

# TEMPLATE – version1.1

## Pathway for prescribing acetylcholinesterase inhibitors (donepezil, rivastigmine, galantamine) and memantine in the treatment of Alzheimer's disease, Parkinson's Disease dementia and Dementia with Lewy bodies

**This template was produced by the London Dementia Clinical Network (NHS England and Improvement London Region) with special thanks to Delia Bishara (Consultant Pharmacist, South London and Maudsley NHS Foundation Trust).**

*This pathway covers*

*Clinical Commissioning Groups:*

- X
- X
- X

*Mental Health Trusts*

- X
- X

*Acute Hospital Trusts*

- X
- X

## **Contents**

Introduction .....	3
Roles of primary and secondary care in initiation of acetylcholinesterase inhibitors and memantine (in patients who are not already prescribed an AChE inhibitor) .....	4
Prescribing memantine for patients who are already established on an acetylcholinesterase inhibitor .....	4
Assessing cardiac status prior to commencing AChE inhibitors .....	6
Deciding which acetylcholinesterase inhibitor to prescribe .....	7
Titration and monitoring of acetylcholinesterase inhibitors and memantine .....	8
Titration guideline:.....	8
Drug interactions.....	9
Stopping treatment.....	9
Local Contacts: .....	10
Pathway outline:.....	10
Appendix one: Cautions .....	11
Appendix two: NHS drug tariff.....	12
Appendix three: Side effects .....	13
Appendix four: Drug interactions .....	14

## **Introduction**

This pathway was designed by the London Dementia Clinical Network after reviewing shared care protocols across London. You can read the findings of this review [here](#). This document is designed to be used as a template; local commissioners and providers should include specific information such as geographical coverage and useful contacts.

This pathway is based on the [2018 NICE dementia guideline](#) and the [2017 NICE Parkinson's disease guideline](#). This pathway should be used in accordance with the principles of the 2005 Mental Capacity Act.

The NICE dementia guideline states that:

- The three acetylcholinesterase (AChE) inhibitors donepezil, galantamine and rivastigmine as monotherapies are recommended as options for managing mild to moderate Alzheimer's disease
- Memantine monotherapy is recommended as an option for managing Alzheimer's disease for people with moderate Alzheimer's disease who are intolerant of or have a contraindication to AChE inhibitors or severe Alzheimer's Disease
- Once a decision has been made to start an AChE inhibitor or memantine, the first prescription may be made in primary care
- For people with an established diagnosis of Alzheimer's disease who are already taking an AChE inhibitor
  - consider memantine in addition to an AChE inhibitor if they have moderate disease
  - offer memantine in addition to an AChE inhibitor if they have severe disease
- For people with an established diagnosis of Alzheimer's disease who are already taking an AChE inhibitor, primary care prescribers may start treatment with memantine without taking advice from a specialist clinician

For dementia with Lewy bodies, the NICE guideline states:

- Offer donepezil or rivastigmine to people with mild to moderate dementia with Lewy bodies
- Only consider galantamine for people with mild to moderate dementia with Lewy bodies if donepezil and rivastigmine are not tolerated
- Consider donepezil or rivastigmine for people with severe dementia with Lewy bodies
- Consider memantine for people with dementia with Lewy bodies if AChE inhibitors are not tolerated or are contraindicated

For Parkinson's disease dementia the NICE Parkinson's disease guideline states:

- Offer a cholinesterase inhibitor for people with mild or moderate Parkinson's disease dementia
- Consider a cholinesterase inhibitor for people with severe Parkinson's disease dementia
- Consider memantine for people with Parkinson's disease dementia, only if cholinesterase inhibitors are not tolerated or are contraindicated

### **Roles of primary and secondary care in initiation of acetylcholinesterase inhibitors and memantine (in patients who are not already prescribed an AChE inhibitor)**

The decision to initiate an AChE inhibitor, or memantine in patients who are not already prescribed an AChE inhibitor, should be made by a dementia specialist (psychiatrist, neurologist, geriatrician, nurse prescriber, GP with special interest). There is no requirement for the specialist to issue the first prescription.

We recommend that the first prescription should be provided by primary care (on the advice of a specialist) for the following reasons:

- Commencing medication is not urgent
- New medications should be integrated with current medications to support adherence and to ensure integration with a patient's dosette box/blister pack
- It is more convenient and safer for a patient to have all prescriptions issued by the same prescriber

Prescribing recommendation from the specialist to primary care must be clearly communicated and include:

- Indication for the medication
- Absence of contra-indications or cautions (e.g. pulse check findings)
- Medication and dose
- Titration plan
- How to seek advice from a specialist

### **Prescribing memantine for patients who are already established on an acetylcholinesterase inhibitor**

For patients with an established diagnosis of Alzheimer's disease who are already taking an AChE inhibitor, primary care prescribers can initiate memantine without advice from a specialist. eGFR needs to be checked prior to prescribing memantine and should be avoided if eGFR is less than 5 mL/minute/1.73 m<sup>2</sup> (see [titration section](#) for further details).

