of the indication, side effect profile, monitoring and common drug interactions. • Discuss with the service user, changes in alcohol intake or if they use any illicit substances.

<table>
<tr><td></td><td>

Ensure the service user maintains an adequate (but not excessive) food and fluid intake (especially fluids in hot weather).
Be aware of the teratogenic effects of lithium for women under the age of 55 years. Reinforce female service users (of childbearing potential) to use suitable contraception throughout lithium therapy. It is important to seek specialist advice if the service user is planning a pregnancy, becomes pregnant or is breastfeeding.

</td></tr>
<tr><td>Prescriber</td><td>

Consult with the service user providing both written and verbal information. This may be delegated to another healthcare professional, such as a pharmacist or appropriately trained nurse. Clearly document the content of the discussion and information provided in the service user's EPR. See Appendix 2 and 3 for information to be discussed with the service user. Clear instructions regarding the symptoms of impending toxicity should be given to the service user and/or carer, and they should be warned of the urgency of immediate action should these symptoms appear. This needs to be clearly documented in the service user's EPR. At the first sign of toxicity, follow the advice in Appendix 4.
Check baseline tests/ investigations (see Appendix 1) are satisfactory and documented in the service user's EPR, and recorded in the Lithium Therapy Record book or provide instructions for the Service User to download the recommended medication management app, e.g. MindMeds app, before initiating treatment.
Inform the service user there is an app that can be downloaded onto smartphones that provides information about lithium and also where lithium plasma levels, kidney checks (eGFR), thyroid function and U&Es can be recorded.
Lithium must be initiated and prescribed by brand (due to differences in bioavailability between the products, brands cannot be readily switched).
The usual brands used across the Trust are:

Table 1
<table>
<tr><th>Site</th><th>Usual brands used</th></tr>
<tr><td>Hertfordshire</td><td>Priadel® tablets
Priadel® liquid
Li-Liquid®
Lithium Carbonate Essential Pharma: 250mg film-coated tablets (immediate release)</td></tr>
<tr><td>Buckinghamshire</td><td>Camcolit® tablets
Priadel® tablets
Priadel® liquid
Li-Liquid®
Lithium Carbonate Essential Pharma: 250mg film-coated tablets (immediate release)</td></tr>
<tr><td>Norfolk</td><td>Priadel® tablets
Camcolit® tablets
Liskonum® tablets
Priadel® liquid
Li-Liquid®
Lithium Carbonate Essential Pharma: 250mg film-coated tablets (immediate release)</td></tr>
<tr><td>Essex</td><td>Priadel® tablets
Camcolit® tablets
Liskonum® tablets
Priadel® liquid</td></tr>
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	<table><tr><td></td><td>Li-Liquid® Lithium Carbonate Essential Pharma: 250mg film-coated tablets (immediate release)</td></tr></table> • Dosage must be individualised depending on lithium plasma levels and clinical response. The dosage necessary to maintain lithium plasma levels within the therapeutic range varies between individuals. The prescriber will be responsible for stabilising the service user and advising on the target range. • An effect may be seen within 5 – 7 days of initiating lithium in manic service users, but may take longer in the depressed bipolar service user. • Lithium has a narrow therapeutic range, and therefore regular blood tests are needed. Check the lithium plasma level 4 – 7 days after initiation, dose change, change in brand/formulation or prescribing/ deprescribing of an interacting medication (see Appendix 6). Levels must be checked weekly until stabilised. • Document the lithium plasma level result in the service user's EPR, in the Lithium Therapy Record book or provide instructions for the Service User to download the recommended medication management app, e.g. MindMeds app. The brand must be stated in both the Lithium Therapy Record book or MindMeds app. • Review and amend the dose in view of the lithium plasma level results if clinically appropriate. Dose adjustments should be made to achieve a lithium plasma level of ***0.4 – 1.0 mmol/L.*** Levels should be aimed to be kept within these parameters to avoid harm due to lithium toxicity and can maintain the optimum therapeutic response. • Ensure that any dose change, lithium plasma level and blood test results are communicated to the service user. • Communicate to all healthcare professionals involved in the service user's care (including the GP and care coordinator, if designated) that lithium has been initiated and the lithium plasma level target range (and ensure this is entered in the Lithium Therapy Record book or MindMeds app). During initiation, any lithium plasma levels received must be entered into the Lithium Therapy Record book or MindMeds app and documented in the service user's EPR. • Prescribing of lithium for the indications above will be initiated in HPFT for a **minimum of 12 weeks** or until stable, whichever is longer. Shared care must be formally accepted by the GP, by completion and return of the form provided within the shared care protocol for lithium.
Pharmacist	• Provide advice to the medical and nursing team on changes in dose, formulation or brand, contraindications, precautions, drug interactions and monitoring requirements. • Consult with the service user, providing written and verbal information about lithium if this has not already been provided, or if further information is requested. • Ensure lithium plasma levels are checked within 4 – 7 days of initiation, after every dose change during initiation and monitored weekly until stable and within the recommended range. • Ensure baseline monitoring has been carried out and is recorded in the Lithium Therapy Record book or provide instructions for the Service User to download the recommended medication management app, e.g. MindMeds app. • Ensure the service user's Lithium treatment booklet or MindMeds app contains the most recent blood test/investigation results and the corresponding doses of lithium. If not and results are accessible, record this information in the Lithium treatment booklet or MindMeds app, and communicate the lithium plasma level with the service user if appropriate. • Supply lithium in accordance with the prescription.

