

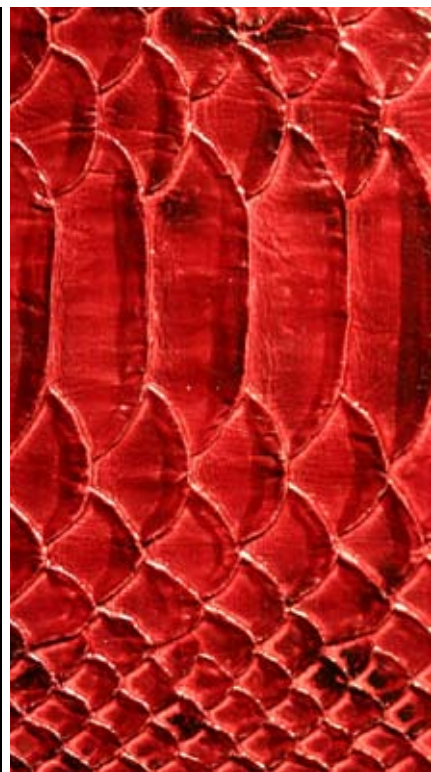
# ACE

## Inhibitors

### Quiz feedback



**bpac**<sup>nz</sup>  
better medicine



# ACE inhibitors quiz feedback

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## Acknowledgement:

bpac<sup>nz</sup> would like to thank Professor Rob Walker, Nephrologist, for his help and guidance on the development of this resource.

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# Contents

Ace inhibitor quiz .....	2
Feedback .....	3
Key recommendations from the ACE inhibitor campaign .....	3
Quiz feedback .....	4

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All information is intended for use by competent health care professionals and should be utilised in conjunction with pertinent clinical data.

# ACE inhibitor quiz

1. Select the option(s) which are contraindications to the use of ACE inhibitors.

Angioedema	
Cough	
Pregnancy	
Renal Impairment	

2. Select the drug(s) which have clinically significant interactions with ACE inhibitors.

Lithium	
Low-dose aspirin	
NSAIDs	
Potassium supplements	
Spironolactone	

3. Write the name and starting dose of any ACE inhibitor for a patient with heart failure.

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4. Write the name and target dose of any ACE inhibitor for a patient with heart failure.

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5. A man commenced ACE inhibitor treatment three weeks ago for hypertension. He mentions a dry cough. Your history and examination lead you to conclude that it is an ACE inhibitor cough. Select the action(s) you would take.

Change to another ACE inhibitor	
Continue ACE inhibitor	
Start A-II receptor antagonist	
Stop ACE inhibitor	

6. A patient on an ACE inhibitor develops angioedema. She would benefit from continued RAS inhibition. Select the action(s) you would take.

Change to another ACE inhibitor	
Continue ACE inhibitor	
Start A-II receptor antagonist	
Stop ACE inhibitor	

7. Select the factor(s) which indicate need for increased vigilance in monitoring when commencing an ACE inhibitor.

Diuretic therapy	
Heart failure	
Serum creatinine of 0.17 mmol/L	
Systolic BP of 110	

8. Six weeks after starting an ACE inhibitor a patient with diabetes and microalbuminuria has a serum creatinine increase to 40% above baseline. Select the action(s) you would take.

Check other medications	
Continue ACE inhibitor	
Start A-II receptor antagonist	
Stop ACE inhibitor	

9. A patient started on ACE inhibitor therapy three weeks ago, and now has a serum potassium of 5.8 mmol/L. Select the action(s) you would take.

Check other medications	
Continue ACE inhibitor	
Start A-II receptor antagonist	
Stop ACE inhibitor	

10. A 55 year-old man with hypertension and COPD has inadequate control of BP on low-dose thiazides. Select the medication you would add.

A-II receptor antagonist	
ACE inhibitor	
Beta-blocker	
Calcium channel blocker	

# Feedback

We are sorry you did not return a quiz to us. Please let us know if there is any way we can make our case studies more useful to you. We want our resources to be helpful with your day-to-day clinical practice. We would be pleased to receive any suggestions that you have.

If you have questions about the use of ACE inhibitors or comments about bpac<sup>nz</sup>'s ACE inhibitor programme please do not hesitate to contact us.