Memantine (in addition to an AChE inhibitor) should be considered in people with moderate dementia and offered to people with severe dementia. A good opportunity to consider the suitability of memantine is during an annual care plan review.

Do not rely solely on a score on a cognitive test to decide if a patient has mild, moderate or severe dementia. Consider any physical, sensory or learning disabilities or communication difficulties in your assessment of the stage of dementia. The descriptions below are a guide to what to expect at the different stages of dementia:

***Mild dementia*** – a person with mild dementia will be able to continue most of their normal activities independently. Friends and family close to the person may be aware of increased difficulties, in for example making plans or finding the right word.

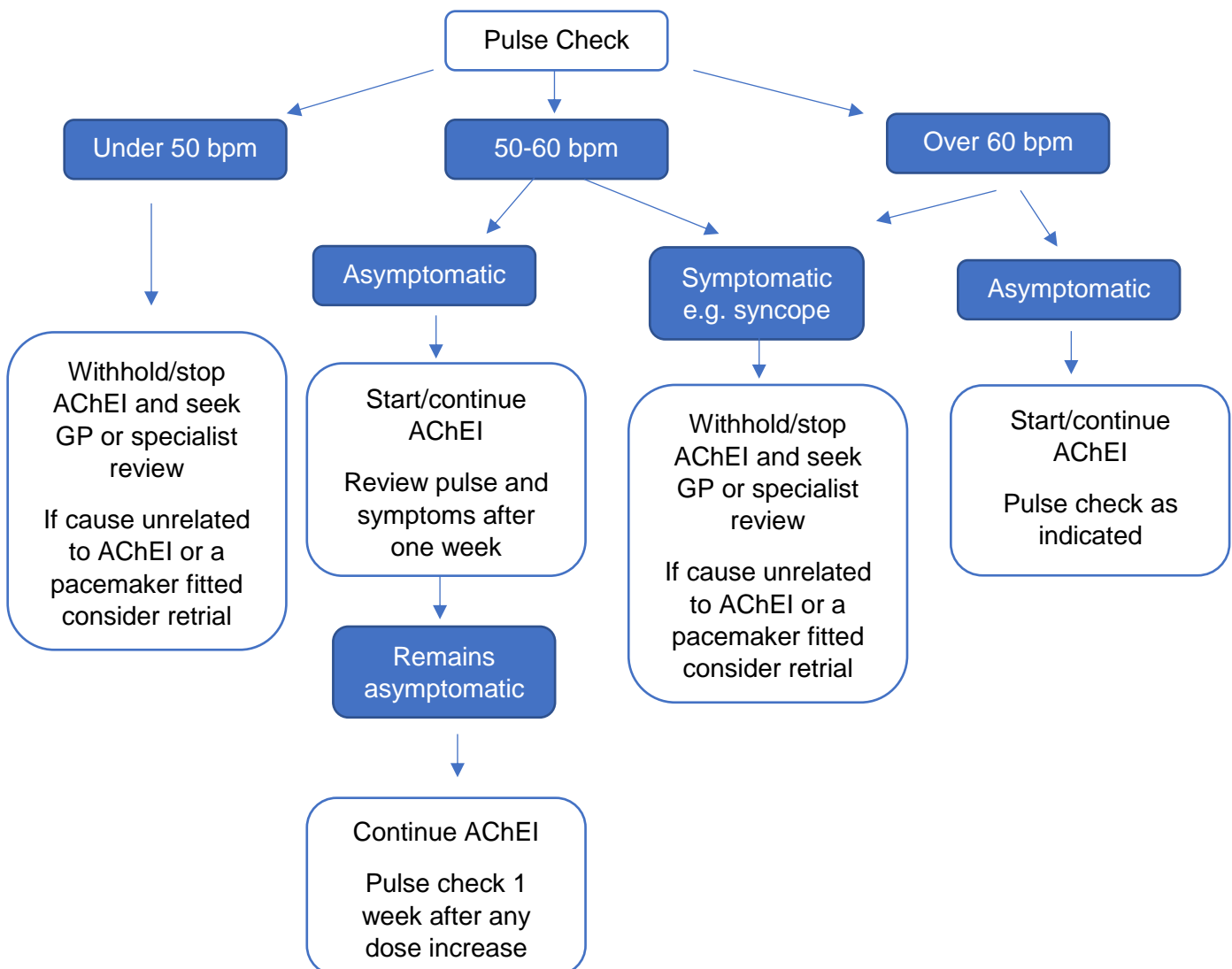
***Moderate Dementia*** – usually people will require support and a greater level of care to carry out their activities of daily living. They may need support with shopping, meal planning, managing household finances and getting washed and dressed and they may sometimes get lost. They may show increased frustration when they are aware they cannot do things they previously used to do. They may lack insight into their increasing difficulties and develop apathy and less interest in joining social activities.