	Hospital pharmacists • Screen the prescription for appropriateness, safety and legality, and endorse the chart (refer to HPFT Clinical Pharmacy Standards for pharmacists and technicians). • Endorse on the medication paper or ePMA when a Lithium treatment booklet has been supplied. • Document the date and current lithium plasma levels on the medication paper or ePMA. • Document any discussions and information provided in the service user's EPR. **Community pharmacists** • Ensure an appropriate dose is prescribed with clear instructions on use, NOT **'as directed'**. • Community pharmacists may not have access to blood test results and, therefore, must contact the prescriber to check the lithium plasma levels before dispensing the prescription. • Refer the service user back to the prescriber if there are any concerns with the lithium therapy.
*Nurse (inpatient setting and if designated care co-ordinator in the community)	• Observe the service user for adverse effects (see Appendix 4 – 7). • Monitor and immediately report any signs or symptoms of lithium toxicity, or if there are any increased risk factors for developing this. Nursing staff may perform the LiSERs rating scale to monitor side effects[7] (see Appendix 7). • Ensure the nursing plan reflects the service user is prescribed lithium.

***If the designated care coordinator in the community is not a registered nurse or there is no care coordinator in place, the prescribing clinician must ensure that a robust care plan is in place to ensure that any signs or symptoms of lithium toxicity are identified promptly and managed appropriately.**

6.3 Continuation of lithium or on discharge to the community

Individual/ staff groups	Responsibilities

All clinical staff groups	• Should familiarise themselves with this guideline and the Lithium treatment booklet or provide instructions for the Service User to download the recommended medication management app, e.g. MindMeds app.
	• Inform the service user that there is an app that can be downloaded onto smartphones that provides information about lithium and also where lithium levels, kidney checks (eGFR), thyroid function and U&Es can be recorded.
	• Provide ongoing advice/ monitoring of the general health of the service user, such as maintaining an adequate food and fluid intake.
	• Ensure that the service user has a Lithium treatment booklet or is using the MindMeds app. Lithium plasma level and other monitoring parameters are within range and are recorded appropriately (see Appendix 1). Ensure that there is documentation in the service user's EPR to support providing a Lithium treatment booklet or how to utilise the MindMeds app.
	• Ensure the high-risk alert section on the service user's EPR includes lithium.
	• All documentation (including letters and case notes) should include the brand name and form of lithium being used.
	• Should check and monitor for any signs of lithium toxicity (see Appendix 4) and actions to be taken. Inform the relevant consultant psychiatrist. Inform the service user of signs and symptoms of lithium toxicity.
	• Discuss with the service user (see Appendix 2, 3 and 7):
	  ○ potential interactions
	  ○ side effects

	○ the significance of blood test results ○ reinforce the importance of concordance/adherence and blood test results • Be aware of teratogenic effects of lithium for women under the age of 55 years. Reinforce to female service users (of child bearing potential) to use suitable contraception throughout lithium therapy. It is important to seek specialist advice if the service user is planning a pregnancy, becomes pregnant or is breastfeeding.
Prescriber	• See Table 1 for usual brands used across the Trust. • If a service user is admitted on a different brand, consider switching to the usual brands prescribed in the area. Refer to the BNF, SPC or consult with a pharmacist for clarification. • Ensure the service user fully understands their treatment and monitoring requirements and if not, provide a clear explanation. • Check if the service user has had blood tests/investigations carried out in accordance with the monitoring specified in Appendix 1, and these are available in the EPR, the Lithium treatment booklet or the MindMeds app. Communicate the results to the service user and GP. If there are no current blood tests/investigations available, repeat samples must be performed and requested urgently before prescribing or changing the dose, brand or formulation. • Check if the service user has any signs of lithium toxicity (see Appendix 4). If the service user is presenting with signs of lithium toxicity a lithium plasma level and renal function test must be performed and requested urgently. Lithium treatment should be withheld until the results are available. • Take appropriate action if blood tests are abnormal (see Appendix 5). Communicate these to all healthcare professionals involved in the service user's care including the GP and care coordinator (if designated). It is important to check the previous results for trends. • Check the previous results and consider adjusting the dose or increasing the frequency of monitoring where there is an upward trend in lithium plasma level towards toxic levels. If toxicity is suspected, a lithium plasma level must be requested urgently and stop lithium immediately. • Monitor renal function (eGFR) and note if there is a decline in renal function as this can impact on lithium plasma levels. If there is a worsening of eGFR, the decision to continue lithium depends on clinical efficacy and degree of renal impairment. Consider seeking advice from a renal specialist. • Communicate with the GP and service user regarding further supplies of lithium (and if there are any changes), when the next monitoring is due and who is responsible for the ongoing monitoring. The responsibilities should be documented on the service user's EPR (see Safe Use of Lithium in Adults, Shared Care Protocol). • Note: **HPFT specialist prescribers must initiate lithium for a minimum of 12 weeks or until stable whichever is longer.** GPs will need to formally accept shared care by completing the Shared Care Agreement Form. This form will need to be scanned onto the service user's EPR.
Pharmacist	• Ensure lithium plasma levels are available within the last 3 months (6 months if the lithium plasma levels are stable) and check who is responsible for the ongoing monitoring (see Appendix 1 for frequency of monitoring). • Consider the trend in lithium plasma level results and alert the prescriber if there is an upward trend towards the toxic range so that action can be taken before toxicity develops. Conversely, sub therapeutic lithium plasma levels should be discussed with the prescriber as this may indicate poor concordance/ adherence or a need to increase the lithium dose. • In case of abnormal renal function and thyroid function tests, liaise with the relevant prescriber to discuss the action plan.

