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Tees Primary Care Drug Monitoring Recommendations

This guide is intended as a quick reference for primary care clinicians, and is not exhaustive. It is based on common recommendations. The frequency of testing may need to be tailored to individual patients, their condition and concurrent treatment. For more details see latest BNF, NICE, CKS, local guidance & shared care documents and the individual SPCs available at: www.medicines.org.uk.

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Produced by NECS Medicines Optimisation Team on behalf of County Durham and Darlington CCGs

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Drug Monitoring Recommendations

Drug	Baseline	Routine	Comments
Gastrointestinal system			
Mesalazine and Balsalazide	FBC, U&Es, LFTs	U&Es, LFTs	3 monthly for first year, then 6 monthly for 4 years, then 12 monthly. FBC and WCC only if blood dyscrasia suspected.
Cardiovascular System			
ACEi / A2RA	U&Es, BP	U&Es, BP	U&Es 1-2 weeks after initiation or significant dose change, then 12 monthly. More frequently for patients taking diuretics and those with renal impairment or unstable heart failure. BP 2-4 weeks after initiation or dose change
Sacubitril/Valsartan	U&Es, BP, LFTs	U&Es, BP	Do not initiate if SBP<100mmHg or K^+>5.4mmol/L. Use lower starting dose if SBP between 100-110mmHg or eGFR 30-60ml/min or AST/ALT >2xULN or if ACEi/A2RA naïve. Routine monitoring as for ACEi/A2RA - consider discontinuation if K^+ level>5.4
Amiodarone	TSH, fT3, fT4, LFTs Chest X-ray, U&Es, ECG, Thyroid a/b	TSH, fT3, fT4	3 months after starting then 6 monthly, including for 12 months after stopping.
		LFTs, U&Es, CXR and ECG	6 monthly Chest X-ray if pulmonary toxicity suspected.
Dronedarone	LFTs, ECG	LFTs, U&Es	Check both LFTs and U&Es1 week after initiation. Repeat U&Es after further 7 days if creatinine raised. LFT monitoring should continue 1 month after initiation of treatment, then monthly for 6 months, then every 3 months for 6 months and annually thereafter—discontinue treatment if 2 consecutive ALT concentrations exceed 3 times upper limit of normal. Patients or their carers should be told how to recognize signs of liver disorders and new onset or worsening heart failure
		ECG and pulmonary monitoring	ECG should be repeated every 6 months. Interstitial lung disease has been reported and onset of dyspnoea or non-productive cough may indicate pulmonary toxicity (MHRA)
Digoxin	U&Es	U&Es	12 monthly. Routine drug levels not necessary, but consider if toxicity suspected, significant weight loss, hypokalaemia or hypothyroidism – At least 6 hrs. Post dose. Ideally 8–12 hours.
Ivabradine	HR	HR	Do not initiate if resting heart rate is less than 70bpm or less 75bpm if heart failure. Reduce dose or stop treatment if resting HR is persistently less than 50 bpm. If AF occurs consider benefits and risks of continued treatment.
Thiazide and related Diuretics	U&Es	U&Es, $HbA1_c$	U&Es 4-6 weeks after initiation, and 1-2 weeks after dose alteration, then 6-12 monthly - stop if eGFR<30mL/min non-diabetic patients: 12 monthly $HbA1_c$ or for diabetic patients, as dictated by diabetes reviews
Eplerenone	U&Es	U&Es	U&Es after 1 week and then monthly for first 3 months, then every 6 months Plus at 1 and 4 weeks after any dose increase
Spironolactone	U&Es	U&Es	**Severe heart failure** (NYHA Class III-IV) U&Es after 1 week and any dose increase. Monthly for the first 3 months, then every 3 months for a year, then every 6 months thereafter **Other Indications:** U&Es after 1 month, and monthly for first 3 months, then every 3 months for a year, then every 6 months thereafter. After dose increase check U&Es within 1 month.

