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NATIONAL GUIDELINES FOR PRIMARY HEALTH CARE PHYSICIANS

HYPERTENSION

PREVENTION, DIAGNOSIS, AND TREATMENT

DIRECTORATE OF PUBLIC HEALTH AND PRIMARY HEALTH CARE CENTERS IN IRAQ

NON-COMMUNICABLE DISEASE SECTION

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Abbreviations

ACEI	Angiotensin converting enzyme inhibitor
ARB	Angiotensin receptor blocker
BB	Beta Blocker
BMI	Body mass index
BP	Blood pressure
CCB	Calcium channel blocker
CVA	Cardiovascular accident
CVD	Cardiovascular Disease
DASH	Dietary approach to stop hypertension
DBP	Diastolic blood pressure
GFR	Glomerular filtration rate
HF	Heart failure
IHD	Ischemic heart disease
ISH	International Society of Hypertension
JVD	Jugular venous distension
LVH	Left Ventricular Hypertrophy
SBP	Systolic blood pressure
TOD	Target organ damage

Hypertension – Prevention, Diagnosis, and Treatment

Introduction

Hypertension is one of the most common worldwide health problems, as it is estimated that over 20% of all adults across the world have hypertension. Developing countries are experiencing dramatic changes in health needs. The increasing prevalence of chronic diseases such as hypertension are creating a public health challenge. The incidence of hypertension is growing among women and adolescents as well as the older adults.. According to the 2006 Iraqi national survey for chronic disease risk factors, 40.4% of the Iraqi adult population have elevated blood pressure. Hypertension is also considered the most important modifiable risk factors for coronary heart diseases, stroke, congestive heart disease; end stage renal disease and peripheral vascular diseases.

General principles:

- **Hypertension and cardiovascular diseases (CVD):** The relationship between blood pressure (BP) and risk of CVD events is continuous, consistent, and independent of other risk factors. The higher the BP, the greater is the chance of heart attack, heart failure, stroke, and kidney disease. For individuals 40–70 years of age, each increment of 20 mmHg in systolic BP (SBP) or 10 mmHg in diastolic BP (DBP) doubles the risk of CVD across the entire BP range

- **Benefit of lowering BP:** In clinical trials, antihypertensive therapy has been associated with reductions in:
  - Stroke incidence **35–40** %.
  - Myocardial infarction **20–25** %.
  - Heart failure more than **50** %

Definition of hypertension:

Based on World Health Organization (WHO)/ International Society of Hypertension (ISH) recommendations, as well as 7th Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7) guidelines, the definition of hypertension in adults aged 18 years or older is:

Systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg on the average of two or more readings taken at each of two or more visits after initial screening.

Types of hypertension:

Essential (primary) hypertension:
That represents over 90% of the cases. It is diagnosed in the absence of an identifiable cause. However, many risk factors increase the likelihood of its occurrence (Table 1):

Table 1
Risk factors for essential hypertension:

Obesity
Diabetes
High salt and/or fat diet
More than moderate intake of alcohol

Cigarette smoking
Sedentary life style
Stress
Family history of hypertension, age, gender and race (non modifiable risk)

Secondary hypertension:
That represents less than 10% of all cases. It is defined as hypertension resulting from an underlying identifiable cause (Table 2).

Table 2
Identifiable causes of secondary hypertension

Source or category of cause	Possible causes
Renal diseases	Renal parenchymal disease Polycystic kidney Urinary tract obstruction Rennin-producing tumor Liddle syndrome
Renovascular hypertension	Renal artery stenosis Connective tissue disease Glomerulonephritis
Vascular	Coarctation of aorta Vasculitis/polycythemia Collagen vascular disease
Hormone and steroid intake	Oral contraceptives Estrogen replacement therapy Oral and Depot contraceptives, Steroid medication
Adrenal	Primary aldosteronism Cushing syndrome Pheochromocytoma Congenital adrenal hyperplasia
Other endocrine disorders	Hyperthyroidism and hypothyroidism Hyperparathyroidism Acromegaly
Neurogenic	Brain tumor Lesions of brainstem or hypothalamus Raised intracranial pressure
Prohypertensive substances	Adrenergic medication, nasal decongestants Nonsteroidal anti-inflammatory drugs Anti-depressants (tricyclic, MAOI), Alcohol, Cyclosporine and Tacrolimus, erythropoietin
Other	Pregnancy Hypercalcemia Sleep Apnea

Malignant or accelerated hypertension:

This clinical entity may complicate hypertension of any etiology and characterized by accelerated microvascular damage with necrosis in the wall of small arteries and arterioles and intravascular thrombosis.

The diagnosis is made clinically by a high BP and rapidly progressive end organ damage such as retinopathy (grade 3 or 4), renal dysfunction (especially proteinuria) and/or hypertensive encephalopathy. If left untreated, death will occur within few months.

Classification of hypertension:

Table 3
Classification of blood pressure for adults*

Blood pressure class	Systolic blood pressure (mmHg)	Diastolic blood pressure (mmHg)
Normal	**<120**	**And <80**
Prehypertension	**120 – 139**	**Or 80 – 89**
Stage 1 hypertension	**140 – 159**	**Or 90 – 99**
Stage 2 hypertension	**≥160**	**Or ≥ 100**

***JNC 7 Guidelines 2003**

Evaluation of patients with confirmed hypertension

Evaluation of patients with confirmed hypertension has three objectives, all of which contribute to risk stratification of hypertensive patients that may affect prognosis and guide management. These objectives are as follows:

(1) To assess lifestyle and identify other cardiovascular risk factors or concomitant disorders (table 4).

(2) To reveal identifiable causes of high BP (secondary hypertension) (see table 2).

(3) To assess the presence or absence of target organ damage (TOD) (table 5).