	• Check for any interacting medicines that have been newly started or stopped, ensuring that more frequent monitoring is carried out until lithium plasma levels are stable. Discuss with the prescriber. **Hospital pharmacists** • On admission, ask service users prescribed lithium, if they have a Lithium treatment booklet (of ask if they are using the MindMeds app). Check this has been completed. If left at home, arrange for this to be brought in. If lost, a replacement should be provided. Ensure this is documented on the medication chart. • Ensure the most recent lithium plasma level is documented on the medication chart or ePMA (including the date of the sample and dose) in the additional instructions section. • Prior to discharge, ensure the Lithium treatment booklet or MindMeds app has been updated with all the relevant blood test results, including the most recent lithium plasma level. • Inform the service user to notify the community pharmacist when purchasing any over-the-counter medicines. Inform the service user to avoid purchasing Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) without medical input as these significantly interact with lithium. • Ensure the discharge notification details the most recent lithium plasma level, dose, formulation and brand, when the next blood test is due and that a Lithium treatment booklet has been provided or provide instructions for the Service User to download the recommended medication management app, e.g. MindMeds app. • The HPFT community team will hold prescribing responsibilities until the service user is **stable or after at least 12 weeks, whichever is longer** before the monitoring and prescribing can be transferred back to primary care. **Community pharmacists** • Ensure an appropriate dose is prescribed with clear instructions on use, NOT 'as directed'. • Check that the Lithium treatment booklet or MindMeds app has been updated with all the relevant blood test results, including the most recent lithium plasma level. Contact the prescriber if these are not available. • If there are any concerns, such as non-adherence or low lithium plasma levels, refer the service user back to the prescriber. • Ensure that lithium monitoring is carried out in line with Appendix 1 before issuing a repeat prescription.
*Care co-ordinator (if a registered nurse)	• Identify if the service user requires any support obtaining their medication supply from a community pharmacy (make arrangements or speak to the team pharmacist). • Monitor and document any side effects (see Appendix 7), signs/ symptoms of lithium toxicity (see Appendix 4) and degree of concordance/adherence with treatment. Inform the prescriber of any concerns. • Discuss with the prescriber if the service user is considering stopping treatment after a period of relatively stable mood. • In case of abnormal renal function and thyroid function tests, liaise with the relevant consultant psychiatrist to discuss the action plan.
GP	• Respond to the consultant's request for shared care once the dose is stabilised within two weeks of receipt of the request. • If shared care is declined: clinical rationale to be provided and GP to copy service user into decline letter so they are aware of who will be providing further supplies of medication. • Ensure lithium monitoring is carried out in line with Appendix 1 and the Lithium treatment booklet or MindMeds app is updated before issuing a repeat prescription.

	• Discuss any concerns relating to lithium therapy for the service user with the consultant psychiatrist (e.g., upward trends in lithium plasma levels, concordance/adherence issues, discontinuation and/or suffering a worsening in mental state). • If signs of lithium toxicity are present, **stop treatment immediately**, check the lithium plasma level **urgently** and monitor the service user. Depending on the severity of symptoms, refer to A&E (see Appendix 4). Inform the consultant psychiatrist. • In case of abnormal renal and thyroid function tests, liaise with the relevant consultant psychiatrist to discuss the action plan (see Appendix 5). • Ensure that interactions are checked before commencing any new medicines (see Appendix 6, current BNF or discuss with a pharmacist). Put in place additional monitoring if an interacting medicine is commenced. Ensure the service user and consultant psychiatrist are informed of any changes to medications to avoid any harm. • Refer back to secondary care if there are any concordance/adherence issues or if the service user discontinues treatment and suffers a worsening mental state. Inform the relevant consultant psychiatrist to discuss the action plan (see Appendix 5). If the service user is no longer with a community mental health team, SPA can be contacted to seek advice should there be any particular concerns.

***If the designated care coordinator in the community is a not a registered nurse or there is no care coordinator in place, the prescribing clinician must ensure that a robust care plan is in place to ensure that any signs or symptoms of lithium toxicity are identified promptly and managed appropriately.**

6.4 Dose recommendations

	Priadel® tablets	**Priadel® liquid**	**Li-liquid®**
Adults (body-weight up to 50kg)	Initially 200-400mg daily	Initially 520mg twice daily	-
Adults (body-weight 50kg and above)	Initially 0.4 – 1.2g daily	Initially 1.04 – 3.12g twice daily	-
Elderly	Initially 200 – 400mg daily	Initially 520mg twice daily	-
Adults (average body-weight 70kg)	-	-	Initially 1018 – 3054mg twice daily
Elderly or adults (body-weight below 50kg)	-	-	Initially 509mg twice daily

Note:
Priadel® liquid 520mg = lithium carbonate 204mg
Li-liquid 509mg = lithium carbonate 200mg

Doses should be taken at the **same time each day**.
Once daily dosing at night or twice daily dosing is preferred as more information on these regimes and dose adjustments are available.
If prescribed twice daily dosing, ensure the **same dose is given in the morning and at night**. For example, 200mg Twice a day should be prescribed as opposed to 100mg in the Morning and 300mg at Night.
Changing the preparation of lithium requires the same precautions as the initiation of treatment.
See BNF or SPC for dosing instructions for other brands.

6.5 Monitoring

Lithium has a half-life of 18 – 36 hours.
On initiation or restarting treatment following missed doses for 7 days or more: Lithium plasma levels 4 – 7days after initiation, after every dose change, change in interacting medication. Lithium plasma levels must be checked weekly until the service user's mental state is stable and the target level is achieved and stable. Please refer to Appendix 1 for monitoring requirements once stabilised.

Lithium plasma levels are usually taken 12 hours post-dose. Lithium plasma levels taken 24 hours post-dose can be considered. Target ranges for lithium plasma levels must be individualised.

Target lithium plasma levels:

	12 hours post-dose	24 hours post-dose
Once daily dosage	0.7 – 1.0 mmol/L	0.5 – 0.8 mmol/L
Twice daily dosage	0.5 – 0.8 mmol/L	-

Consider maintaining a lithium plasma level between 0.8 – 1.0mmol/L (12 hours post-dose monitoring) for a trial period of at least 6 months for people who:

- Have had a relapse while taking lithium in the past or
- Are taking lithium and have subthreshold symptoms with functional impairment

6.6 Interactions (refer to BNF and SPC)

Consider the impact of lithium interactions with other medicines (see Appendix 6). It is also important to note that changes in fluid and salt intake can have an effect on lithium plasma levels. Caffeine intake can also have a small effect on lithium levels. There is no need to avoid concurrent use, but caution service users to adhere to a moderate intake of caffeine.