***Severe Dementia*** – in this final stage of dementia, a person requires significant support, around the clock, for basic activities of daily living like bathing, dressing, and eating. Their communication is likely to be significantly impaired. They may have impaired swallowing ability, increasing difficulty with continence and increasing physical frailty. Most people living with dementia in care homes have severe dementia.

## Assessing cardiac status prior to commencing AChE inhibitors

A pulse check should be taken prior to advising primary care to prescribe AChE inhibitors; the result of this must be communicated to primary care. **ECG is not routinely required prior to prescribing AChE inhibitors.** Further clinical assessment, including ECG, should be undertaken prior to prescribing if the patient has unexplained syncope or a pulse < 50 bpm. You can find further guidance [here](#). Caution should be exercised in prescribing AChE inhibitors in individuals with “sick sinus syndrome” or other supraventricular cardiac conduction disturbances, such as sinoatrial or atrioventricular block. In these conditions, specialist advice e.g. from a cardiologist should be obtained. A list of other cautions can be found in [appendix one](#).

### Pulse check pathway (adapted from [Rowland et al 1997](#))



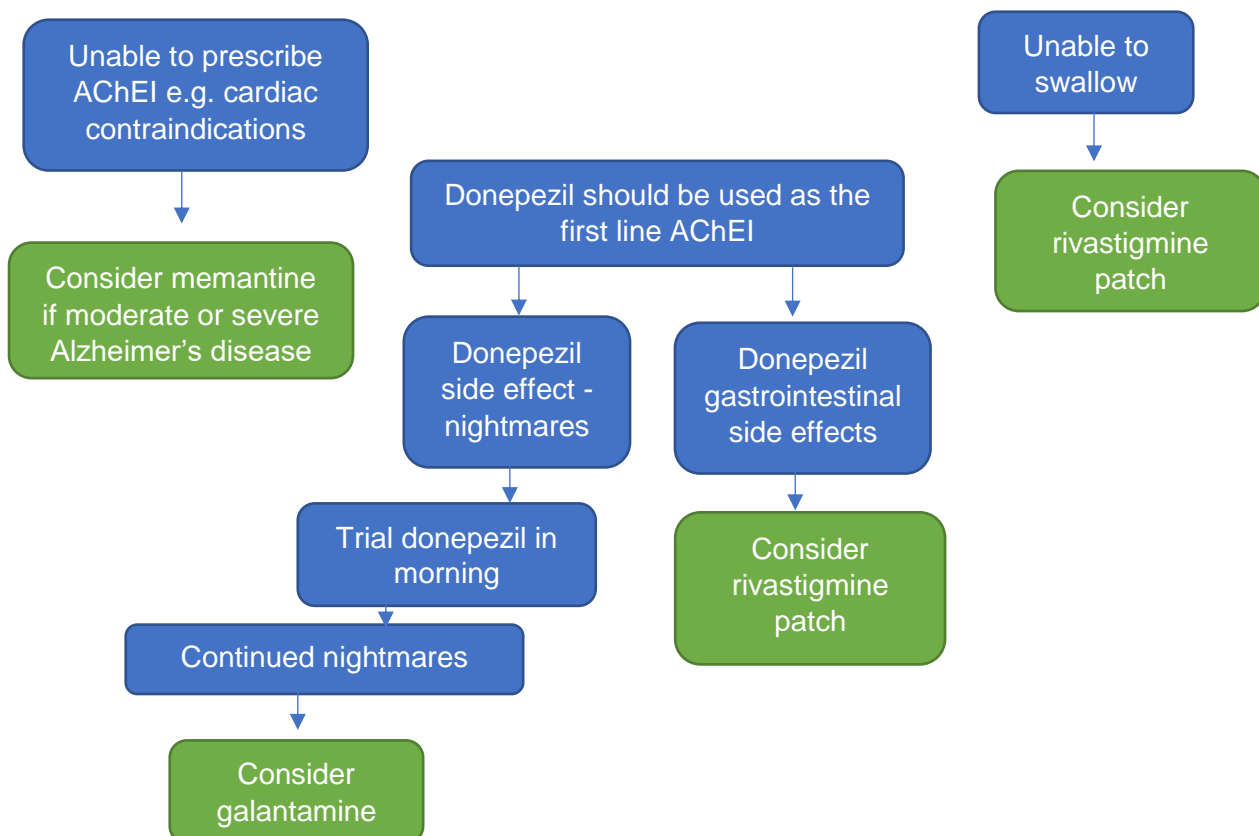
## Deciding which acetylcholinesterase inhibitor to prescribe