Table 4
Cardiovascular risk factors:

- Hypertension BP ≥140/90
- Age men >55 years, women >65 years
- Cigarette smoking
- Overweight or Obesity
  - Body mass index ≥25 Kg/M^2
  - Abdominal obesity (waist circumference of >102 cm for men, >88 cm. for women)
- Physical inactivity

- Dyslipidemia
  - Total Cholesterol > 200 mg/dl. (5.2 mmol/L)
  - High density lipoproteins (HDL) in men <40 mg/dl (<1 mmol/L); and in women < 45 mg/dl. (<1.2 mmol/L)
  - Triglycerides > 150 mg/dl. (1.7 mmol/L)
- Diabetes Mellitus or impaired glucose tolerance
- Renal dysfunction
  - Microalbuminuria (urine albumin >300 mg/dl.)
  - Estimated glomerular filtration rate (GFR) <60ml/min
- Family history of premature cardiovascular disease (man <55 years or woman <65 years) in first degree relative

Table 5
Target organ damage

- Heart
  - Left ventricular hypertrophy
  - Angina or myocardial infarction
  - Prior coronary bypass or revascularization
  - Heart failure
- Brain
  - Stroke or transient ischemic attack
- Peripheral arterial disease
- Retinopathy

Assessment:
History:
To adequately evaluate accompanying risk factors, possible treatable causes, and target organ damage, a careful and comprehensive clinical history and physical examination is essential. The history should include:

- Family history of the following:
  - hypertension
  - diabetes
  - dyslipidaemia
  - chronic heart disease
  - stroke/ cardiovascular accident (CVA)
  - renal disease.
- Duration and previous levels of blood pressure, and results and side effects of previous antihypertensive therapy.
- Past history or current symptoms of the following, as well as information about the drugs used to treat these conditions:
  - Chronic heart disease and heart failure
  - Cerebrovascular disease
  - Peripheral vascular disease
  - Diabetes
  - Gout
  - Dyslipidemia
  - Bronchospam /chronic respiratory diseases

- Sexual dysfunction
- Renal disease
- Other significant illnesses

- Symptoms suggestive of secondary causes of hypertension, such as:
  - Significant obesity
  - Loud nocturnal snoring or interrupted respirations
  - Hypertension in childhood or adolescence
  - Palpitations
  - Frequent episodes of sweating or tremor
  - abdominal and back pain
  - Evidence of renal disease or insufficiency
- Careful assessment of lifestyle and factors including:
  - dietary intake of fat
  - dietary intake of salt (sodium)
  - Possible use of alcohol
  - History of smoking
- Frequency of and type of regular physical activity
- History of weight gain since early adult life (as useful index of excess body fat)
- Past history of drug use or use of substances that can raise blood pressure, such as: hormones, steroids and other prohypertensive drugs and substances
- Personal, psychological and environmental factors that could influence the course and outcome of antihypertensive care, including family situation, work environment and educational background.

Physical examination:

Points to be considered:

a. General signs suggestive of secondary causes and other risk factors like :
   - Characteristic facies of Cushing syndrome.
     Signs of acromegaly

b. Presence of other risk factors: central obesity , tendon xanthomas (dyslipedemia)

c. Measurement of height and weight and waist circumference, with calculation of Body Mass Index (BMI)

d. Cardiovascular system:
   - apical heave, left ventricular hypertrophy (LVH)
   - loud S2 or S4, jugular vein distension- JVD (evidence of heart failure)
   - arterial disease (carotid, peripheral, renal)
   - Radial-femoral delay of pulse (coarctation of aorta)
   - Dependant edema

e. Lungs:
   - Basal crackles
   - Wheezes

f. Abdomen:

- Palpable kidney (polycystic kidney)
- Other masses(abdominal aortic aneurysm)
- Bruit (renal artery stenosis)

g. Fundoscopy:
   - Arteries: tortuosity, thickening, arterio-venous ripping
   - Background: haemorrhage, exudates, diabetic retinopathy
   - Discs: papilledema

h. Nervous system:
   - Evidence of previous neurological disease

i. Endocrine:
   - Evidence of Cushing's syndrome, thyroid disease

Laboratory Tests and Other Diagnostic Procedures:

Routine laboratory tests recommended before initiating therapy include (all patients):

1. Urinalysis for blood and protein
2. Hematocrit CBC
3. Chemical profile: Blood glucose, urea, creatinine (or the corresponding estimated GFR), potassium, calcium, uric acid.
4. Lipid profile: total cholesterol, (TC) high density lipoprotein cholesterol (HDL), low-density lipoprotein cholesterol (LDL), and triglycerides (TG).
5. Twelve lead ECG.

Tests for selected patients:

1. Chest X-ray (CXR) to detect cardiomegaly, heart failure and coarctation of aorta.
2. Ambulatory blood pressure monitoring to assess borderline hypertension or white coat hypertension.
3. Echocardiography to detect LVH.
4. Abdominal ultrasound to detect renal disease, aortic aneurysm.
5. Thyroid function test
6. Urinary catecholamine or vanillylmandelic acid (VMA) to detect pheochromocytoma.
7. Urinary cortisol and dexamethasone suppression test to detect Cushing syndrome.
8. Plasma renin activity and aldosterone to detect primary aldosteronism.

Risk stratification for hypertension management:

There are specific factors that are known to complicate hypertension and increase the overall risk of cardiovascular diseases.

Cardiovascular risk can be expressed as the percentage chance of an individual experiencing a cardiovascular event over a pre-defined period of time, usually the next 10 years. It mainly depends on the presence of CVD risk factors such as smoking, average blood pressure, cholesterol levels, age, and presence or absence of diabetes. The two charts below (Table 6 and Table 7) can be used based on the availability of cholesterol measurement to estimate cardiovascular disease risk over the nex