6.7 Contraindications (Refer to BNF and SPC)

- Cardiac disease, including Brugada syndrome, or a family history of Brugada syndrome
- Severe renal impairment
- Untreated hypothyroidism
- Breastfeeding
- Hyponatraemia, including dehydrated patients, those on a low sodium diet or conditions predisposing to low sodium (e.g. Addison's, severe diarrhoea and/or vomiting and concurrent infections, especially if sweating profusely)
- Hypersensitivity to lithium or to any of the excipients

6.8 Precautions

- Mild/moderate renal impairment may be associated with high lithium plasma levels and lithium toxicity caused by reduced elimination of lithium. Closely monitor lithium plasma levels and adjust the dose accordingly. A gradual deterioration in renal function is seen in 20% of patients exposed to lithium. There is limited evidence on whether impaired renal function is reversible or irreversible.
- Fluid/electrolyte imbalance – advise the patient of risks and action to be taken in case of nausea, vomiting, diarrhoea, excess sweating and/or other conditions leading to salt/water depletion as increased monitoring and/or a decreased dose may be required.
- Risk of convulsions when lithium is administered with drugs that lower the epileptic threshold or in epileptics.
- Benign intracranial hypertension may occur – service users should be advised to report persistent headaches or visual disturbances.
- Avoid in service users with congenital long QT syndrome and prescribe with caution to those with predisposing factors for QT prolongation (uncorrected hypokalaemia, bradycardia, predisposing drugs).

- Elderly service users may exhibit toxicity at serum levels ordinarily tolerated by younger service users, and lithium excretion may be reduced due to age-related decreases in renal function in this group of service users.

6.9 Stopping lithium

- If stopping lithium is planned, discuss it with the service user (and carers) and other healthcare staff involved in the service user's care. Reduce the dose ***gradually over at least 4 weeks***, and preferably up to 3 months, even if the person has started taking another mood-stabilising drug.
- If abrupt discontinuation is necessary, the service user should be carefully observed for the recurrence of signs of mania or depression, especially in the first 3 months after stopping.
- Continue monitoring mood and mental state during the dose reduction and for at least 2 years after medication has stopped for early signs of mania and depression.
- Inform the service user how to recognise early signs of relapse and to report any symptoms of relapse, depression or mania.
- Inform the GP and care coordinator that lithium is being stopped and the reasons why, and advise to monitor the service user closely for signs of mania and depression.

7. Training and Awareness

Course	For	Renewal Period	Delivery Mode
Medicines Optimisation Training	Prescribers	3 years	e-learning
Medicines Optimisation Training	Registered Nurses and Nursing Associates	3 years	e-learning

8. Embedding a culture of equality and respect

The Trust promotes fairness and respect in relation to the treatment, care and support of service users, carers and staff.

Respect means ensuring that the particular needs of 'protected groups' are upheld at all times and individually assessed on entry to the service. This includes the needs of people based on their age, disability, ethnicity, gender, gender reassignment status, relationship status, religion or belief, sexual orientation and in some instances, pregnancy and maternity.

Working in this way builds a culture where service users can flourish and be fully involved in their care and where staff and carers receive appropriate support. Where discrimination, inappropriate behaviour or some other barrier occurs, the Trust expects the full cooperation of staff in addressing and recording these issues through appropriate Trust processes.

Access to and provision of services must therefore take full account of needs relating to all protected groups listed above, and care and support for service users, carers and staff should be planned that takes into account individual needs. Where staff need further information regarding these groups, they should speak to their manager or a member of the Trust Inclusion & Engagement team.

Where service users and carers experience barriers to accessing services, the Trust is required to take appropriate remedial action.

Service user, carer and/or staff access needs (including disability)	Effective communication is essential during the assessment and decision making process around a patient's capacity to make decisions around taking medicines. Appropriate adjustments must be made to account for the needs of people with disabilities and differing communication needs, e.g. for people with physical, sensory or learning disabilities or people who do not read or speak English. Staff may need access to an interpreting service.
Involvement	The reason for prescribing each medicine should be fully explained with each service user, and reasons for refusal should be explored to seek engagement with proposed treatment plans.
Relationships & Sexual Orientation	All service users must be given due consideration and appropriate advice/treatment by staff in terms of medication administration by unregistered staff. This must be independent of their circumstances.
Culture & Ethnicity	All service users must be given due consideration and appropriate advice/treatment by staff in terms of medication administration by unregistered staff. This must be independent of their circumstances.
Spirituality	All service users must be given due consideration and appropriate advice/treatment by staff in terms of medication administration by unregistered staff. This must be independent of their circumstances.
Age	All service users must be given due consideration and appropriate advice/treatment by staff in terms of medication administration by unregistered staff. This must be independent of their circumstances.
Gender & Gender Reassignment	All service users must be given due consideration and appropriate advice/treatment by staff in terms of medication administration by unregistered staff. This must be independent of their circumstances.
Advancing equality of opportunity	All service users must be given due consideration and appropriate advice/treatment by staff in terms of medication administration by unregistered staff. This must be independent of their circumstances.

9. Promoting and Considering Individual Wellbeing

Under the Care Act 2014, Section 1, the Trust has a duty to promote wellbeing when carrying out any of their care and support functions in respect of a person. Wellbeing is described as relating to the following areas in particular:

- Personal dignity (including treatment of the individual with respect);
- Physical and mental health and emotional wellbeing;
- Protection from abuse and neglect;
- Control by the individual over day-to-day life including over the care and support provided and the way in which it is provided;
- Participation in work, training, education, or recreation;
- Social and economic wellbeing;
- Domestic, family and personal;
- Suitability of living accommodation;
- The individual's contribution to society.

There is no hierarchy, and all should be considered of equal importance when considering an individual's wellbeing. How an individual's wellbeing is considered will depend on their individual circumstances including their needs, goals, wishes and personal choices and how these impact on their wellbeing.