Donepezil should be used as the first line AChE inhibitor due to cost effectiveness (for costings list see [appendix two](#)). If Donepezil is not tolerated due to nightmares, trial taking the tablet in the morning (this is usually sufficient); if still not tolerated then consider galantamine as it is less likely to cause nightmares. If switching to galantamine review cardiac risk factors as two research studies reported a higher than expected rate of adverse cardiac effects in an MCI population (see [here](#) for further information).

If donepezil is not tolerated due to gastrointestinal symptoms, or the patient cannot swallow tablets or capsules then consider rivastigmine patch. (full side effects can be found in [appendix three](#)). When prescribing rivastigmine patches, ensure the patient/carer is informed to remove the old patch before applying the new one, and to not apply a new patch to the same skin area twice within 14 days; the [Exelon patch tracker](#) can be useful to support carers.

Summary flow chart:

*There may be other reasons to prescribe a particular AChEI; this flow chart is to be used as a guide and is not an exhaustive list.*



## **Titration and monitoring of acetylcholinesterase inhibitors and memantine**

Titration and monitoring of AChE inhibitors and memantine should happen in primary care. Once medication is titrated to optimum dose no further specific review is required other than general medication review appropriate to age and comorbidities. Medication should be continued lifelong if tolerated. It may be appropriate to withdraw medication during the last phase of life in discussion with a GP or palliative care team.

**Titration guideline:** (BNF online <https://bnf.nice.org.uk/> last updated 30 May 2019)

**Donepezil:** The starting dose is 5 mg once daily (taken at bedtime). Review after one month and if tolerated offer to increase to 10 mg. Donepezil is also available in orodispersible tablets and oral solution; due to cost this is only recommended for people who have difficulties swallowing tablets

**Rivastigmine (oral):** The starting dose is 1.5 mg twice daily, review after two weeks and increase in steps of 1.5 mg twice daily at intervals of at least 2 weeks according to response and tolerance. Maximum dose is 6 mg twice daily.

**Rivastigmine (transdermal):** Apply 4.6 mg/24 hours daily, review at 4 weeks, if tolerated increased to 9.5 mg/24 hours daily for a further 6 months. After 6 months if well tolerated and cognitive deterioration or functional decline is demonstrated then it can be increased to 13.3 mg/24 hours daily. Rivastigmine is also available in an oral solution, however this is currently more costly than transdermal patches, therefore transdermal patch is recommended for people with swallowing difficulties.

**Galantamine modified release:** The starting dose is 8 mg daily increasing by 8mg at four weekly intervals to a maximum dose of 24 mg. (Non-modified release tablets are soon to be withdrawn, therefore not recommended.)

If an oral AChE inhibitor is not tolerated due to gastrointestinal side effects, consider transdermal rivastigmine.

**Memantine:** The starting dose is 5 mg once daily; if tolerated increase in steps of 5 mg every week to a maximum 20 mg per day (this is the usual maintenance dose). Memantine is available in a titration pack with one week (7 tablets) of 5 mg, 10 mg, 15 mg and 20 mg. Memantine 5 mg tablets are not readily available, 10 mg tablets are scored and should be split in half give a 5mg dose. Memantine should be avoided if eGFR is less than 5 mL/minute/1.73 m<sup>2</sup>. Reduce dose to 10 mg daily if eGFR 5–29 mL/minute/1.73 m<sup>2</sup>. Reduce dose to 10 mg daily if eGFR 30-49 mL/minute/1.73 m<sup>2</sup>; if well tolerated after at least 7 days dose can be increased to 20 mg daily in 5 mg steps.