Table 6
WHO Risk Prediction chart WITHOUT Cholesterol Measurement

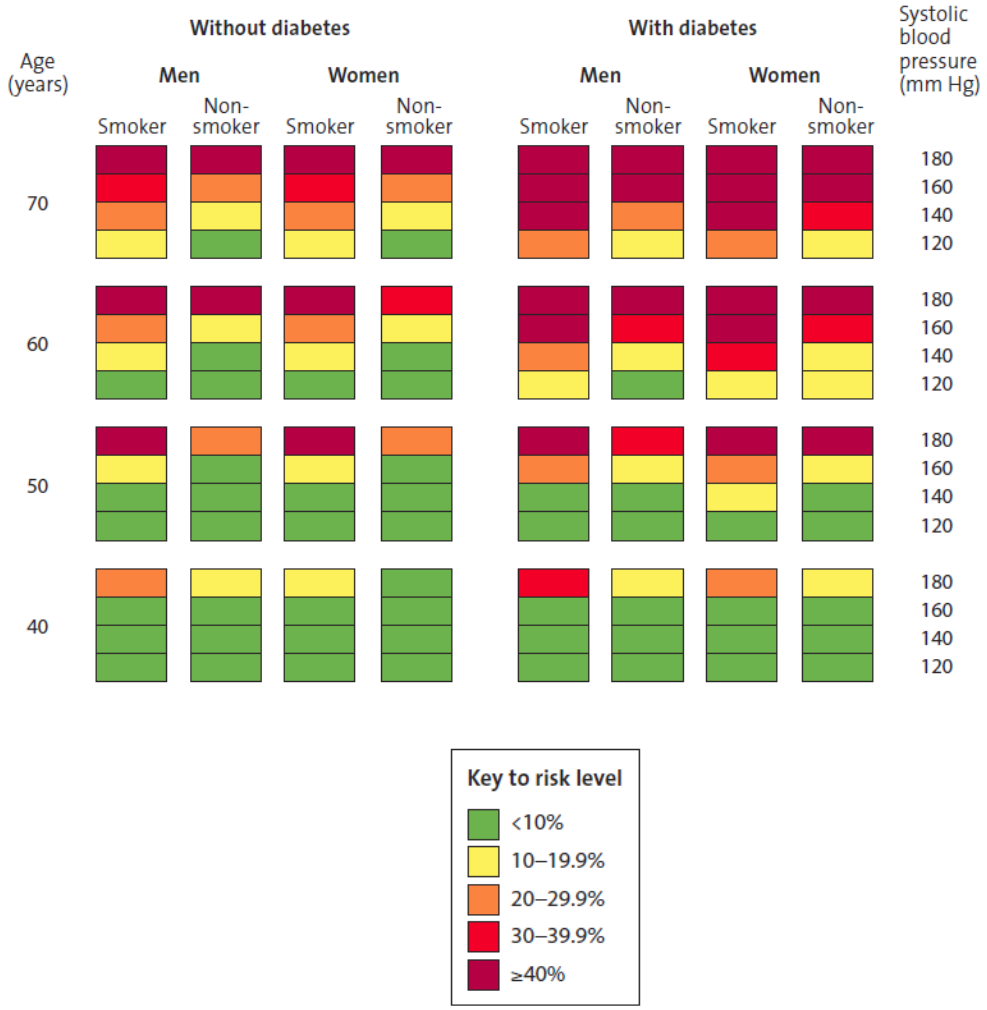


Table 7
WHO Risk Prediction chart WITH Cholesterol Measurement

World Health Organization, "Prevention of Cardiovascular Disease", 2007

Goals of Management of Hypertension

The therapeutic goal of long-term management of hypertension is to maintain a blood pressure of less than 140/90 mmHg; that is, BOTH a systolic pressure of less than 140 mmHg and a diastolic pressure of less than 90 mmHg for as long as the patient lives.

Because of the higher risk of cardiovascular complications in those with current diabetes (Type I or II) or renal disease (elevated serum creatinine or microalbuminuria), the goal of management in these patients is a sustained blood pressure of less than 130/80 mmHg.

Management strategy for hypertension

1. Classification of the degree of hypertension of the patient based on Table 3.
2. Determine the overall risk profile of the patient based on the risk factors identified and the above WHO Risk Prediction charts 6 and 7, and determine the patient's overall risk for CVD events over the next 10 years.
3. Determine the specific therapeutic goals for the individual patient (<140/90 mmHg and <130/80 mmHg for diabetic or with renal disease) and develop a plan to lower BP and reduce the overall cardiovascular risk.
   The plan includes:
   - Life style modification to decrease risk factors
   - Drug therapy
   - Monitoring blood pressure and other risk factors
4. Discussion the cardiovascular risks and treatment plan with the patient, explaining the importance of each step, and start treatment as presented below:

Table 8
Treatment of hypertension

Blood pressure classification	SBP mmHg	DBP mmHg	Life style modification	Initial drug therapy	
				Without compelling indication*	With compelling indication
Normal	<120	and <80	Encourage	No antihypertensive indicated	Drugs for compelling indication
Pre-hypertension	120-139	or 80-89	Yes		
Stage 1 Hypertension	140-159	or 90-99	Yes	Thiazide type diuretic, may consider ACEI, ARB, BB, CCB or combination	Drugs for compelling indication. Other types of antihypertensive drugs (diuretics, ACEI, ARB, BB, CCB) as needed
Stage 2 Hypertension	≥160	or 100	Yes	Two-drug combination for most (usually thiazide-type diuretic and ACEI or ARB or BB or CCB)	

* Compelling indication: target organ damage or associated clinical condition or risk factors

Lifestyle Modifications:

The adoption of healthy lifestyles by all persons is critical for the prevention of hypertension and is an indispensable part of the management of those with hypertension (Annex 3).

Major lifestyle modifications shown to lower BP include:

1. Weight reduction in those individuals who are overweight or obese.
2. Adoption of the Dietary Approaches to Stop Hypertension (DASH) eating plan which is rich in potassium and calcium with dietary sodium reduction.
3. Practicing moderate intensity physical activity,
4. Cessation of smoking
5. Reduction of alcohol intake if alcohol taken

Appropriate lifestyle modifications may eliminate the need for drug therapy in patients with borderline hypertension, decrease the dose and /or the number of drugs needed in patients with established hypertension, and reduce cardiovascular risk.

Pharmacologic Treatment

There are clinical outcome trial data proving that lowering blood pressure with several classes of drugs, will reduce the complications of hypertension (annex 4).

Thiazide diuretics have been proven to be efficient in achieving blood pressure control and preventing the cardiovascular complications of hypertension with few side effects. They also enhance the antihypertensive efficacy of multiple drug regimens. Because of this, they are used as initial therapy for most patients with hypertension, either alone or in combination with one of the other classes which have been demonstrated to be beneficial in randomized controlled outcome trials. Other more potent loop diuretics such as furosemide, bumetanide have few advantages over thiazide except in patients with renal impairment. If a drug is not tolerated or is contraindicated, then one of the other classes proven to reduce cardiovascular events should be used instead.

The other classes of antihypertensive drugs include angiotensin converting enzyme inhibitors (ACEI), angiotensin receptor blockers (ARB), beta-blockers (BB), calcium channel blockers (CCB), aldosterone antagonists (ALDO ANT) should especially be used for the treatment of hypertension if there are co-existing clinical conditions such as those listed below in Table 9. Their effectiveness in reducing the morbidity of these co-existing conditions as well as in reducing blood pressure creates a compelling indication for their use.