In addition to the general principle of promoting wellbeing there are a number of other key principles and standards which the Trust must have regard to when carrying out activities or functions:

- The importance of beginning with the assumption that the individual is best placed to judge their wellbeing;
- The individual's views, wishes, feelings and beliefs;
- The importance of preventing or delaying the development of needs for care and support and the importance of reducing needs that already exist;
- The need to ensure that decisions are made having regard to all the individual's circumstances;
- The importance of the individual participating as fully as possible;
- The importance of achieving a balance between the individuals wellbeing and that of any carers or relatives who are involved with the individual;
- The need to protect people from abuse or neglect;
- The need to ensure that any restriction on the individuals rights or freedom of action that is involved in the exercise of the function is kept to the minimum necessary

Part 3 – Document Control & Standards Information

10. Version Control

Version	Date of Issue	Author	Status	Comment
3.0	August 2023	Principal Clinical Pharmacist	Active	• Format change • Update on relevant resources • How to utilise MindMeds app (for lithium) & how to obtain Lithium Therapy booklet • Documenting when providing a Lithium Therapy booklet and counselling including signs and symptoms of lithium toxicity. • Update of Appendix 8: Lithium poster
2.0	April 2020	Principal Clinical Pharmacist	Superseded	• Format change • Update on relevant resources • Documenting when providing a Lithium Therapy booklet and counselling including signs and symptoms of lithium toxicity. • Addition of Appendix 8: Lithium poster • Different brands used across the Trust. • Hospital pharmacist responsibilities in documenting lithium levels on the inpatient medication chart and ensuring the Lithium Therapy booklet is updated. • Caffeine interaction added. • Clearer guidance on the use of lithium in mild/moderate renal impairment. • Incorporation of findings from the POMH-UK Lithium report.
1.2	November 2018	Principal Clinical Pharmacist	Superseded	• Remove duplicate information • 24 hour monitoring of lithium plasma levels added • Addition of monitoring recommendations
1.1	June 2018	Principal Clinical Pharmacist	Superseded	• Addition of Lithium app • Addition of doses • Addition of shared care arrangement • Addition of contraindications and precautions • Changes in monitoring frequency for calcium levels and renal/thyroid function
1.0	November 2017	Principal Clinical Pharmacist	Superseded	New guidance

11. Associated Documents

- Physical Health Policy
- Medicines Policy
- Mental Health Act
- Mental Capacity Act
- Covert Administration of Medicines Policy
- Medicines Adherence Policy
- Medicines Reconciliation Policy

12. Supporting References

- National Patient Safety Agency (NPSA) Alerts Summary Lithium December 2009
- The National Institute for Health and Care Excellence. Bipolar disorder: assessment and management CG185 updated 2020 (accessed via https://www.nice.org.uk/guidance/cg185)
- BNF online (accessed via BNF (British National Formulary) | NICE)
- Summary of Product Characteristics (SPC). Lithium carbonate (Priadel®). Sanofi. Last updated October 2022. Available online at www.medicines.org.uk
- Summary of Product Characteristics (SPC). Lithium citrate (Priadel®). Sanofi. Last updated October 2022. Available online at www.medicines.org.uk
- Summary of Product Characteristics (SPC). Lithium citrate (Li-liquid®). Rosemont Pharmaceuticals Limited. Last updated October 2022. Available online at www.medicines.org.uk
- Goodwin et al. Evidence-based guidelines for treating bipolar disorder: Revised third edition recommendations from the British Association for Psychopharmacology. Journal of Psychopharmacology 2016 p.1-59
- Taylor D, Banes T, Young A. The Maudsley Prescribing Guidelines in Psychiatry. 14th Edition
- Haddad P, Wieck A, Yarrow M, Denham P. The Lithium Side Effects Rating Scale (LISERS) development of a self-rating instrument. European Neuropsychopharmacology 9(5): 231-232
- Bazire S. Psychotropic Drug Directory 2020/21. Lloyd-Reinhold Publications
- Gupta S, Das S, Khastgir U, Wai San V, Suwito C. Management of the renal adverse effects of lithium: an audit cycle. Progress in Neurology and Psychiatry 2019; 23:2 (p. 19-21)

13. Consultation

The Consultation section of the Policy Management System advises on the types of people to invite to express their views and give constructive suggestions to improve the draft policy being worked on.

In the case of the Procedural Document Management System, the following have been consulted so far.

Job Title of person consulted
Consultant Psychiatrists
Pharmacy and Medicines Optimisation Team
Community Clinical Nurse Leads
Drug and Therapeutics Committee

Part 4 Appendices

Appendix 1: Baseline and ongoing monitoring requirements

	BASELINE	MAINTENANCE
Serious Mental Illness (psychosis/bipolar disorder)	Full Blood Count (FBC) Urea and Electrolytes (U&Es) Renal function (serum creatinine or e-GFR) Liver Function Tests (LFTs) Fasting blood glucose (if possible), HbA_{1c} Blood lipid profile (fasting if possible) Prolactin level ECG, if clinically indicated BP, weight, waist circumference	Annual health check* FBC annually U&Es 6 monthly Renal function (serum creatinine or e –GFR) 6 Monthly LFTs annually Fasting (if possible) blood glucose, HbA_{1c} annually Blood lipid profile (fasting if possible) annually
Lithium	Lithium plasma level (usually 12 hours post-dose) 4 – 7 days after initiation, after every dose change, change in interacting medication U&Es e-GFR (renal function) Thyroid function tests Serum calcium Cardiac function: ECG, if clinically indicated Blood pressure Weight and height (or BMI)	Annual health check* Lithium plasma level – 4 – 6 monthly once stable** e-GFR – 6 monthly*** U&Es- 6monthly Thyroid function tests – 6 monthly*** Serum calcium 6 monthly Fasting (if possible) blood glucose, HbA1c- annually Blood lipid profile (fasting if possible)- annually Weight and height (or BMI) annually *Note: monitor lithium plasma levels more frequently if urea and creatinine levels become elevated or eGFR falls over 2 or more tests and assess the rate of deterioration in renal function. Consult renal specialist for advice if needed.*

***Annual Health Check requirements see Physical Health Policy**

**NICE Guidelines for Bipolar Disorders 2014 recommends to monitor lithium plasma levels weekly until a stable therapeutic level is achieved, then every 3 months for the first year and then every 6 months thereafter if stable, unless the service user falls into one of the following groups of people, where more frequent monitoring should be considered:

- Older adults
- Those taking other medicines that interact with lithium
- Those who are at risk of renal or thyroid dysfunction, raised calcium levels or other complications
- People who have poor symptom control
- People with poor adherence
- People whose last lithium plasma level was 0.8mmol/L or higher

*** eGFR and TFTs are to be monitored more often if there is evidence of impaired renal or thyroid function, raised calcium or an increase in mood symptoms that might be related to impaired thyroid function.