## Key recommendations from the ACE inhibitor campaign

1. Unless there are contraindications, use ACE inhibitors for everybody with:
  - Left ventricular dysfunction with or without symptoms of heart failure
  - Diabetic or non-diabetic nephropathy as indicated by microalbuminuria or frank proteinuria
  - Known cardiovascular disease or at high risk of cardiovascular disease.
2. For most people with hypertension who have diabetes or are at high risk of diabetes use an ACE inhibitor or a low-dose thiazide or a combination of both. Ensure BP is maintained below 130/80 mmHg. Add other agents as indicated.
3. Consider ACE inhibitors for people with diabetes or people who are at high risk of diabetes as they appear to reduce cardiovascular and renal risk for these groups and reduce progression to diabetes for those at high risk.
4. When people have indications for ACE inhibitors they are also likely to benefit from statins and low-dose aspirin.
5. Serious adverse effects from ACE inhibitor use can usually be predicted and avoided with careful monitoring.

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If you have any questions please email these to us and we will answer via the 'Your Questions Answered' section of our web site.

[www.bpac.org.nz](http://www.bpac.org.nz)

# Quiz feedback

1. Select the option(s) which are contraindications to the use of ACE inhibitors.

	GPs average responses
Angiodema	98 %
Cough	4 %
Pregnancy	96 %
Renal impairment	4 %

Most respondents correctly identified angioedema and pregnancy as contraindications to ACE inhibitor use. Renal impairment is likely to be improved with ACE inhibitors although extra vigilance is required with monitoring.

Cough is not a contraindication to starting an ACE inhibitor. All panel members had patients who had developed ACE inhibitor cough and the variations in the way they handled this is discussed in question five.

2. Select the drug(s) which have clinically significant interactions with ACE inhibitors.

	GPs average responses
Lithium	95 %
Low-dose aspirin	2 %
NSAIDs	95 %
Potassium supplements	98 %
Spirinolactone	91 %

The panel felt that all listed drugs except low-dose aspirin have clinically significant interactions with ACE inhibitors. They stressed that many of their patients on ACE inhibitors are also likely to benefit from low-dose aspirin.

Potassium supplements are rarely needed when ACE inhibitors are being used. Spironolactone or NSAIDs may be indicated for selected patients who are on ACE inhibitors but these patients will need careful monitoring of renal function and electrolytes. They are at particular risk of acute renal failure at times of volume depletion such as with diarrhoea or vomiting.

As ACE inhibitors reduce the excretion of lithium, patients on this combination are at increased risk of lithium toxicity and require attentive monitoring of lithium levels.

N.B GP panel response =

## Quiz feedback

3. Write the name and **starting dose** of any ACE inhibitor for a patient with heart failure.

	Starting dose (BNF)	GPs average responses
Quinapril	2.5 mg/d.	2.5 mg/d.
Cilazapril	0.5 mg/d.	0.5 mg/d.
Enalapril	2.5 mg/d.	2.5 mg/d.
Captopril	6.25 - 12.5 mg/d.	7.0 mg/d.
Lisinopril	2.5 mg/d.	2.5 mg/d.

The key to the safe use of ACE inhibitors in heart failure is to start low and go slow. The first dose is usually given at night.

4. Write the name and **target dose** of any ACE inhibitor for a patient with heart failure.

	Target dose	GPs average responses
Quinapril	20 - 40 mg/d.	28 mg/d.
Cilazapril	1.23 - 2.5 mg/d.	2.5 mg/d.
Enalapril	10 - 20 b.i.d	28 mg/d.*
Captopril	50 mg t.i.d	135 mg/d.*
Lisinopril	20 - 40 mg/d.	30 mg/d.

In heart failure it is recommended we use high target doses with careful monitoring to achieve maximum benefits.

We have had several comments from GPs that their local cardiologists recommend a target dose of cilazapril 5 mg daily in heart failure. This is certainly appropriate.

\* We transformed GPs responses to total daily dose to reach these figures.

N.B GP panel response =

## Quiz feedback

5. A man commenced ACE inhibitor treatment three weeks ago for hypertension. He mentions a dry cough. Your history and examination lead you to conclude that it is an ACE inhibitor cough. Select the action(s) you would take.