Table 9
Compelling Indications for Individual Drug Classes

COMPELLING INDICATION*	RECOMMENDED DRUGS+					
	Diuretic	BB	ACEI	ARB	CCB	ALDO ANT
Heart failure	Yes	Yes	Yes	Yes		Yes
Postmyocardial infarction		Yes	Yes			Yes
High coronary disease risk	Yes	Yes	Yes		Yes	
Diabetes	Yes	Yes	Yes	Yes	Yes	

COMPELLING INDICATION*	RECOMMENDED DRUGS+					
	Diuretic	BB	ACEI	ARB	CCB	ALDO ANT
Chronic kidney disease			Yes	Yes		
Recurrent stroke prevention	Yes		Yes			

• Compelling indications for antihypertensive drugs are based on benefits from outcome studies or existing clinical guidelines; the compelling indication is managed in parallel with the BP.
+ Drug abbreviations: ACEI, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; Aldo ANT, aldosterone antagonist; BB, beta-blocker; CCB, calcium channel blocker.
* Conditions for which clinincal trials demonstrate benefit of specific classes of antihypertensive drugs.

Achieving Blood Pressure Control in Individual Patients:

Most patients who are hypertensive will require two or more antihypertensive medications to achieve their BP goals. Addition of a second drug from a different class should be initiated when use of a single drug in adequate doses fails to achieve the BP goal. When BP is more than 20/10 mmHg above goal, consideration should be given to initiating therapy with two drugs, either as separate prescriptions or in fixed-dose combinations.

The initiation of drug therapy with more than one agent may increase the likelihood of achieving the BP goal in a more timely fashion, but particular caution is advised in those at risk for orthostatic hypotension, such as patients with diabetes, autonomic dysfunction, and some older persons. Use of either generic drugs or combination drugs should be considered to reduce prescription costs.

Key points in drug therapy

- In unselected group of hypertensive population, no one class of agents is any more effective at lowering BP than another.
- Overall single drug therapy will lower BP by 7-8%; however there is substantial inter-individual variation in response.
- Begin with the lowest possible dose of the particular agent so as to reduce BP by 5-10 mmHg at a time .Too rapid BP lowering may lead to undue side effects (fatigue, lethargy and postural dizziness) and this may affect the compliance of the patient.
- If this is not successful at achieving the BP goal, then increase the dose gradually provided that it is well tolerated.
- Using low doses of two drugs that act by different mechanisms, allows better BP control with least side effects. Examples of useful combinations:
  - Thiazide diuretic can be used in combination with all antihypertensive drugs
  - ACEI + CCB
  - Dihydropyridine CCB (nifedipine) + BB
  - ACEI + ARB
- Some combinations may have additive ADVERSE effects, such as BB + Verapamil or diltiazem (can lead to bradycardia, cardiac depression and heart block)
- Change to a different class of antihypertensive drug if there is little response, poor tolerability or side effect. This should be done cautiously with further consultation, especially if discontinuing B-Blocker medication.

- Remember that the presence of certain clinical conditions in hypertensive patient (ischemic heart disease, heart failure, renal disease, dyslipedemia, prostatic hypertrophy, COPD) may necessitate the use of certain classes of antihypertensive drugs.
- Using drugs with long duration of action is preferred to improve patient compliance as to be taken in a single dose daily.
- The best time to take the drug with long duration of action is as early as possible in the morning to cover the early morning surge of BP.
- The patient should know about his medication, dosing, mode of actions and possible side effects.
- When possible, to improve compliance with the management program, other staff members such as nurses should be trained to counsel the patient regarding the medications, dosing, and possible side effects
- The importance of regular visits to monitor the effectiveness of therapy and lifestyle changes should be emphasized.

Compliance with drug treatment

Failure of compliance with drug treatment is a major problem in all hypertensive patients which may reach up to 60%, may result from many causes:

- Complex drug regimen.
- Nature of the doctor –patient relationship.
- Frequent dosing schedules.
- Side effects.
- Cost of medication.
- Resistant hypertension which need multi drug regimen and more side effects.

Additional Considerations in Antihypertensive Drug Choices

Antihypertensive drugs can have both favorable or unfavorable effects on other possible co-morbidities. This can influence the specific choice of antihypertensive medication in these selected patients.

Table 10
Potential favorable effects

Co-Morbid Condition	Drug	Effect
Osteoporosis	Thiazides	Slow demineralization
Atrial tachy-arrhythmias or atrial fibrillation	Beta Blockers	Control tachyarrythmias
Migraine headache	Beta Blockers	Decrease frequency of migraine attacks
Thyrotoxicosis	Beta Blockers	Decrease tremor and tachycardia
Essential tremor	Beta Blockers	Decrease intensity of tremor
Perioperative hypertension	Beta Blockers	Decrease level of hypertension
Raynaud's syndrome	CCB	Decrease intensity of vasospasm
Selected arrhythmias	CCB	Increase A-V blockage
Prostatic hypertrophy	Alpha blocker	Reduces obstruction to urine flow

Table 11
Important Contraindications to Specific Antihypertensive Medications

Class of drug	*Compelling contraindication*	*Possible contraindications*
Diuretics	gout history of hyponatremia	dyslipidaemia sexual active men pregnancy
Beta-Blocker	asthma chronic obstructive lung disease 2nd or 3rd degree heart block	dyslipidaemia athletes & physically active patients peripheral vascular disease
ACE Inhibitors	pregnancy hypercalemia history of angioedema	bilateral renal artery stenosis
Calcium Antagonists	heart block (2nd or 3rd degree)	congestive heart failure
Alpha- Blockers		orthostatic hypotension
Angiotensin Antagonists	pregnancy bilateral renal artery stenosis hyperkalaemia	

Special considerations in Management of Hypertension

Ischemic Heart Disease
Ischemic heart disease (IHD) is the most common form of target organ damage associated with hypertension. In patients with hypertension and stable angina pectoris, the first drug of choice is usually a BB; alternatively, long-acting CCBs. In patients with acute coronary syndromes (unstable angina or myocardial infarction), hypertension should be treated initially with BBs and ACEIs, with addition of other drugs as needed for BP control. In patients with postmyocardial infarction, ACEIs, BBs, and aldosterone antagonists have proven to be most beneficial.

Heart Failure
Heart failure (HF), in the form of systolic or diastolic ventricular dysfunction, results primarily from systolic hypertension and IHD. In asymptomatic individuals with demonstrable ventricular dysfunction, ACEIs and BBs are recommended. For those with symptomatic ventricular dysfunction or end-stage heart disease, ACEIs, BBs, ARBs and aldosterone blockers are recommended along with loop diuretics.

Diabetes with Hypertension
Combinations of two or more drugs are usually needed to achieve the target goal of <130/80 mmHg. ACEI or ARB based treatments favorably affect the progression of diabetic

nephropathy and reduce albuminuria, and ARBs have been shown to reduce progression to macroalbuminuria. Thiazide diuretics, BBs, ACEIs, ARBs, and CCBs have been shown to be beneficial in reducing CVD and stroke incidence in patients with diabetes.