Appendix 2: Consultation tips for healthcare professionals when providing information about lithium to service users/ carers

Before consultation: gather some background information regarding the service user's medical and drug history, current mental state and care plan.

Indication:

- Treatment and prophylaxis of mania (acute manic and hypomanic episodes).
- Treatment and prophylaxis of bipolar disorder (also known as manic depression).
- Treatment and prophylaxis of recurrent depression where treatment with other antidepressants has been unsuccessful.
- Treatment and prophylaxis of aggressive or intentional self-harming behaviour.

The decision to use lithium is usually taken by secondary care.

Onset of action: an effect may be seen within 5 – 7 days of initiating lithium in a manic service user, but may take longer in the depressed bipolar service user. Please advise the service user that it may take some time to find the correct dose for them and that they should not attempt to make any changes themselves unless specifically told to do so by a healthcare professional.

Dosing regimen: advise that tablets should be swallowed whole and not chewed as most are modified release preparations. If they cannot be swallowed whole, they are scored and can be broken in half before being swallowed. An oral measure should be provided for liquid lithium preparations to measure the correct amount. It should be taken as directed on the medicine label at regular times. Usually, the liquid preparation is taken twice daily and tablets once daily. If the instructions specify ONCE daily, then it is usually best to take it at bedtime.

Formulations: it is important to continue with the same form and brand of lithium as they are not all bioequivalent. Service users should inform healthcare professionals of the brand they take when being prescribed or dispensed further lithium.

Duration of treatment: this should be discussed at initiation as people respond differently. As well as treating the illness, lithium also helps to prevent relapse. Once lithium has been started, it may need to be taken for a long time, at least 2 or 3 years, and possibly much longer. For it to continue working, lithium must be taken every day as directed.

Adherence: it is important to reinforce adherence even if the service user feels better. Stopping or erratic adherence is associated with a high risk of relapse. Medication must be taken regularly to prevent an episode rather than after symptoms occur.

Drug/ food interactions: (below is not an exhaustive list – please refer to BNF and/or product SPC)

- ACE inhibitors and angiotensin receptor antagonists – decreased lithium clearance may result in toxicity; monitor lithium plasma level and renal function; consider using an alternative antihypertensive. Onset may be insidious, with toxicity occurring after several weeks.
- NSAIDs – including ibuprofen (not aspirin) can decrease lithium clearance which may result in toxicity; avoid combination unless essential; monitor lithium plasma level.
- Diuretics – all diuretics can reduce lithium clearance, but the effect of thiazides is greatest; monitor lithium plasma level closely.
- Carbamazepine, some antidepressants, diltiazem, verapamil, methyldopa, and antipsychotics – enhanced risk of neurotoxicity; monitor carefully.
- Maintain an adequate (but not excessive) fluid intake (especially in hot weather) and avoid dietary changes which reduce or increase salt (sodium) intake, including dieting without consulting a doctor.
- Alcohol and illicit drugs – both can impair psychomotor skills and can cause dehydration which can precipitate lithium toxicity.

Side effects:

- Initially drowsiness, however, this tends to wear off after a couple of weeks. Service users should be advised to take care if (s)he intends to drive or use tools or machines whilst taking lithium- refer to Drugs and driving: the law.
- Declining or worsening of renal function needs monitoring regularly.
- Common – mild gastrointestinal effects such as nausea, general discomfort and vertigo may occur initially but frequently disappear after the first few days of administration. Metallic taste, weight gain, fatigue, headache, fine tremor, acne, psoriasis, polyuria, hypothyroidism and benign T wave changes on ECG.
- Infrequent – nephrogenic diabetes insipidus with polydipsia and polyuria, memory impairment, hair loss and hyperparathyroidism.
- Rare – cardiac arrhythmias and hyperthyroidism.

Signs and symptoms of lithium toxicity

Service user must seek immediate medical attention if s(he) develops any of the following signs or symptoms:

- Confusion, coarse tremor or twitching
- Loss of balance, drowsiness, dizziness
- Slurred speech
- Visual disturbance
- Nausea, vomiting, stomach ache or diarrhoea
- Abnormal general weakness or drowsiness
- Extreme thirst, frequent urination

Alcohol: caution as it may potentiate sleepiness and CNS depression. It can be dehydrating, but excess volume can also have a dilutional effect which could affect lithium plasma levels.

Monitoring: careful monitoring needs to be carried out. Lithium plasma levels are usually taken 12 hours post-dose 4 – 7 days after initiation, after a change of dose/formulation or introduction of interacting medication. Weekly monitoring should follow until the dose is stable, and then repeat every 3 months for the first year, then 6 monthly thereafter. If there are any complicating issues, more frequent monitoring may be indicated.

General information: be alert for signs and symptoms of lithium toxicity as detailed above. If these occur, stop taking the lithium and seek medical attention urgently.

Maintain a normal diet with regular salt and fluid intake. Avoid drastic changes in diet or 'crash diets'. Drink more non-alcoholic fluid (preferably water) during hot weather and bouts of diarrhoea and vomiting to avoid toxicity.

If weight gain or weight-related problems are experienced, the doctor may be able to organise a dietician review.

Provide written information: patient information leaflets (PILs) are usually provided with medication every time it is collected from the pharmacy. 'Purple' Lithium Therapy booklets are provided to record blood test results and general information on lithium. The purple lithium therapy booklet is important to record information to pass on to other healthcare professionals. The Choice and Medication website also has patient information leaflets, which can be accessed at http://www.choiceandmedication.org/hertfordshire/. There is also a NHS Physical Health app that service users should be made aware of, which can be used as an alternative to the purple lithium therapy booklet.