	GPs average responses
Change to another ACE inhibitor	29 %
Continue ACE inhibitor	57 %
Start A-II receptor antagonist	29 %
Stop ACE inhibitor	28 %

6. A patient on an ACE inhibitor develops angioedema. She would benefit from continued RAS inhibition. Select the action(s) you would take.

	GPs average responses
Change to another ACE inhibitor	<1 %
Continue ACE inhibitor	1 %
Start A-II receptor antagonist	89 %
Stop ACE inhibitor	80 %

Members of the panel approached the ACE inhibitor cough issues in different ways and their discussion reflected the range of options chosen by respondents. Some members of the panel feel that once patients realise the cough is caused by the ACE inhibitor they want to stop it immediately, others feel that once the cause of the cough is explained patients find it is not a problem and it usually settles.

Options the panel use include encouraging the patient to give the ACE inhibitor a trial period, swapping to another antihypertensive agent or swapping to another ACE inhibitor. If the cough is intolerable and the patient has tried two ACE inhibitors (and is likely to benefit from continued modification of the renin angiotensin system); an AIIRA is a safe and effective alternative.

The panel would stop the ACE inhibitor and start an AIIRA. Of course angioedema which occurs during the course of ACE inhibitor therapy is not always caused by the ACE inhibitor. However, even in these circumstances, it would be wise to discontinue the ACE inhibitor.

N.B GP panel response =

## Quiz feedback

7. Select the factor(s) which indicate need for increased vigilance in monitoring when commencing an ACE inhibitor.

	GPs average responses
Diuretic therapy	90 %
Heart failure	78 %
Serum creatinine of 0.17 mmol/L	72 %
Systolic BP of 110 mm/Hg	56 %

8. Six weeks after starting an ACE inhibitor a patient with diabetes and microalbuminuria has a serum creatinine increase to 40% above baseline. Select the action(s) you would take.

	GPs average responses
Check other medications	88 %
Continue ACE inhibitor	73 %
Start A-II receptor antagonist	3 %
Stop ACE inhibitor	20 %

Any of the options listed prompt the panel to perform especially vigilant monitoring until patients are stabilised on the target dose. Once ACE inhibitor dose, physiological parameters and symptoms are stable they revert to routine monitoring.

Although renal impairment is present, level 1 evidence suggests that ACE inhibitor/ARB inhibition provides the best degree of subsequent renoprotection to limit progression of renal disease with and without proteinuria. A small change in plasma creatinine (eGFR) reflects the mode of action of these agents at the level of the glomeruli. It is entirely reversible if the ACE inhibitor is withdrawn, but is not a reason to withdraw the drug. Some specialists argue that people in this situation need to continue with high doses of ACE inhibitors to get maximal benefit, others recommend lowering the dose of ACE inhibitor. This uncertainty was reflected in the GP panel discussion, however all agreed that this patient needs very careful monitoring of renal function and review of other potentially nephrotoxic medication including NSAIDs, which the patient may be buying from their supermarket or pharmacy.

N.B GP panel response =

## Quiz feedback

9. A patient started on ACE inhibitor therapy three weeks ago, now has serum potassium of 5.8 mmol/L. Select the action(s) you would take.

	GPs average responses
Check other medications	94 %
Continue ACE inhibitor	78 %
Start A-II receptor antagonist	1 %
Stop ACE inhibitor	14 %

The panel felt comfortable continuing the ACE inhibitor with potassium levels below 6 mmol/L although they would increase the frequency of monitoring. They would check for other medications and foods which might be elevating potassium levels. The importance of this should also be discussed with higher risk individuals when the drug is commenced - especially for people with diabetes and renal impairment or those with CHF and renal impairment, as they are more likely to develop associated hyperkalaemia.

10. A 55 year-old man with hypertension and COPD has inadequate control of BP on low-dose thiazides. Select the medication you would add.

	GPs average responses
A-II receptor antagonist	2 %
ACE inhibitor	94 %
Beta-blocker	3 %
Calcium channel blocker	8 %

The panel would choose an ACE inhibitor in this setting although they pointed out that beta-blockers are no longer contraindicated for people with COPD.

N.B GP panel response =