Chronic Kidney Disease

In people with chronic kidney disease (CKD), as defined by either:
(1) Reduced excretory function with an estimated GFR below 60 ml/min per 1.73 m2 (Corresponding approximately to a creatinine of >1.5 mg/dL in men or >1.3 mg/dL in women), **OR**
(2) The presence of albuminuria (>300 mg/day or 200 mg albumin/g creatinine). Therapeutic goals are to slow deterioration of renal function and prevent CVD. Hypertension appears in the majority of these patients, and they should receive aggressive BP management, often with three or more drugs to reach target BP values of <130/80 mmHg.

ACEIs and ARBs have demonstrated favorable effects on the progression of diabetic and non-diabetic renal disease. A limited rise in serum creatinine of as much as 35 percent above baseline with ACEIs or ARBs is acceptable and is not a reason to withhold treatment unless hyperkalemia develops. With advanced renal disease (estimated GFR <30 ml/min 1.73 m2, corresponding to a serum creatinine of 2.5–3 mg/dL), increasing doses of loop diuretics are usually needed in combination with other drug classes.

Cerebrovascular Disease

The risks and benefits of acute lowering of BP during an acute stroke are still unclear; control of BP at intermediate levels (approximately 160/100 mmHg) is appropriate until the condition has stabilized or improved. Recurrent stroke rates are lowered by the combination of an ACEI and thiazide-type diuretic.

Obesity and the metabolic syndrome

Obesity (BMI >30 kg/m^2) is an increasingly prevalent risk factor for the development of hypertension and CVD. Metabolic syndrome defined as the presence of and increased waist circumference (waist circumference >102 cm. in men or >88 cm. in women) with two or more of the following conditions: glucose intolerance (fasting glucose >100 mg/dL), BP >130/80 mmHg, high triglycerides (>150 mg/dL), or low HDL (<40 mg/dL in men or <50 mg/dL in women).

Intensive lifestyle modification should be pursued in all individuals with the metabolic syndrome, and appropriate drug therapy should be instituted for each of its components as indicated

Left ventricular hypertrophy

Left ventricular hypertrophy (LVH) is an independent risk factor that increases the risk of subsequent CVD. Regression of LVH occurs with aggressive BP management, including weight loss, sodium restriction, and treatment with all classes of antihypertensive agents except the direct vasodilators hydralazine, and minoxidil.

Peripheral arterial disease
Peripheral arterial disease (PAD) is equivalent in risk to IHD. Any class of anti-hypertensive drugs can be used in most PAD patients. Other risk factors should be managed aggressively, and aspirin should be used.

Hypertension in older persons
Hypertension occurs in more than two-thirds of individuals after age 65. This is also the population with the lowest rates of BP control. Treatment recommendations for older people with hypertension, including those who have isolated systolic hypertension, should follow the same principles outlined for the general care of hypertension. In many individuals, lower initial drug doses may be indicated to avoid symptoms; however, standard doses and multiple drugs are needed in the majority of older people to reach appropriate BP targets. Thiazde diuretics and CCB are the preferred classes of drugs to be used in elderly patients.

Postural hypotension
A decrease in standing SBP >10 mmHg, when associated with dizziness or fainting, is more frequent in older patients with systolic hypertension, diabetes, and those taking diuretics, venodilators (e.g., nitrates, alpha-blockers, and sildenafil like drugs), and some psychotropic drugs. BP in these individuals should also be monitored in the upright position. Caution should be used to avoid volume depletion and excessively rapid dose titration of antihypertensive drugs.

Hypertension in women
Oral contraceptives may increase BP, and the risk of hypertension increases with duration of use. Women taking oral contraceptives should have their BP checked regularly. Development of hypertension is a reason to consider other forms of contraception. In contrast, menopausal hormone therapy does not raise BP.

Women with hypertension who become pregnant should be followed carefully because of increased risks to mother and fetus. Methyldopa, BBs, and vasodilators are preferred medications for the safety of the fetus. ACEI and ARBs should not be used during pregnancy because of the potential for fetal defects and should be avoided in women who are likely to become pregnant.

Pre-eclampsia, which occurs after the 20th week of pregnancy, is characterized by new-onset or worsening hypertension, albuminuria, and hyperuricemia, sometimes with coagulation abnormalities. In some patients, preeclampsia may develop into a hypertensive urgency or emergency and may require hospitalization, intensive monitoring, early fetal delivery, and parenteral antihypertensive

Hypertensive urgencies and emergencies
Emergency:
Patients with marked BP elevations and acute target-organ damage (e.g., encephalopathy, myocardial infarction, unstable angina, pulmonary edema, eclampsia, intra cranial hemorrhage, head trauma, life-threatening arterial bleeding, or aortic dissection) require hospitalization and parenteral drug therapy.

Urgency:

Patients with markedly elevated BP but without acute target organ damage usually do not require hospitalization, but they should receive immediate combination oral antihypertensive therapy. They should be carefully evaluated and monitored for hypertension-induced heart and kidney damage and for identifiable causes of hypertension.

Resistant Hypertension

Resistant hypertension is the failure to reach goal BP in patients who are adhering to full doses of an appropriate three-drug regimen that includes a diuretic. After excluding potential identifiable causes of resistant hypertension (table 12), With particular attention paid to diuretic type and dose in relation to renal function, consultation with a specialist should be considered.

Table 12

Some Potential Causes of Resistant Hypertension

- Improper BP measurement
- Volume overload and pseudo-tolerance
  - Excess sodium intake
  - Volume retention from kidney disease
  - Inadequate diuretic therapy
- Drug induced or other causes
  - Non adherence to medication protocol
  - Inadequate doses
  - Inappropriate combinations of medications
  - Non-steroidal anti-inflammatories
  - Cocaine, amphetamines, other illicit drugs
  - Sympathomimetics (oral decongestant medications)
  - Oral contraceptives
  - Corticosteroids
  - Cyclosporine, tacrolimus
  - Erythropoietin
  - Licorice, including some chewing tobacco
  - Selected dietary supplements
- Associated conditions
  - Obesity
  - Excess alcohol intake

Referral Guidelines

A hypertensive patient should be referred to an appropriate specialist under the following conditions:

- If therapeutic goals, including blood pressure control, have not been reached within six months.
- For further assessment, screening, and management of Target Organ Disease or associated conditions, such as:
  - Screening ophthalmoscopic exam.