Document discussion in service user's EPR: any discussion must be documented on the service user's EPR, including any information provided (both verbal and written).

Appendix 3: Lithium Counselling Checklist

Service user name: **NHS Number:** **DOB:**

	Counselling point	**Staff name**	**Comments**
1.	Indication for lithium		
2.	Basic mode of action and onset of action		
3.	Purpose and importance of purple Lithium Therapy booklet. Provide a booklet for new service users and for service users where current booklet cannot be obtained. There is also an app that can be downloaded onto smartphones		
4.	Monitoring • Blood monitoring requirements and frequency • Lithium plasma levels • Target lithium plasma levels • Frequency of monitoring and where to go for monitoring • Always bring purple Lithium Therapy booklet to appointments		
5.	Dosing: • Different formulations/ brands • Take tablets at same time of day, preferably at night • Importance of adherence (ways to remember taking tablets e.g., calendar, pill reminder, reminder charts etc.)		
6.	What to do if a dose is missed		
7.	What to do if an extra dose is taken		
8.	**AVOID** stopping lithium abruptly (risk of relapse) *If thinking of stopping the need to discuss with the prescriber/ healthcare professional*		
9.	What to do in the event of an inter-current illness, especially vomiting and diarrhoea and when receiving new medicines		
10.	Side effects of lithium		
11.	Potential drug interactions and 'OTC' medicines (especially NSAIDs)		
12.	Alcohol intake: importance of moderation		
13.	Ensure reliable contraception in women of childbearing age, need to attend anti-natal clinic as soon as possible in case of pregnancy.		
14.	Inform all healthcare professionals involved in the service user's care of lithium		
15.	How to obtain further supplies of lithium		
16.	Who to contact for advice/ further information		

All service users must have a purple Lithium treatment booklet or MindMeds App. Either booklet or App MUST be fully completed, and the service user is advised to keep this on themself at all times, and show it to anyone who may prescribe medication for them, or if they intend to buy medication over the counter at a pharmacy.

Note: The form may be scanned onto the patient's EPR on completion.

Appendix 4: Management of toxic lithium plasma levels or where signs and symptoms of lithium toxicity are present.

If an individual develops toxic lithium plasma levels, the onset of symptoms may be delayed for up to 24 hours, especially in lithium naïve service users.

Toxicity (>1mmol/L)	Symptoms	Management
Asymptomatic (1-1.5mmol/L)	-	➢ Check the time of the blood sample in relation to dose. ➢ Repeat lithium plasma levels before changing the dose. ➢ If correct timing, reduce dose, repeat level in one week. Consider withholding treatment.
Mild (>1.5mmol/L)	Nausea, altered taste, diarrhoea, blurred vision, polyuria, lightheadedness, fine resting tremor, muscular weakness and drowsiness	➢ **Withhold** lithium. Immediate referral to clinician responsible for follow up. ➢ NB: lithium plasma levels may still be rising. Monitor for moderate/severe signs of toxicity over next 7 days.
Moderate (>2mmol/L)	Increasing confusion, blackouts, increased deep tendon reflexes, myoclonic twitches and jerks, choreoathetoid movements, urinary or faecal incontinence, increasing restlessness followed by stupor and hypernatraemia	➢ **Withhold** lithium. ➢ **Immediate referral to A&E** for diuresis and inform responsible clinician. ➢ Investigate reason for toxicity. ➢ NB: plasma levels may still be rising. Monitor for moderate/severe signs of toxicity over next 7 days. ➢ Deaths have been reported above 4mmol/L.
Severe	Coma, convulsions, cardiac dysrhythmias including SA block, cerebellar signs, ECG changes (sinus and junctional bradycardia), first degree heart block, hypotension or rarely hypertension, peripheral neuropathy, peripheral vascular collapse and renal failure	

Note: this is a guide for likely symptoms at various toxic levels. A service user may experience severe symptoms at lower levels than stated in the table above especially in older adults. Symptoms must take precedence over lithium plasma levels for management guidance.

Lithium is very toxic and clinicians managing service users who have a high lithium plasma level and displaying severe symptoms of toxicity are encouraged to discuss these cases with the Poisons Information Service (Tel: 0344 892 0111).

Appendix 5: Management abnormal lithium plasma levels, renal function and TFTs

Blood test	Therapeutic range*	Action	
		BELOW therapeutic range	**ABOVE therapeutic range**
Lithium (12 hours post dose. Check timing of level before adjusting dose).	0.4 - 1mmol/L	Discuss with the service user/carer, assess adherence and consider whether a dose increase is clinically indicated, if so, refer to the specialist.	**SAME DAY CONTACT.** Assess for symptoms of toxicity (see Appendix 4). Check if service user is taking prescribed dose of lithium. Service users with levels above 2 mmol/L must be referred to A&E. Progressively increasing levels are usually a consequence of deteriorating renal function. Be more vigilant with elderly service users, or those experiencing side effects which could be signs of toxicity. Withhold lithium treatment.
eGFR**	>90ml/min/1.73m^2	Increase the frequency of monitoring of eGFR and lithium plasma levels. May need to decrease lithium dose. If eGFR<60ml/min/1.73m^2 increase monitoring frequency of eGFR and lithium plasma levels. A downward trend in eGFR indicates deterioration in renal function and this requires close monitoring. The decision to continue lithium depends on clinical efficacy and degree of renal impairment. Prescribers should consider seeking advice from a renal specialist. Lithium is contraindicated in severe renal insufficiency.	Not applicable.
Thyroid function	TSH 0.3 – 5.5mU/L Free thyroxine (fT4) 9 - 23pmol/L	Prescriber to assess relevance and treat	If substantially raised (TSH ≥ twice the upper limit), **SAME DAY CONTACT** with service user and agree action. Service users with a sustained increase in TSH of more than twice the upper limit of the reference range, which is confirmed with repeat testing after 2 weeks, should be treated with levothyroxine.