Medication	Frequency	Titration – week and dose in mg								
		Initial dose	2	3	4	5	6	7	8	9
Donepezil	OD (oral)	5				10				
Rivastigmine	BD (oral)	1.5		3		4.5		6		
Rivastigmine – patch	Daily (patch)	4.6				9.5				
Galantamine MR	OD (oral)	8				16				24
Memantine	OD (oral)	5	10	15	20					

## Drug interactions

### Cardiac

For patients prescribed an AChE inhibitor there is a possible interaction with agents that can cause bradycardia e.g. digoxin,  $\beta$  blockers, certain calcium-channel blockers and amiodarone. Caution with concomitant use of medications known to induce QT prolongation and/or torsade de pointes; an ECG is recommended by the manufacture when prescribing galantamine and these medications. A full list of interactions can be found in [appendix four](#)

### Anticholinergics

The combination of AChE inhibitors and anticholinergic medications such as amitriptyline or oxybutynin can lead to pharmacological antagonism. The Anticholinergic Effect on Cognition (AEC) scale can be used to establish which medications have an anticholinergic effect on cognition, the online tool can be accessed [here](#). A full list of interactions can be found in [appendix four](#)

## Stopping treatment

Dementia medication should not be stopped based on cognitive test scores, as discontinuation may lead to worsening cognition and function. Generally, if well tolerated dementia medication is continued until the patient is nearing the end of life.

### Reasons for stopping treatment

- When the patient/caregiver decides to stop (after being advised on the risks and benefits of stopping treatment).
- When the patient refuses to take the medication (take into account any local and national covert prescribing guidance, such as [NICE care home guidance](#)).
- When there are issues with patient compliance which cannot be reasonably resolved.
- When the patient's cognitive, functional or behavioural decline occurs as a consequence of treatment.
- When there are intolerable side effects.
- When comorbidities make treatment risky or futile (e.g. terminal illness).

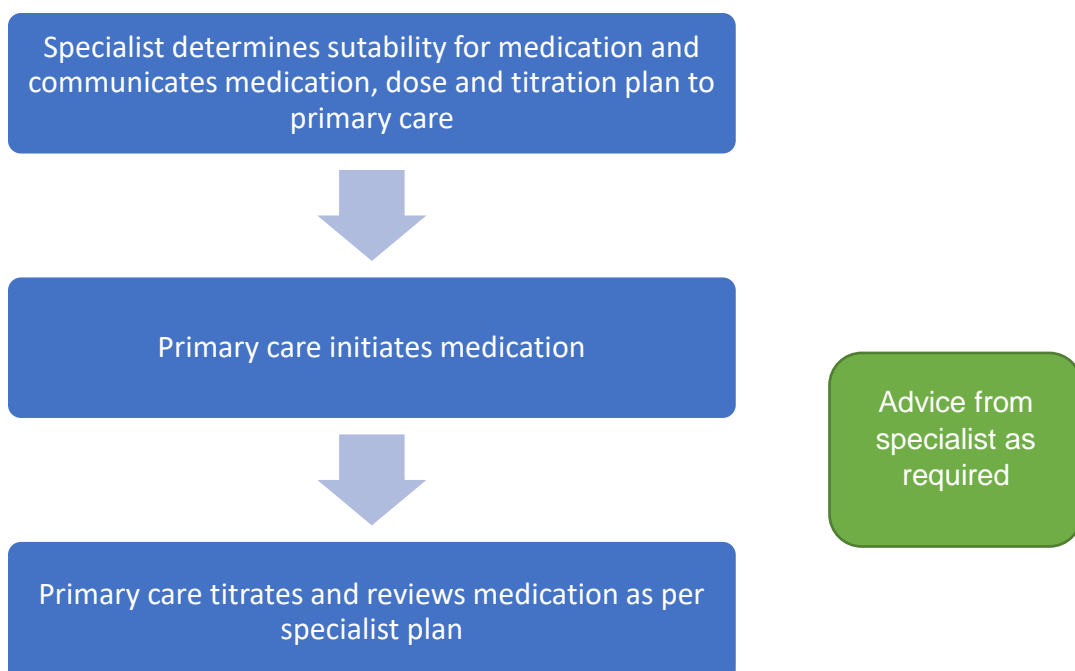
- Where there is no clinically meaningful benefit to continuing therapy (clinical judgement should be used here rather than ceasing treatment when a patient reaches a certain score on a cognitive outcome or when they are institutionalised).

When a decision is made to stop therapy (for reasons other than lack of tolerability), tapering of the dose and monitoring the patient for evidence of significant decline during the next 1–3 months are advised. If such decline occurs, reinstatement of therapy should be considered.

