# Diabetic nephropathy

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## Type 2 diabetes and early nephropathy

## ACE inhibitors

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### Summary

#### Mortality

*Compared with placebo* We don't know whether ACE inhibitors reduce mortality compared with placebo in people with early nephropathy and type 2 diabetes ( very low-quality evidence).

*Compared with ACE inhibitors* The effects of ACE inhibitors on mortality seem to be similar to those of angiotensin II receptor antagonists (low-quality evidence).

#### Progression to late nephropathy

*Compared with placebo* ACE inhibitors reduce progression to late nephropathy in people with diabetes and microalbuminuria over 3 years compared with placebo ( moderate-quality evidence).

*Compared with angiotensin II receptor antagonists* The effects of ACE inhibitors on progression of nephropathy aseem to be similar to those of angiotensin II receptor antagonists ( low-quality evidence).

#### Cardiovascular events

*Compared with angiotensin II receptor antagonists* The effects of ACE inhibitors on cardiovascular events seem to be similar to those of angiotensin II receptor antagonists (low-quality evidence).

**Note**

We found no clinically important results about the effects of ACE inhibitors plus angiotensin II receptor antagonists in people with type 2 diabetes and early nephropathy.

**For GRADE evaluation of interventions for diabetic nephropathy, see table.**

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## Benefits

**ACE inhibitors versus placebo:**

We found one systematic review (search date 1999) [29] and three subsequent RCTs. [30] [31] [32] The systematic review evaluated the effects of ACE inhibitors in people with diabetes and nephropathy, but did not stratify the results by the type of diabetes. [29] It found that ACE inhibitors significantly reduced progression to late nephropathy in people with diabetes and microalbuminuria over 3 years compared with placebo (9 RCTs, 642 people, mean age 36 years; progression to macroalbuminuria: RR 0.35, 95% CI 0.24 to 0.53). The first subsequent RCT found that ramipril 10 mg significantly reduced the combined outcomes of myocardial infarction, stroke, or cardiovascular death compared with placebo (subgroup analysis with diabetes and early nephropathy, 1140 people; specific ORs not reported). [30] The outcome of total mortality was not reported separately for people with diabetes and early nephropathy. However, the RCT found that ramipril 10 mg reduced the risk of mortality in the diabetic subgroup compared with placebo (196/1808 [11%] with ramipril *v* 248/1769 [14%] with placebo; P = 0.004). The second subsequent RCT found that enalapril 10 mg significantly reduced the risk of progression to late nephropathy over 5 years compared with placebo (6/49 [12%] with enalapril *v* 19/45 [42%] with placebo; ARR 30%, 95% CI 15% to 45%). [31] The third subsequent RCT found no significant difference in mortality, end stage renal disease, incidence of stroke, heart failure, or myocardial infarction between very low dose ramipril (1.25 mg/day) and placebo at a median of 4 years (4912 people with type 2 diabetes and early nephropathy; mortality: 334/2443 [14%] with ramipril *v* 324/2469 [13%] with placebo; RR 1.04, 95% CI 0.90 to 1.20; end stage renal disease: 4/2443 [0.2%] with ramipril *v* 10/2469 [0.4%] with placebo; RR 0.40, 95% CI 0.13 to 1.30; stroke: 89/2443 [4%] with ramipril *v* 84/2469 [3%] with placebo; RR 1.07, 95% CI 0.80 to 1.44; heart failure: 76/2443 [3%] with ramipril *v* 91/2469 [4%] with placebo; RR 0.84, 95% CI 0.62 to 1.14; myocardial infarction: 52/2443 [2.1%] with ramipril *v* 59/2469 [2.4%] with placebo; RR 0.89, 95% CI 0.61 to 1.29. [32]

**ACE inhibitors versus angiotensin II receptor antagonists:**

See benefits of angiotensin II receptor antagonists.

**ACE inhibitors plus angiotensin II receptor antagonists:**

We found no systematic review or RCTs.

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## Harms

**ACE inhibitors versus placebo:**

The systematic review [29] and one subsequent RCT [31] did not report on harms. One subsequent RCT found a greater incidence of cough with ramipril 10 mg (133/1808 [7%] with ramipril *v* 37/1769 [2%] with placebo; P value not reported). [30] A further RCT found an increased incidence of cough on very low dose ramipril 1.25 mg daily (80/2443 [3%] with very low dose ramipril *v* 21/2469 [1%] with placebo; P value not reported. [32]

**ACE inhibitors versus angiotensin II receptor antagonists:**

See harms of angiotensin II receptor antagonists.

**ACE inhibitors plus angiotensin II receptor antagonists:**

We found no RCTs.

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## Comment

None.

**References**

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