- Suspicion of left ventricular failure
- Suspicion of cerebrovascular accident or transient ischemic attack
- Suspicion of coronary event
- Progressive increase in serum creatinine or renal failure
- Hypertensive encephalopathy

Follow up and monitoring

Patients treated only with lifestyle modification should be seen after 3-6 months. After their blood pressure is stabilized, they should be seen every 6-12 months to reinforce the necessity and goals of maintaining these modifications of lifestyle.

Once antihypertensive drug therapy is initiated, most patients should return for follow up and adjustment of medications at approximately monthly intervals until the BP goal is reached. More frequent visits will be necessary for patients with stage 2 hypertension or with complicating co morbid conditions.

Co-morbidities, such as heart failure, associated diseases such as diabetes, and the need for laboratory tests influence the frequency of visits. Other cardiovascular risk factors should be treated to their respective goals, and tobacco avoidance should be promoted vigorously. Low-dose aspirin therapy should be considered only when BP is controlled, because the risk of hemorrhagic stroke is increased in patients with uncontrolled hypertension. On each regular visit, the following parameters should be investigated and documented:

- Diet/salt intake
- Smoking
- Adherence to medication protocol
- Blood Pressure
- Weight and BMI
- Cardiac Examination
- Pulmonary Examination
- Optic Fundi
- Review of counseling on diet, exercise, appropriate medication use
- Medication side effects

Approximately every 6 months, the following investigations should be monitored:

- Creatinine/ Urea Nitrogen
- Serum potassium
- ECG

Every 12 months, the patient should have the following examinations:

- Referral to an ophthalmologist for a full fundoscopic examination
- ECG – 12 lead

Prevention of hypertension

High blood pressure is preventable and treatable and because hypertension is a major risk factor for cardiovascular disease. Many deaths can be prevented if hypertension is prevented from developing or is detected early and managed properly.

Primary prevention:
This refers to actions that can be taken prior to the onset of hypertension through lifestyle modification.

Actions:

- Maintain normal body weight (BMI <25 kg/m^2)
- Avoid high salt diet (add no salt to food either in cooking or at the table, avoid canned and processed foods)
- Engage in regular aerobic activity
- Limit alcohol consumption
- Consume diet rich in fresh fruits and vegetables,
- Replace saturated fat with polyunsaturated fats.
- Stop smoking

Secondary prevention:
This refers to actions which halt the progress of hypertension at its incipient stage and prevents complications through early detection and proper management.

Actions:

- Regular blood pressure screening
- Lifestyle modification
- Early initiation of treatment and assurance of compliance

Tertiary prevention:
Refers to Measures used late in the stage of the disease to limit disease progression and clinical disease complication after overt clinical hypertension manifest

Actions:

- Lifestyle modifications
- Treatment of hypertension and any target organ damage with consideration of compliance, adherence, and concordance
- Concomitant treatment of diseases developed secondary to hypertension

Health Education Messages on Hypertension

It is very crucial that the patient should understand what hypertension is, the factors that influence it, therefore the treating physician should have a plan for the patient education, stressing the importance of the following points:

- Hypertension requires permanent, life-long treatment – it can be controlled, but not cured.
- Hypertension is frequently asymptomatic and may progress silently (called the silent killer); therefore regular monitoring and management of BP is important.
- Hypertension is important risk factor for many cardiovascular diseases such as heart attack and stroke, which can be prevented by adequate control.
- Life style modification is an essential part of therapy which leads to better control of hypertension and reduces the no. and doses of required drugs.
- Hypertension is usually asymptomatic and requires treatment based only the blood pressure readings rather than symptoms such as headache or dizziness.
- Stress can contribute to hypertension, but is not the most common cause; a genetic predisposition is the most common factor.
- Continually reinforce the dangers to smoking, not only in regard to hypertension, but to cardiac and lung health.
- Both systolic and diastolic BP are important, SBP may be more predictive of complication than DBP especially in elderly people.
- Herbal substances such as acidic foods and plants such as garlic are ineffective in lowering BP.

Hypertension

Prevention, Diagnosis, and Treatment

Annexes

Annex I
Blood pressure measurement:

Equipment for blood pressure measurement:

A ***sphygmomomanometer*** or blood pressure meter is a device with an inflatable cuff used to measure blood pressure, consist of inflation cuff, measuring unit (the manometer) tube to connect the two and inflation bulb connected by a tube to the cuff.

Types of sphygmomanometers:
1. ***Manometric***: includes both the mercury column type and the aneroid, both manually inflated and require stethoscope. The mercury type is very accurate and used for standardization of other measuring devices. The aneroid may give inaccurate readings if not properly calibrated.

2. ***Digital types***: are easy to use but can give inaccurate results, require no stethoscope. Three types are available: *finger* and *wrist* devises, both are not considered to be accurate and the *upper arm* devices which are the least susceptible to position error.

Cuff size for measuring blood pressure:

It is important to select the proper cuff size for blood pressure measurement, too small cuffs give false high BP, and too large cuffs give false low BP reading. The cuff bladder length should be at least 80% of the arm circumference, and width should be at least 40% of the arm circumference (table 1).

Table 1: Size of cuff

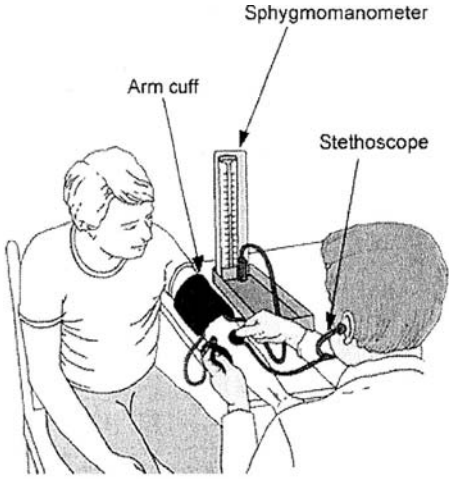
Midpoint Arm Circumference*** (cm)	Cuff Name	Bladder Width (cm)	Bladder Length (cm)
22-26	Small adult	10	24
27-34	Adult	13	30
35-44	Large adult	16	38
45-52	Thigh	20	42

*** Arm circumference as measured at the midpoint of the upper arm.

Measurement of BP at the clinic/office:

1. The auscultatory method of BP measurement with a properly calibrated and validated instrument should be used.

2. Persons should stop smoking and coffee drinks for at least 30 min. before the examination, and be seated quietly for at least 5 minutes in a chair (rather than on an exam table), with feet on the floor, and arm supported at heart level (fig.1)



Proper measurement of blood pressure

3. Measurement of BP in the standing position is indicated periodically, especially in those at risk for postural hypotension, diabetics and elderly.