**Local Contacts:**

*Fill in local contacts to specialist services e.g. MAS, cognitive neurology*

**Pathway outline:**



**Appendix one: Cautions**

*BNF online <https://bnf.nice.org.uk/> last updated 30 May 2019*

**Donepezil:** Asthma; chronic obstructive pulmonary disease; sick sinus syndrome; supraventricular conduction abnormalities; susceptibility to peptic ulcers

**Galantamine:** Avoid in gastro-intestinal obstruction; avoid in urinary outflow obstruction; avoid whilst recovering from bladder surgery; avoid whilst recovering from gastro-intestinal surgery; cardiac disease; chronic obstructive pulmonary disease; congestive heart failure; electrolyte disturbances; history of seizures; history of severe asthma; pulmonary infection; sick sinus syndrome; supraventricular conduction abnormalities; susceptibility to peptic ulcers; unstable angina

**Rivastigmine:** Bladder outflow obstruction; conduction abnormalities; duodenal ulcers; gastric ulcers; history of asthma; history of chronic obstructive pulmonary disease; history of seizures; risk of fatal overdose with patch administration errors; sick sinus syndrome; susceptibility to ulcers

**Memantine:** Epilepsy; history of convulsions; risk factors for epilepsy

## Appendix two: NHS drug tariff

June 2019 NHS Tariff: <http://www.drugtariff.nhsbsa.nhs.uk/#/00710361-DA/DA00710356/Home>

	Pack size	Cost	Cost per month
Donepezil 5mg tablets	28	£0.83	£0.83
Donepezil 10mg tablets	28	£0.97	£0.97
Donepezil 10mg orodispersible tablets sugar free	28	£8.18	£8.18
Donepezil 5mg orodispersible tablets sugar free	28	£7.35	£7.35
Donepezil 1mg/ml oral solution sugar free	150ml	£50.99	Approx. £101.98 (10mg)
Galantamine 8mg MR capsules	28	£51.88	£51.88
Galantamine 16mg MR capsules	28	£64.90	£64.90
Galantamine 24mg MR capsules	28	£79.80	£79.80
Galantamine 20mg/5ml oral solution sugar free	100ml	120	Approx. £225 (12mg BD)
Rivastigmine 1.5mg capsules	28	£2.52	£5.04
Rivastigmine 3mg capsules	28	£3.16	£6.32
Rivastigmine 4.5mg capsules	28	£23.53	£47.06
Rivastigmine 6mg capsules	28	£29.17	£58.34
Rivastigmine 4.6mg/24hours transdermal patches	30	£77.97	£77.97
Rivastigmine 9.5mg/24hours transdermal patches	30	£19.97	£19.97
Rivastigmine 13.3mg/24hours transdermal patches	30	£77.97	£77.97
Rivastigmine 2mg/ml oral solution sugar free	120ml	£96.82	Approx. £145.23 (6mg BD)
Memantine 5mg tablets	Not readily available – half 10mg tablet		
Memantine 10mg tablets	28	£1.19	£1.19
Memantine 20mg tablets	28	£1.51	£1.51
Memantine 5mg/10mg/15mg/20mg tablets initiation pack	28	£43.13	£43.13
Memantine 10mg orodispersible tablets sugar free	28	£24.99	£24.99
Memantine 20mg orodispersible tablets sugar free	28	£49.98	£49.98
Memantine 10mg soluble tablets sugar free	28	£29.09	£29.09
Memantine 20mg soluble tablets sugar free	28	£58.18	£58.18
Memantine 10mg/ml oral solution sugar free	50ml	£55.06	Approx. £66.07 (20mg OD)

**Appendix three: Side effects**

	Common or very common	Uncommon	Rare or very rare	Frequency unknown / other
Donepezil	Aggression, agitation, appetite decreased, common cold, diarrhoea, dizziness, fatigue, gastrointestinal disorders, hallucination, headache, injury, muscle cramps, nausea, pain, skin reactions, sleep disorders, syncope, urinary incontinence, vomiting	Bradycardia, gastrointestinal haemorrhage, hypersalivation, seizure	Cardiac conduction disorders, extrapyramidal symptoms, hepatic disorders, neuroleptic malignant syndrome, rhabdomyolysis	
Rivastigmine - general	Anxiety, appetite decreased, arrhythmias, asthenia, dehydration, depression, diarrhoea, dizziness, drowsiness, fall, gastrointestinal discomfort, headache, hyperhidrosis, hypersalivation, hypertension, movement disorders, nausea, skin reactions, syncope, tremor, urinary incontinence, urinary tract infection, vomiting, weight decreased	Aggression, atrioventricular block	Pancreatitis, seizure	Hepatitis
Rivastigmine oral specific	confusion, gait abnormal, hallucinations, malaise, parkinsonism, sleep disorders	Hypotension	angina pectoris, gastrointestinal disorders, gastrointestinal haemorrhage	
Rivastigmine transdermal specific		gastric ulcer		hallucination, nightmares
Galantamine	Appetite decreased, arrhythmias, asthenia, depression, diarrhoea, dizziness, drowsiness, fall, gastrointestinal discomfort, hallucinations, headache, hypertension, malaise, muscle spasms, nausea, skin reactions, syncope, tremor, vomiting, weight decreased	Atrioventricular block, dehydration, flushing, hyperhidrosis, hypersomnia, hypotension, muscle weakness, palpitations, paraesthesia, seizure, taste altered, tinnitus, vision blurred	Hepatitis, severe cutaneous adverse reactions (SCARs)	Serious skin reactions (including Stevens-Johnson syndrome and acute generalized exanthematous pustulosis) have been reported—manufacturer advises discontinue at the first appearance of skin rash.
Memantine	Balance impaired, constipation, dizziness, drowsiness, dyspnoea, headache, hypersensitivity, hypertension	Confusion, embolism and thrombosis, fatigue, fungal infection, hallucination, heart failure, vomiting	Seizure	Hepatitis, pancreatitis, psychotic disorder