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Drug	Baseline	Routine	Comments
Loop Diuretics	U&Es	U&Es	1-2 weeks after initiation and each dose increase Earlier monitoring (after 5–7 days) may be required for people with existing renal impairment or those taking a combination of a diuretic plus an ACEi/ARB, or an aldosterone antagonist. For people receiving a combination of a loop diuretic and a thiazide: check renal function within 5 days of starting combination treatment and recheck every 5–14 days until stable. Monitor weight and hydration status Once treatment is stable monitor 6 monthly
Fibrates	LFTs, CK, Lipids, U&Es	LFTs	Every 3 months for first year then annually.
		U&Es	Fenofibrate – during first 3 months then annually. Otherwise annually
		Lipids	If response inadequate after 3 months stop. 12 monthly thereafter.
		CK	Check only if myopathy suspected which is more common when used in combination with a statin
		FBC	Gemfibrozil requires FBC 3 monthly for first year. Otherwise not required
Statins Drug Considerations in the Management of Blood Lipids	LFTs, U&Es, Lipids (CK; only if history of persistent generalised unexplained muscle pain)	Lipids	At 3 months, aim for 40% reduction in non HDL-C levels Consider annual assessment of non HDL-C levels to inform medication/chronic disease reviews
		LFTs	Repeat after 3 months and 12 months. Do not measure again unless clinically indicated e.g. signs or symptoms of hepatotoxicity
		CK	Before starting treatment: If CK levels are > 5 times the upper limit of normal, re-measure after 7 days. If CK levels are still 5 times the upper limit of normal, do not start statin treatment. If creatinine kinase levels are raised but < 5 times the upper limit of normal, start statin treatment at lower dose. Check CK as soon as possible if the person reports new muscular symptoms.
Warfarin	INR, FBC, U&Es, LFTs, BP	INR	BP should be used to calculate HAS-BLED score INR should be checked at least every 12 weeks once stable in individual therapeutic range. If changes in patient's general health or medication regimen check more regularly.
Direct Oral Anticoagulants (DOACs) **See also:** **Guidelines for prescribing in primary care: Atrial Fibrillation**	U&Es & CrCl, LFTs, FBC, coag screen, Wt (to calculate CrCl) BP (for HAS-BLED)	U&Es, LFTs & FBC	**Use Cockcroft-Gault formula** to estimate renal function, not eGFR • If under 75 years and CrCl>60ml/min ensure **annual** U&Es • If 75 years or over or CrCl 30-60ml/min ensure **6 monthly** U&Es • If CrCl 15-30mL/min ensure **3 monthly** U&Es • Recalculate CrCl if any significant changes or if intercurrent condition that may have impact on renal function Annual LFTs and FBC

Dosing in Renal Impairment (also refer to individual Summary of Product Characteristics:

Creatinine Clearance	Rivaroxaban	Dabigatran	Apixaban	Edoxaban
>50ml/min	AF and maintenance of VTE treatment: 20mg od	AF and VTE: 150mg bd or ; 110mg bd if: • Age>80 yrs. • Use of verapamil Consider 110mg bd if patient at increased risk of bleeding, aged between 75-80 years or has GORD.	AF: 5mg bd or (; 2.5mg bd if 2 or more of the following are present: • >80yrs old, • <60kg • Serum Cr >133mmol/L Maintenance of VTE treatment: 5mg bd (or 2.5mg bd after 6 months	AF and VTE: 60mg od *or* 30mg od if: • Wt ≤ 60kg • Use of Ciclosporin, Dronedarone, erythromycin or ketoconazole