4. An appropriate-sized cuff should be used to ensure accuracy, remember that for obese patients appropriate cuff size should be used; otherwise false high BP will be recorded.

5. Steps for proper blood pressure measurement should be followed (table 1). Systolic and diastolic blood pressure is accordingly recorded (table 2).

5. At least two measurements should be made and take the average. Both Right (RT) and Left (LT) arm BP should be measured in the initial visit, the arm with the higher BP should be considered for diagnosis of hypertension and treatment decisions.

Clinicians should provide to patients, verbally and in writing, their specific BP numbers and BP goals.

Diagnosis of hypertension is not based on the first assessment. Blood pressure measurement should be taken three separate times one to several weeks from the initial assessment to confirm the diagnosis.

Table 1 - Steps for proper blood pressure measurement technique

- Expose the upper arm. Remove any tight or restrictive clothing from the arm
- Evaluate the patient's bare upper arm for the appropriate size cuff
- Place the cuff on the patient's bare upper arm, with the lower edge of the cuff 2.5 cm above the antecubital fossa, with the center of the cuff bladder over the brachial artery.
- Palpate brachial artery pulse
- Inflate the cuff until pulsation disappears
- Deflate the cuff
- The point of disappearance is the estimated systolic pressure
- Wait 15-30 seconds, then place the bell head of the stethoscope over the brachial artery and inflate the bladder to 30 mmHg above estimated SBP
- Allow the cuff to slowly deflate at a rate of 2-3 mmHg per second while listening for repetitive sounds
- Record the pressure at which the first of at least two repetitive sounds is heard. This is the systolic blood pressure (phase1 sounds)
- Record the pressure at which the last regular sound is heard. This is the diastolic blood pressure(phase 5 sounds)
- Continue to listen during full deflation to confirm disappearance of the heart sounds.

Table 2 - Auscultatory sounds in reading blood pressure

- **Phase 1** the first appearance of faint, repetitive, clear tapping sounds that gradually increase in intensity for at least two consecutive beats. This is the **systolic blood pressure**.
- **Phase 2** A brief period may follow during which the sounds soften and acquire a swishing quality
- **Auscultatory gap** in some patients sounds may disappear altogether for a short time
- **Phase3** the return of sharper sounds, may be even sharper than phase 1 sounds.
- **Phase 4** the distinct, abrupt muffling sounds, which become soft and blowing in quality
- **Phase 5** The point at which all sounds finally disappear completely is the diastolic pressure

Inaccurate blood pressure measurement:
Accurate blood measurement is essential for diagnosis and treatment of hypertensive patients. The following points need to be considered for inaccuracy:

1. **Inaccurate manometer or improper cuff size**.
The manometer should be calibrated at regular basis and the proper cuff size should be selected.

2**. Inaccuracy results from the examiner**: cuff pressure is released too fast, terminal digit bias (the examiner tends to round off the measured value so as to end in 0 or 5), examiner bias and the examiner skills.

3. **Inaccuracy results from inter-arm difference**:
Pressure difference of > 10 mm Hg between the arms of hypertensive patient may be present in hypertensive patient, in such a case the higher BP reading should be selected for diagnosis and treatment.

4. **Inaccuracy from physiological variation**:
Emotional situation of the patient(stress or fear) during the measurement, white coat hypertension, the patient activity prior to measurement, position during measurement(sitting , standing , seating) and ingestion of certain substances (caffeine , alcohol , nicotine or sympathomimetic drugs like nasal drops)

Ambulatory BP monitoring:
Ambulatory blood pressure measurement is a method of obtaining information about blood pressure in a patient outside the clinical setting.

Anxiety, discomfort and unfamiliar surroundings at the clinic can lead to transient rise in BP. Sphygmomanometry, especially when performed by physicians, can cause an unrepresentative surge in BP called "**white coat hypertension**". Up to 20% of patients with apparent hypertension in the clinic may have this "white coat hypertension" and tend to have normal BP recordings by automated devises measured at home.

Ambulatory BP measurement devises are portable automated instruments that can be held by the patient for the whole 24 hours, recording the BP automatically at specified time intervals during the actual patient day life.

Ambulatory BP recordings are better correlated with the target organ damage due to hypertension than clinic readings ,yet lower reading than the clinic recordings should be considered for both diagnosis and treatment decisions (clinic reading should be >140/85 mmHg, ambulatory >130/80 mmHg). In most individuals, BP decreases by 10 to 20 percent during the night; those in whom such reductions are not present are at increased risk for cardiovascular events.

Indications for ambulatory blood pressure monitoring:
1. "White-coat" hypertension in the absence of target organ damage.
2. Drug resistance hypertension.
3. Hypotensive symptoms with antihypertensive medication
4. Episodic or labile hypertension and autonomic dysfunction