**Appendix four: Drug interactions**  
Acetylcholinesterase inhibitors

<https://bnf.nice.org.uk/interaction/> (accessed July 2017)

Medication	Description	Interaction with D=donepezil, G=galantamine, R=rivastigmine		
		D	G	R
Acebutolol	AChEIs predicted to increase the risk of bradycardia when given with acebutolol. Manufacturer advises caution.	√	√	√
Alectinib	Both can increase risk of bradycardia	√	√	√
Alfentanil	Both can increase risk of bradycardia	√	√	√
Amiodarone	Amiodarone increases the risk of bradycardia when given with AChEIs. Manufacturer makes no recommendation.	√	√	√
Apraclonidine	Both can increase risk of bradycardia	√	√	√
Atazanavir	Atazanavir is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Atenolol	AChEIs predicted to increase the risk of bradycardia when given with atenolol. Manufacturer advises caution.	√	√	√
Atracurium	AChEIs predicted to decrease the effects of atracurium. Manufacturer makes no recommendation.	√	√	√
Betaxolol	AChEIs predicted to increase the risk of bradycardia when given with betaxolol. Manufacturer advises caution.	√	√	√
Bisoprolol	AChEIs predicted to increase the risk of bradycardia when given with bisoprolol. Manufacturer advises caution.	√	√	√
Brimonidine	Both can increase risk of bradycardia	√	√	√
Bupropion	Bupropion is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Carbamazepine	Carbamazepine is predicted to decrease the exposure to donepezil. Manufacturer advises caution.	√		
Carvedilol	AChEIs predicted to increase the risk of bradycardia when given with carvedilol. Manufacturer advises caution.	√	√	√
Celiprolol	AChEIs predicted to increase the risk of bradycardia when given with celiprolol. Manufacturer advises caution.	√	√	√
Cinacalcet	Cinacalcet is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Cisatracurium	AChEIs predicted to decrease the effects of cisatracurium. Manufacturer makes no recommendation.	√	√	√
Clarithromycin	Clarithromycin is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Clonidine	Both can increase risk of bradycardia	√	√	√
Cobicistat	Cobicistat is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Crizotinib	Both can increase risk of bradycardia	√	√	√
Darunavir	Darunavir is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Digoxin	Both can increase risk of bradycardia	√	√	√
Diltiazem	Diltiazem increases the risk of bradycardia when given with AChEIs. Manufacturer advises caution.	√	√	√
Enzalutamide	Enzalutamide is predicted to decrease the exposure to donepezil. Manufacturer advises caution.	√		
Esmolol	AChEIs predicted to increase the risk of bradycardia when given with esmolol. Manufacturer advises caution.	√	√	√
Fentanyl	Both can increase risk of bradycardia	√	√	√
Fingolimod	Both can increase risk of bradycardia	√	√	√
Flecainide	Both can increase risk of bradycardia	√	√	√
Fluoxetine	Fluoxetine is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Fosamprenavir	Fosamprenavir is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	

