



# DGPK, GPN, DGKJ Guidelines Arterial Hypertension

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# Definition

	children and adolescents ≥3 single measurements or 24-h-measurement systolic or diastolic	adults ≥3 auscultatory measurements systolic    diastolic	adults 24-h-measurement (daytime) systolic    diastolic	adults 24-h-measurement (nighttime) systolic    diastolic
optimal	not jet defined	< 120    and    < 80	not jet defined	not jet defined
normal	< 90th percentile	< 130    and    < 85	< 130    and    < 80	not jet defined
high normal	P90 – P94	130-139    or    85-89	130-134    or    80-84	< 120    and    < 70
hypertension 1°	P95 - (P99 +5 mmHg)	140-159    or    90-99	≥ 135    or    ≥ 85	≥ 120    or    ≥ 70
hypertension 2°	> P99 + 5 mmHg	160-179    or    100-109	not jet defined	not jet defined
hypertension 3°	not jet defined	≥ 180    or    ≥ 110	not jet defined	not jet defined

If an adolescents surmounts the thresholds for adults, the lower thresholds for adults should be used.



# Which References?

- US values for auscultatory manual BP (1963-2000, various genetic background)
- German values for automated oscillatory BP (2003-2006, obese children excluded)
- German values for ambulatory 24-h blood pressure measurement (ABPM) (1993-1996, three publication on the same data set with three different modes of calculations)



# End Organ Damage

- left ventricular hypertrophy, heart failure
- microalbuminuria, proteinuria, renal failure
- hypertensive encephalopathy
- hypertensive retinopathy, macular edema, exsudate, retinal bleeding, retinal detachment



# Long-term Cardiovascular Disease

- arteriosclerosis of the elastic arteries
- aortic aneurysm, aortic dissection
- atheromatosis in all arteries
- endothelial dysfunction, reduced FMD
- coronary artery disease, myocardial infarction, ischemic cardiomyopathy
- hypertensive restrictive cardiomyopathy
- peripheral artery disease
- chronic renal failure, hypertensive nephropathy
- ischemic or hemorrhagic stroke, vascular dementia