*Note: service users differ in their target lithium plasma level e.g., older adults may have a lower target range and therefore may need a dose reduction if the lithium plasma levels are above this.

**Lithium should be used with caution in mild to moderate impairment and avoided in severe renal impairment. Prescribers should seek advice from a renal specialist.

Appendix 6: Managing lithium drug interactions or drug-disease interaction

Potentially hazardous interactions. Combined administration should be avoided

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 plasma level.	• Not clinically important in every service user. Lithium plasma level can increase over several weeks. • Monitor closely for signs of lithium toxicity and consider taking lithium plasma level. • May need to reduce lithium dose. • With Angiotensin II antagonists increase monitoring especially during the first couple of months. Note: check each medication for individual effects on lithium as some agents are safer to use with lithium.
Analgesics (NSAIDs) e.g., ibuprofen, diclofenac	Excretion of lithium reduced.	• Avoid concomitant use. • Note: aspirin does not affect lithium plasma levels.
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.	• Contraindicated. Consider an alternative antihistamine.
Methyldopa	• Neurotoxicity may occur without increasing lithium plasma concentration.	• Avoid concomitant use if possible.
Thiazide Diuretics e.g., bendroflumethiazide	• Increase lithium plasma 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 plasma levels.

Less significant interactions- usually without serious consequences

Drug	Interaction effects	Risk Reduction Measures
Alcohol	Increased tremor/shakiness with chronic alcohol use.	
Antibiotics e.g., metronidazole, doxycycline, tetracycline, levofloxacin	Reduced lithium excretion leading to increased lithium plasma 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. • Increase lithium plasma level, possible neurotoxicity and serotonergic effects.	Monitor carefully for signs of neurotoxicity.
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.
Muscle relaxants e.g., baclofen	• Lithium enhances the effect of muscle relaxants. • Hyperkinesis caused by lithium is aggravated by baclofen.	Monitor for signs of hyperkinesis.
Parasympathomimetics	Lithium antagonises the effects of neostigmine and pyridostigmine.	
Sodium bicarbonate containing antacids e.g., Gaviscon®	Excretion of lithium increased by sodium bicarbonate therefore, reduced lithium plasma levels.	Change to an alternative antacid with lower sodium content.
Theophylline/ aminophylline	Increased excretion of lithium. Reduced lithium plasma level. Depressive and/ or manic relapse may occur if the lithium dose is not adjusted.	Monitor lithium plasma 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).
- Caution in psoriasis: risk of exacerbation.
- Addison's disease or other conditions with a sodium imbalance 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.
- Caution in Neuroleptic Malignant Syndrome (NMS) associated with lithium as reintroduction has led to recurrences of NMS.

Appendix 7: Lithium Side Effects Rating Scale (LiSERS)[7]

Service user name: **NHS no.:**
Staff completing the form: **Date:**

		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 plasma level: consider urgent lithium plasma level if any of these symptoms are reported. The prescriber must be promptly informed if any of these are present. The form may be scanned onto the service user's EPR on completion.

Appendix 8: Pathology contact details

	Tel:
West Herts Pathology	01442 287 829
East and North Herts Pathology	01438 314 333
Princess Alexandra Pathology	01279 444 455
Royal Free Hospital Pathology	020 7794 0500

Appendix 9. Lithium poster

For more information on the Safe Use of Lithium, please download the MindMeds App

Apple IOS: **Android:**

Signs of Lithium Toxicity

Lithium can cause side effects such as fine tremor, gastric disturbance, weight gain, metallic taste, fatigue, and headache.

Lithium toxicity occurs when lithium plasma levels exceed therapeutic levels. Symptoms of toxicity increase in severity with increasing lithium plasma levels and can be dangerous and possibly fatal.

Lithium plasma levels need close monitoring to ensure safe and effective therapy.

If a person on lithium experiences any of the below symptoms, it is essential they are referred to a doctor immediately for review.

Early signs of lithium toxicity	Moderately severe lithium toxicity	Severe lithium toxicity
• Dehydration • Lack of appetite • Diarrhoea • Vomiting • Blurred vision • Fine resting tremor	• A marked tremor • Unsteadiness • Slurred speech • Drowsiness • Confusion	• Muscle twitches • Very severe drowsiness and confusion • Fits • Unconsciousness

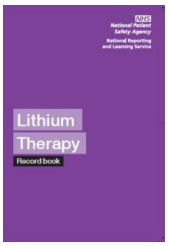
Any factors that can affect the salt/water balance such as dehydration, diarrhoea, vomiting, big changes in salt intake and excess sweating can increase the level of lithium in the blood and increase the risk of toxicity.

Routine Lithium Monitoring

- 4-7days after initiation, changes in interacting medicines, changes in dose, until stable
- Every 3 months for the first year
- Every 6 months thereafter IF STABLE
- Every 3 months for at risk groups (e.g., older adults, those taking interacting medicines, poor adherence, those whose last lithium plasma level ≥0.8mmol/L)
- More frequent monitoring if evidence of deterioration

Document results in Electronic Patient Record and in Lithium treatment booklet or MindMeds app.

MindMeds



Safer Use of Lithium

Ensure blood levels are between 0.4 – 1.0mmol/L. Symptoms of toxicity usually occur at lithium plasma levels >1.5mmol/L. This can be lower in at risk groups. Monitor and treat the clinical symptoms.

- Check for interactions whenever medicines are changed, including OTC medicines.
- Always prescribe by brand due to differences in bioavailability
- Discuss contraception in female service users (of child bearing potential) and importance of planning a pregnancy.
- Ensure 6 monthly TFTs, renal function (eGFR and U&Es), serum calcium tests are carried out
- Ensure yearly weight and height/ BMI, HbA1c and blood lipids are completed

NOTE: Lithium levels should be taken 12 hours post dose

Our Values	we are...	you feel...
	Welcoming	Valued as an individual
	Kind	Cared for
	Positive	Supported and included
	Respectful	Listened to and heard
	Professional	Safe and confident

Our Values

Welcoming Kind Positive Respectful Professional