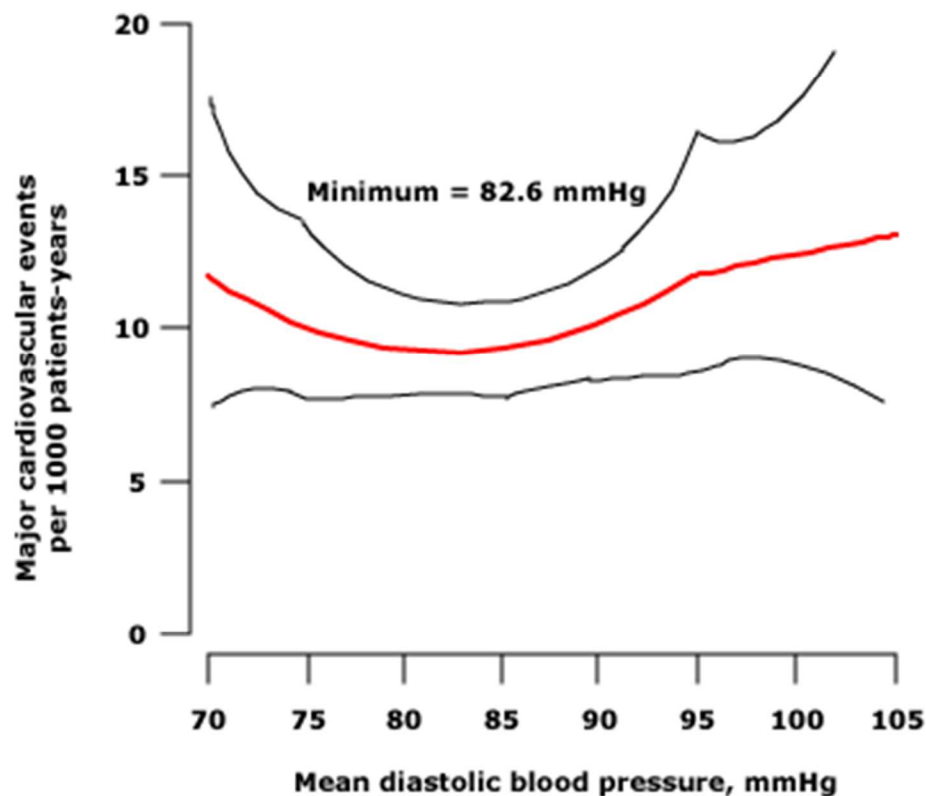


Hypertension in Hemodialysis

Diastolic pressure and cardiovascular events in HOT trial

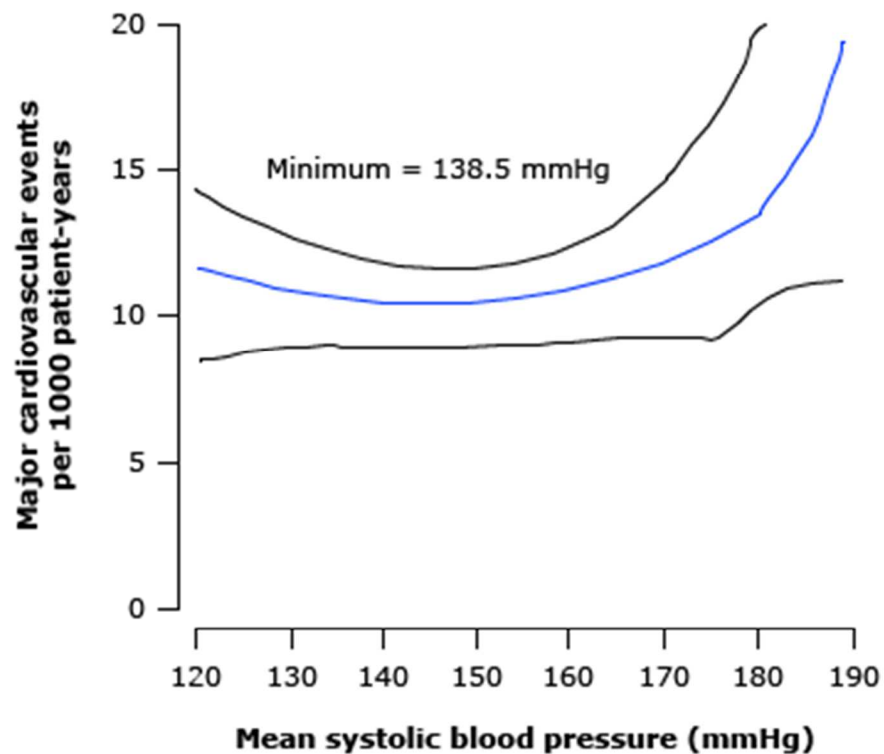


Estimated incidence (95 percent CI) of major cardiovascular events in relation to achieved mean diastolic blood pressure in the HOT trial. The diastolic pressure at the lowest point of the curve is indicated (minimum).