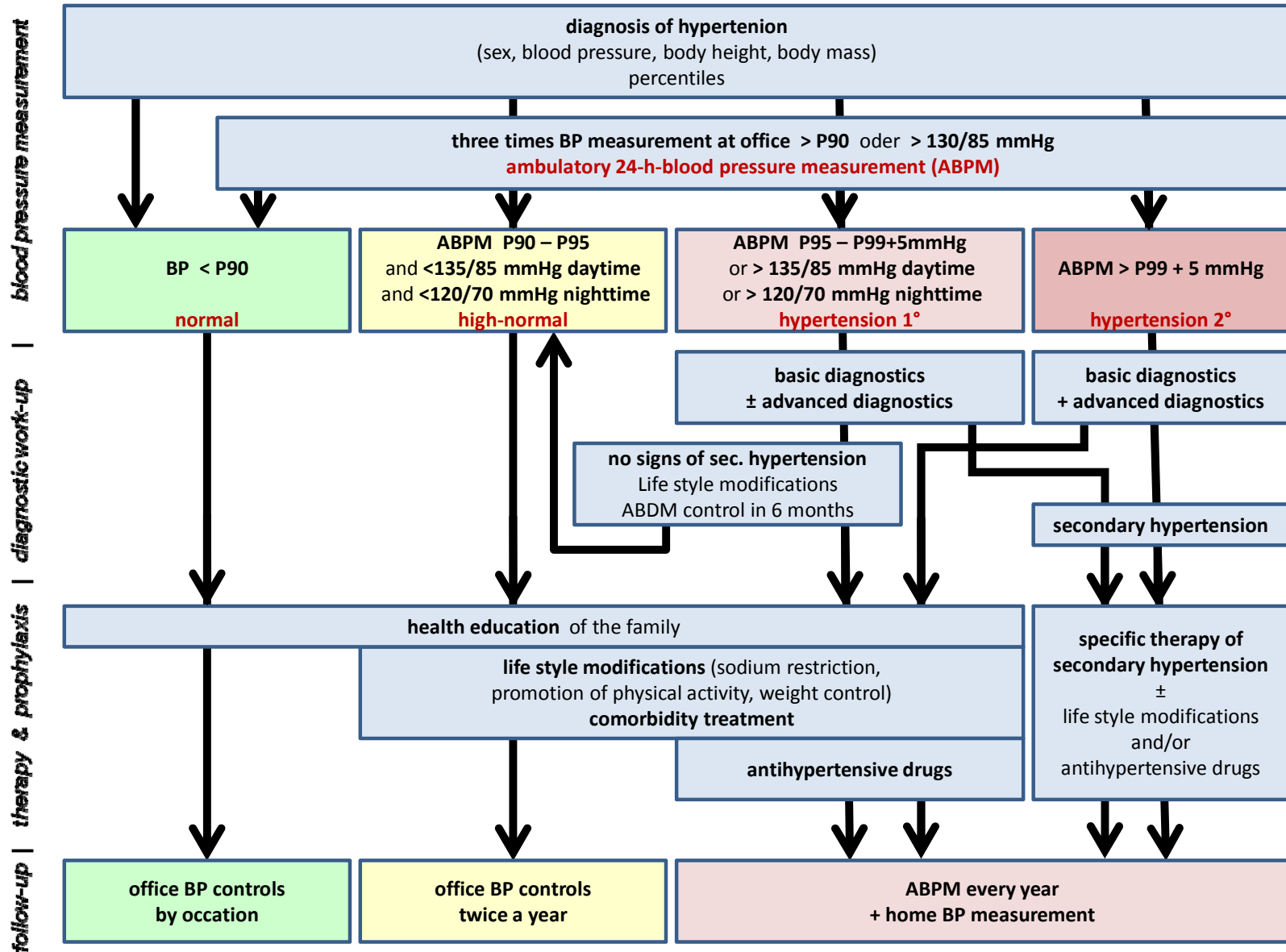


# Diagnostics

- medical history, physical examination
- ambulatory blood pressure measurement (ABPM)
- **basic** blood tests: blood cells; creatinine, urea, electrolytes; TSH, free T4; triglyzeride, cholesterol, LDL- / HDL cholesterol; blood glucose
- **basic** urine tests: glucose, cells, protein, microalbuminuria
- **basic** abdominal sonography (kidneys, urinary tract, Doppler of the extra- and intrarenal arteries, other abdominal findings)
- **basic** referral to paediatric cardiologist (echocardiography) and ophthalmologist (fundoscopy)
- **advanced diagnostics** according an individual plan by a paediatric nephrologists, endocrinologist, cardiologist, radiologist, ...



# Management Algorithm





# Antihypertensive Drugs

- **First choice**
  - ACE inhibitors (captopril, enalapril, lisinopril)
  - AT<sub>2</sub> receptor antagonists (losartan, valsartan)
  - Ca antagonists (amlodipine)
  - beta-adrenergic receptor antagonists (metoprololsuccinat)
- **Second choice / combination partner**
  - diuretics (furosemid, torasemid)
  - $\alpha_1$ -adrenergic receptor antagonists (prazosine)
  - central  $\alpha_2$ -adrenergic receptor agonists (clonidine)
  - vasodilatators (minoxidil)





# Aims

## Therapeutic goals

- BP < P90
- chronic renal failure without proteinuria: BP < P75
- chronic renal failure with proteinuria: BP < P50
- with an hypertensive emergency no quick reduction of the BP in the first 6-8 hours of >25-30 %

## Pathophysiologic goals

- reduction of mortality and morbidity in hypertensive emergencies
- reduction of a left ventricular hypertrophy
- reduction of albuminuria
- delay of a terminal renal failure



# Therapeutic Strategy

## single drug therapy

- only one drug
- only one tablet
- if well tolerated, better dosage
- high predictability

## combination therapy

- different mechanisms
- additive effects
- every drug with only low dosage
- almost no side effects