Drug Monitoring Recommendations

Drug	Baseline	Routine	Comments		
				treatment)	
	30 – 49 ml/min	AF:15mg od VTE: 20mg od; (unless bleeding risk outweighs risk of further VTE, then use 15mg od)	AF and VTE: Dose as in normal renal function. Consider 110mg bd for those at high risk of bleeding.	AF and VTE Dose as in normal renal function above	AF and VTE: 30mg od
	15 – 29 ml/min	As above with caution	Avoid	AF: 2.5mg bd VTE : Use with caution	AF and VTE: 30mg od
	<15ml/min	Avoid			
Respiratory System					
Theophylline	U&Es, LFTs smoking status	Drug level, U&Es	Check plasma drug levels 2- 6 weeks following dose changes to assess response and 12 monthly once maintenance dose reached, or if toxicity suspected. Range 10-20mg/l. Sample 4-6 hours after last dose. Dose adjustments may be required if a patient starts or stops smoking during treatment		
Central Nervous System					
Section 4 has been removed and replaced with: TEWV Psychotropic Medication Monitoring Guide **Other guidelines including transfer of prescribing documents and shared care, relating to antipsychotic, antidepressant and antiepileptic medications, lithium and drugs for ADHD can be found at: TEWV Pharmacy guidelines and policies page**					
Infections					
Nitrofurantoin	U&Es	Nitrofurantoin is contraindicated in patients with an eGFR of less than 45 ml/min/1.73m^2. Short courses of nitrofurantoin may be used with caution in patients with eGFR 30-44ml/min. For prophylactic therapy; Treatment should not normally exceed 6 months and patients should remain under the care of urology during this period. Consideration should be given to pulmonary fibrosis if respiratory symptoms develop, especially in the elderly, and treatment should be discontinued if any evidence of deterioration in lung function. BNF recommends LFT monitoring for long term treatment – 6 monthly			
Minocycline (not a preferred treatment option)	LFTs	FBC and LFTs	3 monthly. Check for signs/symptoms of hepatotoxicity or Systemic Lupus Erythematosus (SLE) pigmentation		
Terbinafine	LFTs	LFTs	4-6 weeks after initiation		
Endocrine System					
Levothyroxine	TSH, T4, ECG	TSH	Measure 6 – 8 weeks following a dose change then 12 monthly once stable		
Carbimazole & Propylthiouracil	TFTs, FBC, LFTs	TFTs	Every 1-3 months until stable, then 12 monthly. 6 monthly monitoring if using as part of a block and replace regimen with thyroxine.		
		FBC	Test immediately if warning signs of infection (sore throat, mouth ulcers, bruising, bleeding, fever) Regular FBC should be carried out in confused patients or those with poor memory.		
		LFTs (Propylthiouracil)	At 3 and 6 months then annually		

Drug Monitoring Recommendations

Drug	Baseline	Routine	Comments
Metformin	U&Es	U&Es	12 monthly (6 monthly for elderly patients or if worsening renal function. Dose adjustment may be required)
Pioglitazone	LFTs, Wt	LFTs	12 monthly. Advise patients to seek immediate medical attention if symptoms such as nausea, vomiting, abdominal pain, fatigue and dark urine develop; discontinue if jaundice occurs. Monitor weight regularly for signs and symptoms of heart failure.
Gliptins	U&Es, LFTs and HbA1C	LFTs	Vildagliptin only - 3 monthly for first year, then 12 monthly
		HbA1c	2 to 6 monthly until person stable on treatment then 6 monthly (or according to individual need). Discontinue if HbA1c has not reduced by at least 5.5 mmol/mol within 6 months of starting treatment.
		U&Es	6 monthly, dose adjustments may be required if renal function declines – check for individual products
Dulaglutide, Exenatide, , Lixisenatide and Liraglutide	Weight and HbA1c	Weight and HbA1c	3 monthly. Discontinue if HbA1c has not reduced by at least 11 mmol/mol and if a weight loss of at least 3% has not been achieved at 6 months.
Ulipristal	LFTs (before each course)	LFTs	Do not initiate treatment for women where ALT or AST levels > 2x ULN Monthly during first 2 treatment courses and thereafter if clinically indicated. Repeat 2-4 weeks after stopping. Test immediately in current or recent users of the drug who present with signs or symptoms suggestive of liver injury. Treatment should be stopped if ALT or AST levels >3xULN
Musculoskeletal System			
DMARDs	see CDDFT shared care guidelines **Monitoring Immunosuppressive Drugs in Chronic Inflammatory Disease**		
NSAIDs	Renal function should be monitored in patients with renal, cardiac or hepatic impairment		

Abbreviations:

ACEi	Angiotensin converting enzyme inhibitors	Ht	Height
A2RA	Angiotensin-II receptor antagonists	LFTs	Liver function tests
AST/ALT	Aspartate transaminase/alanine transaminase	Li	Serum lithium
BP	Blood Pressure	NECS	North of England Commissioning Support
BP	Blood pressure	Plts	Platelets
CK	Creatine phosphokinase	SBP	Systolic blood pressure
CV	Cardiovascular	TFTs	Thyroid function tests
ECG	Electrocardiograph	TGs	Triglycerides
FBC	Full blood count	Thyroid a/b	Thyroid antibodies
FBG	Fasting blood glucose	TSH	Thyroid stimulating hormone
fT3	Free T3	U&Es	Urea and electrolytes, creatinine and eGFR
fT4	Free T4	ULN	Upper limit of normal
HbA1c	Glycosylated Haemoglobin (mmol/mol)	Wt	Weight
HR	Heart rate/pulse		