Adapted from Hansson, L, Zanchetti, A, Carruthers, SG, et al, Lancet 1998; 351:1755.

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Systolic pressure and cardiovascular events in HOT trial



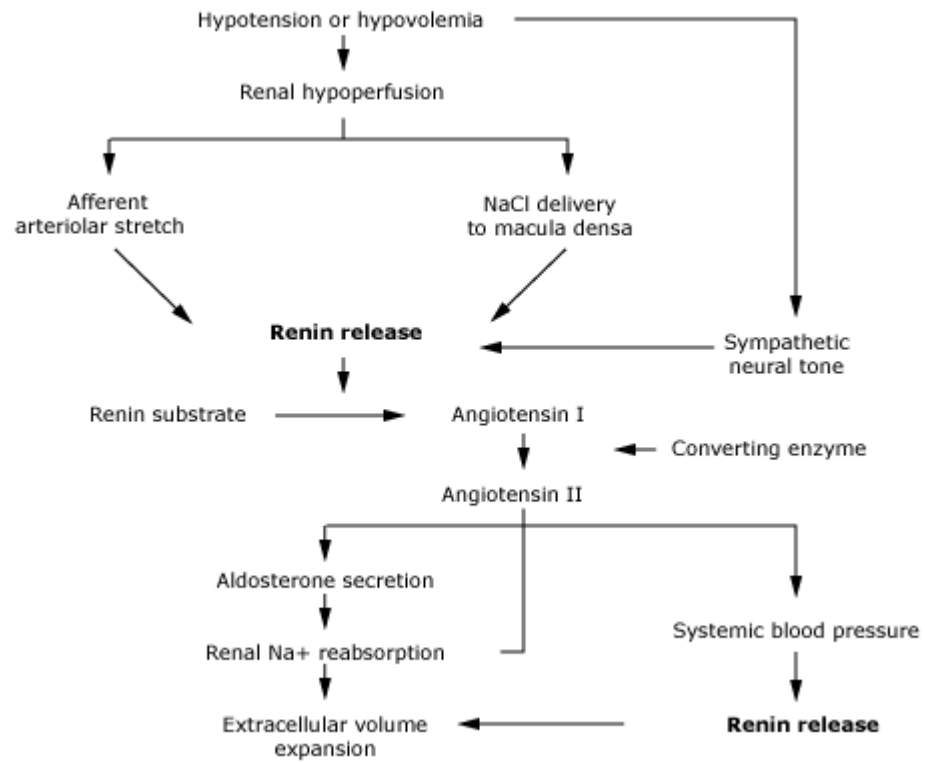
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Adapted from: Hansson L, Zanchetti A, Carruthers SG, et al, *Lancet* 1998; 351:1755.

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Causes of High Blood Pressure in Dialysis Patients

- Sodium and Volume
- Activation of renin-angiotensin system
- Increased sympathetic nervous system activity
- Increased endothelial vasoconstrictors
- ESAs
- PTH excess causes increased intracellular calcium
- Calcification of the arteries



Volume Expansion

- Leads to high BP by causing a rise in Cardiac Output and an inappropriately high SVR
- High SVR causes increased renin etc.
- The absence of edema DOES NOT exclude volume overload

- An increase in the BP of 10 mmHg or more may occur in patients on ESA's
- Optimal blood pressure targets for dialysis patients is controversial
- There is increased mortality in patients with **LOW predialysis** systolic pressures below 110
- There is increased mortality in patients with **postdialysis** diastolic pressures greater than 110

Treatment

- Control Volume
- Prolonged and more frequent hemodialysis
- Medications
 - Beta Blockers
 - Calcium Channel Blockers
 - ACEI/ARB
 - Clonidine
 - Sodium dialysate - lower

Hypertension During Dialysis

- Some patients develop paradoxical hypertension during dialysis
- The cause is unknown and the treatment is as well unclear
- Carvedilol may be of benefit