# Special Considerations

- renal failure
- heart failure
- coarctation
- overweight
- migraine
- drug resistance
- hypertensive crisis/emergency

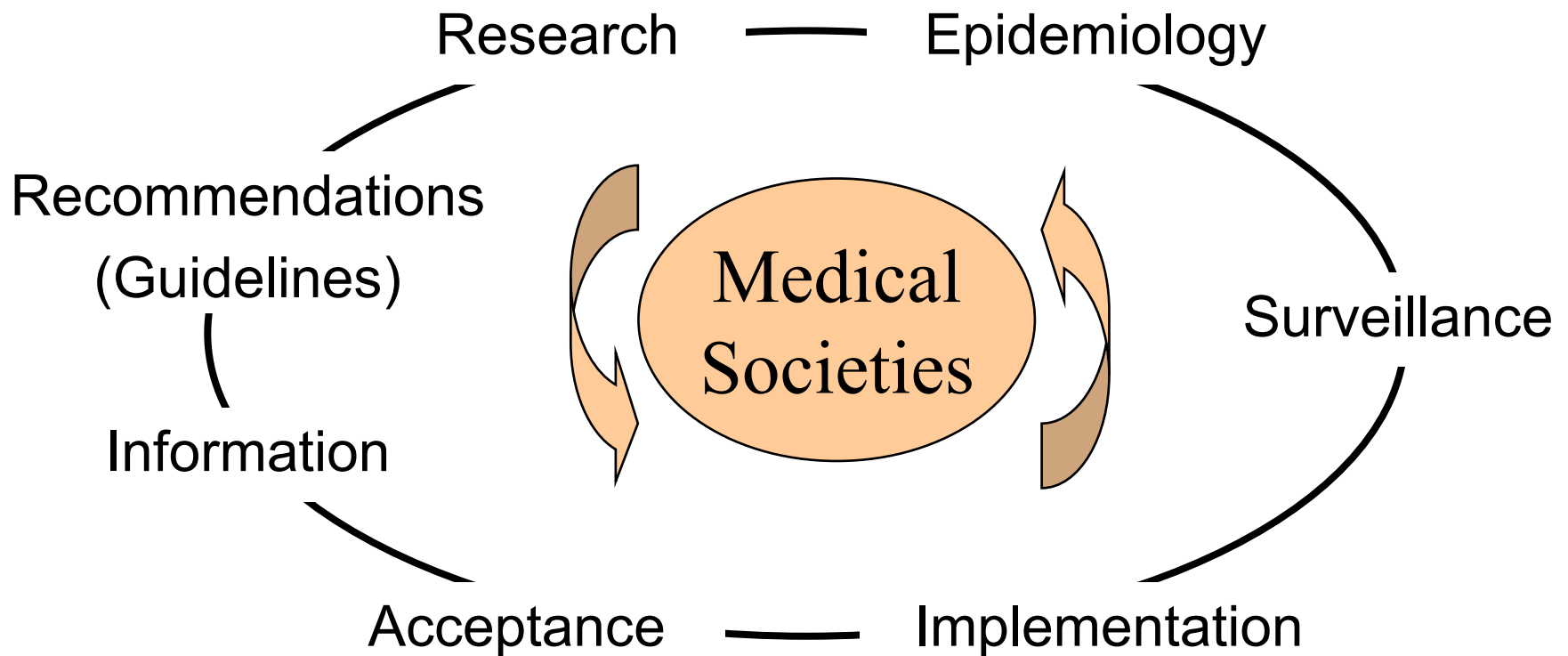


# Surveillance

- home BP measurements
- every 6-12 months ABPM
- annual screening for end organ damage
  - blood tests, urine tests,
  - ophthalmologic fundoscopy
  - echocardiography



# From Research to Clinical Practice ... and Back to Research





# DGPK, DGPN, DGKJ Leitlinie Arterielle Hypertonie

([www.kinderkardiologie.org/dgpkLeitlinien.shtml](http://www.kinderkardiologie.org/dgpkLeitlinien.shtml))

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