

Multiple Risk Factor Intervention Trial (MRFIT)

Number Screened	361,659 men
Mean Follow-up	15.3 years
Overall incidence of ESRD	17.12/100,000

Result: There was a graded increase in the risk of developing ESRD with higher levels of blood pressure

Source: Klag MJ, et al. **Circulation**. 1994;89:941.



Risk of Developing ESRD in the MRFIT Study, by Baseline Blood Pressure*

Relative risk of developing ESRD with:

Difference in relative risk for individuals with baseline DBP < 70 mm Hg and those with baseline DBP \geq 120 mm Hg was 30.9

Difference in relative risk for individuals with baseline SBP < 120 mm Hg and those with baseline SBP \geq 200 mm Hg was 48.2

*** 15.3 year followup**

Source: Klag MJ, et al. **Circulation.** 1994;89:941.



Veterans Administration Hypertension and Screening Clinics

15-Year ESRD Rates and Risk Ratios by Baseline Systolic Blood Pressure

SBP (mm Hg)	Risk Ratio
≤ 140	1.00
> 140 but ≤ 151	1.00
> 151 but ≤ 165	1.08
> 165 but ≤ 180	2.07
> 180	5.62

Number of screenees: 11,912 (5,730 black; 6,182 white)

Source: Perry HM, et al. **Hypertension.** 1995;25:587-594



Veterans Administration Hypertension and Screening Clinics

15-Year ESRD Rates and Risk Ratios by Baseline Diastolic Blood Pressure

DBP (mm Hg)	Risk Ratio
≤ 94	1.00
> 94 but ≤ 100	1.05
> 100 but ≤ 106	0.89
> 106 but ≤ 118	1.54
> 118	4.18

Number of screenees: 11,912 (5,730 black; 6,182 white)

Source: Perry HM, et al. **Hypertension.** 1995;25:587-594



Veterans Administration Hypertension and Screening Clinics

15-Year ESRD Rates and Risk Ratios by Race

	Risk Ratio
Nonblack	1.00
Black	2.07

Number of screenees: 11,912 (5,730 black; 6,182 white)

Source: Perry HM, et al. **Hypertension.** 1995;25:587-594



Veterans Administration Hypertension and Screening Clinics

15-Year ESRD Rates and Risk Ratios by Risk Factor

	Risk Ratio
Diabetes	2.44
Heart Disease	1.35
History of Stroke	1.88
Urinary Tract Problems	2.53

Number of screenees: 11,912 (5,730 black; 6,182 white)

Source: Perry HM, et al. **Hypertension**. 1995;25:587-594



Incidence of Hypercreatinemia* at Baseline in the Hypertension Detection and Follow-up Program

All persons (10,768)	2.76%
White men (3,716)	2.53%
Black men (2,107)	5.17%
White women (2,304)	1.13%
Black women (2,641)	2.57%

* In persons with hypertension and a baseline serum creatinine concentration of ≥ 1.7 mg/dL.

Source: Shulman NB, et al. **Hypertension**. 1989;13:1-80-1-93.



Incidence: Possible Causes of Increased ESRD

- Higher blood pressure
- Low SES
- Lack of access to care
- Lower educational level
- Genetic predisposition



How Low Should Blood Pressure Be?

No large-scale, prospective, randomized studies exist to determine what level of BP reduction will protect the kidneys.

However, the data that exists suggest the higher the pressure, the greater the risk.



Hypertension Detection and Follow-up Program

Development of hypercreatinemia after 5 years of follow-up was significantly greater:

- in blacks than in whites**
- in men than in women**
- in those with higher baseline DBP**
- in older than younger persons**



Hypertension Detection and Follow-up Program 5-Year Incidence and Progression of Hypercreatinemia

Baseline Creatinine Concentration	Treatment Group	Rates per 1,000	95% CI
< 1.70 mg/dL	Stepped Care	15.7 ± 1.8	p= 0.11
	Referred Care	20.3 ± 2.2	
1.50-1.69 mg/dL	Stepped Care	113.3 ± 25.5	p= 0.01
	Referred Care	226.6 ± 34.7	

Source: Shulman NB, et al. **Hypertension**. 1989;13:1-80-1-93.



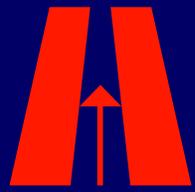
Hypertension Detection and Follow-up Program 1-Year Follow-up Blood Pressure Levels

Treatment Group*	Mean SBP (mm Hg)	Mean DBP (mm Hg)
Stepped Care	128.9	85.5
Mean at Baseline	152.5	96.4
SE**	0.31	0.18
Referred Care	139.1	90.1
Mean at Baseline	154.5	96.8
SE**	0.47	0.26

* Stratum I: Baseline DBP 90-104 mm Hg.

** Standard error; $p = < 0.0005$

Source: HDFP. Prev Med. 1979;8:2-13.



The Modification of Diet in Renal Disease Study (MDRD)

At 3-year follow-up, decline in glomerular filtration rate was inversely related to follow-up BP for patients with baseline proteinuria of 1 g/day or more

Source: Peterson JC, et al. **Ann Intern Med.** 1995;123:754-762.



The Modification of Diet in Renal Disease Study (MDRD)

MDRD suggests a target blood pressure:

< 125/75 mm Hg if proteinuria > 1.0 g/d

< 130/80 mm Hg if proteinuria = 0.25-1.0 g/day

Source: Peterson JC, et al. **Ann Intern Med.** 1995;123:754-762.