Fosphenytoin	Fosphenytoin is predicted to decrease the exposure to donepezil. Manufacturer advises caution.	√		
Idelalisib	Idelalisib is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Itraconazole	Itraconazole is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Ivabradine	Both can increase risk of bradycardia	√	√	√
Ketoconazole	Ketoconazole is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Labetalol	AChEIs predicted to increase the risk of bradycardia when given with labetalol. Manufacturer advises caution.	√	√	√
Levobunolol	AChEIs predicted to increase the risk of bradycardia when given with levobunolol. Manufacturer advises caution.	√	√	√
Lopinavir	Lopinavir is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Methadone	Both can increase risk of bradycardia	√	√	√
Metoprolol	Donepezil is predicted to increase the risk of bradycardia when given with metoprolol. Manufacturer advises caution.	√	√	√
Mitotane	Mitotane is predicted to decrease the exposure to donepezil. Manufacturer advises caution.	√		
Mivacurium	AChEIs predicted to decrease the effects of mivacurium. Manufacturer makes no recommendation.	√	√	√
Nadolol	AChEIs predicted to increase the risk of bradycardia when given with nadolol. Manufacturer advises caution.	√	√	√
Nebivolol	AChEs predicted to increase the risk of bradycardia when given with nebivolol. Manufacturer advises caution.	√	√	√
Neostigmine	Both can increase risk of bradycardia	√	√	√
Pancuronium	AChEIs predicted to decrease the effects of pancuronium. Manufacturer makes no recommendation.	√	√	√
Paroxetine	Paroxetine is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Pasireotide	Both can increase risk of bradycardia	√	√	√
Phenobarbital	Phenobarbital is predicted to decrease the exposure to donepezil. Manufacturer advises caution.	√		
Phenytoin	Phenytoin is predicted to decrease the exposure to donepezil. Manufacturer advises caution.	√		
Pindolol	AChEIs predicted to increase the risk of bradycardia when given with pindolol. Manufacturer advises caution.	√	√	√
Primidone	Primidone is predicted to decrease the exposure to donepezil. Manufacturer advises caution.	√		
Propranolol	AChEIs predicted to increase the risk of bradycardia when given with propranolol. Manufacturer advises caution.	√	√	√
Pyridostigmine	Both can increase risk of bradycardia	√	√	√
Remifentanyl	Both can increase risk of bradycardia	√	√	√
Rifampicin	Rifampicin is predicted to decrease the exposure to donepezil. Manufacturer advises caution.	√		
Ritonavir	Ritonavir is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Rocuronium	AChEIs predicted to decrease the effects of rocuronium. Manufacturer makes no recommendation.	√	√	√
Saquinavir	Saquinavir is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Selegiline	Both can increase risk of bradycardia	√	√	√
Sotalol	AChEIs predicted to increase the risk of bradycardia when given with sotalol. Manufacturer advises caution.	√	√	√
Sufentanil	Both can increase risk of bradycardia	√	√	√
Suxamethonium	AChEIs increases the effects of suxamethonium. Manufacturer makes no recommendation.	√	√	√
Terbinafine	Terbinafine is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	

Thalidomide	Both can increase risk of bradycardia	√	√	√
Timolol	AChEIs is predicted to increase the risk of bradycardia when given with timolol. Manufacturer advises caution.	√	√	√
Tipranavir	Tipranavir is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	
Tizanidine	Both can increase risk of bradycardia	√	√	√
Verapamil	Verapamil increases the risk of bradycardia when given with donepezil. Manufacturer advises caution.	√	√	√
Voriconazole	Voriconazole is predicted to increase the exposure to galantamine. Manufacturer advises monitor and adjust dose.		√	

## Drug interactions – memantine

Amantadine	Amantadine increases the risk of CNS toxicity when given with memantine. <b>Manufacturer advises use with caution or avoid.</b>
Apomorphine	Memantine is predicted to increase the effects of apomorphine. Manufacturer makes no recommendation.
Bromocriptine	Memantine is predicted to increase the effects of bromocriptine. Manufacturer makes no recommendation.
Cabergoline	Memantine is predicted to increase the effects of cabergoline. Manufacturer makes no recommendation.
Ketamine	Memantine is predicted to increase the risk of CNS side-effects when given with ketamine. <b>Manufacturer advises avoid.</b>
Levodopa	Memantine is predicted to increase the effects of levodopa. Manufacturer makes no recommendation.
Pergolide	Memantine is predicted to increase the effects of pergolide. Manufacturer makes no recommendation.
Pramipexole	Memantine is predicted to increase the effects of pramipexole. Manufacturer makes no recommendation.
Quinagolide	Memantine is predicted to increase the effects of quinagolide. Manufacturer makes no recommendation.
Ropinirole	Memantine is predicted to increase the effects of ropinirole. Manufacturer makes no recommendation.
Rotigotine	Memantine is predicted to increase the effects of rotigotine. Manufacturer makes no recommendation.

### Memantine additional information:

Isolated cases of international normalized ratio (INR) increases have been reported in patients on warfarin who commence treatment with memantine. Although no causal relationship has been established, close monitoring of prothrombin time or INR is advisable for patients on warfarin during the titration phase of memantine administration (note this is not listed as a drug interaction in the BNF). See [here](#) for further details.