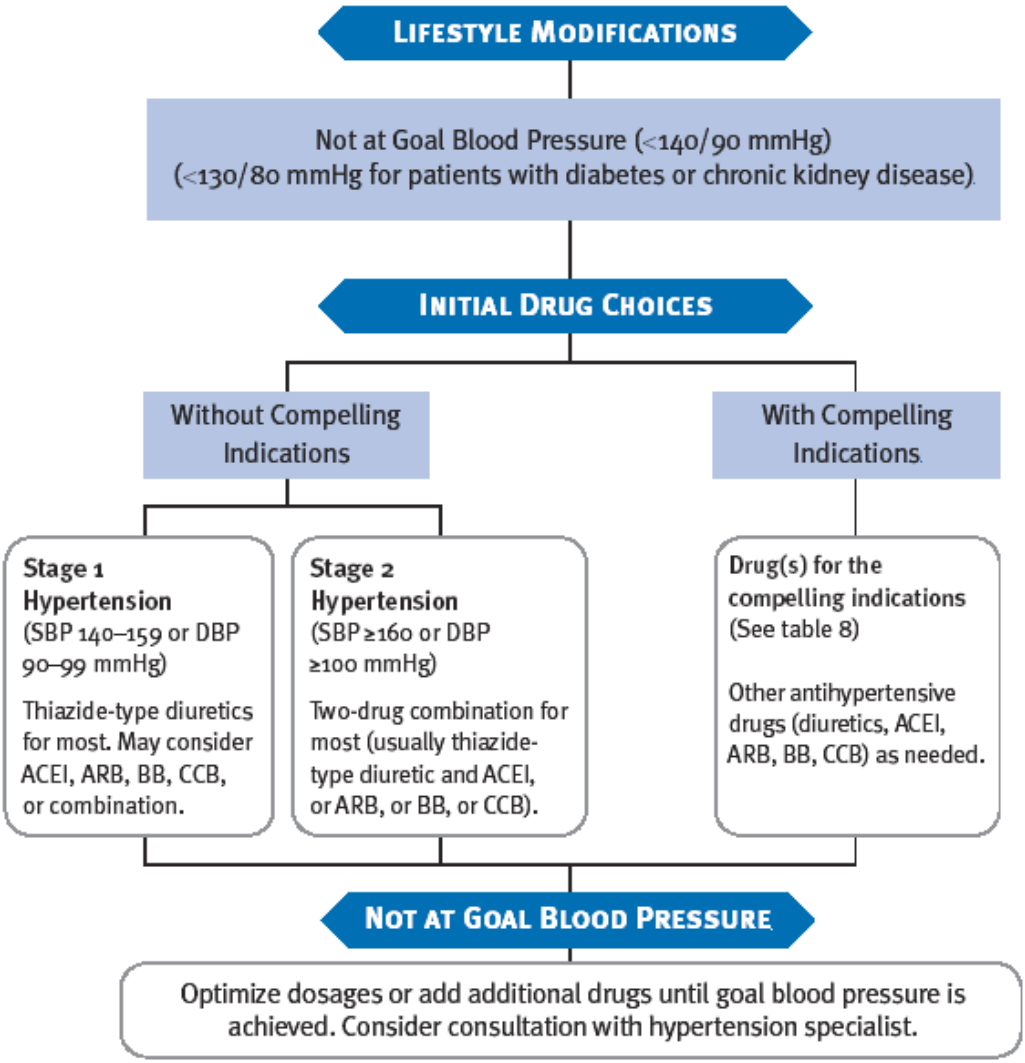
Self-measurement of blood pressure:

Blood pressure self-measurements may benefit patients by providing information on response to antihypertensive medication, improving patient adherence with therapy, and in evaluating white-coat hypertension.

Persons with an average BP more than 135/85 mmHg measured at home are generally considered to be hypertensive. Home measurement devices which are of variable quality semi-automated devices should be checked regularly for accuracy.

Annex II

Figure 1. Algorithm for treatment of hypertension



DBP, diastolic blood pressure; SBP, systolic blood pressure.
Drug abbreviations: ACEI, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; BB, beta-blocker; CCB, calcium channel blocker.

Seventh Report of the JNC on Prevention, Detection,Evaluation and Treatment of High Blood Pressure, National Heart, Lung and Blood Institute, National Institutes of Health, USA, Aug. 2004

Annex III

Lifestyle Modifications to Manage Hypertension*+

MODIFICATION	RECOMMENDATION	APROXIMATE SBP REDUCTION (RANGE)
Stop smoking	Completely stop smoking	Unknown, but results in reduction of many risks
Weight reduction	Maintain normal body weight (body mass index 18.5-24.9 $Kg/m^{2)}$	5-20 mmHg/10 Kg weight loss
Adopt DASH* eating plan	Consume a diet rich in fruits, vegetables, and low fat dairy products with a reduced content of saturated and total fat	8-14 mm. Hg reduction
Dietary sodium reduction	Reduce dietary sodium intake to no more than 100 mmol per day (Add no salt to the food; avoid canned and processed foods and obviously salty foods)	2-8 mm. Hg reduction
Aerobic physical activity	Engage in regular aerobic physical activity such as brisk walking (at least 30 min per day, most days of the week)	2-4 mm. Hg reduction
IF alcohol taken: Moderate alcohol consumption	Less than 90 ml. whiskey (or equivalent), or 300 ml. wine per day	2-4 mm. Hg reduction

* DASH: Dietary Approaches to Stop Hypertension.

Annex IV
Oral antihypertensive drugs

Table Oral antihypertensive drugs (CONTINUED)

CLASS	DRUG (TRADE NAME)	USUAL DOSE RANGE IN MG/DAY (DAILY FREQUENCY)
ACE inhibitors	benazepril (Lotensin†)	10–40 (1–2)
	captopril (Capoten†)	25–100 (2)
	enalapril (Vasotec†)	2.5–40 (1–2)
	fosinopril (Monopril)	10–40 (1)
	lisinopril (Prinivil, Zestril†)	10–40 (1)
	moexipril (Univasc)	7.5–30 (1)
	perindopril (Aceon)	4–8 (1–2)
	quinapril (Accupril)	10–40 (1)
	ramipril (Altace)	2.5–20 (1)
	trandolapril (Mavik)	1–4 (1)
Angiotensin II antagonists	candesartan (Atacand)	8–32 (1)
	eprosartan (Tevetan)	400–800 (1–2)
	irbesartan (Avapro)	150–300 (1)
	losartan (Cozaar)	25–100 (1–2)
	olmesartan (Benicar)	20–40 (1)
	telmisartan (Micardis)	20–80 (1)
	valsartan (Diovan)	80–320 (1)
Calcium channel blockers—non-Dihydropyridines	diltiazem extended release (Cardizem CD, Dilacor XR, Tiazac†)	180–420 (1)
	diltiazem extended release (Cardizem LA)	120–540 (1)
sympathomimetic activity	penbutolol (Levatol)	10–40 (1)
	pindolol (generic)	10–40 (2)
Combined alpha- and beta-blockers	carvedilol (Coreg)	12.5–50 (2)
	labetalol (Normodyne, Trandate†)	200–800 (2)

Table Oral antihypertensive drugs* (CONTINUED)

CLASS	DRUG (TRADE NAME)	USUAL DOSE RANGE IN MG/DAY (DAILY FREQUENCY)
Alpha$_1$-blockers	doxazosin (Cardura)	1–16 (1)
	prazosin (Minipress†)	2–20 (2–3)
	terazosin (Hytrin)	1–20 (1–2)
Central alpha$_2$-agonists and other centrally acting drugs	clonidine (Catapres†)	0.1–0.8 (2)
	clonidine patch (Catapres-TTS)	0.1–0.3 (1wkly)
	methyldopa (Aldomet†)	250–1,000 (2)
	reserpine (generic)	0.05‡–0.25 (1)
	guanfacine (generic)	0.5–2 (1)
Direct vasodilators	hydralazine (Apresoline†)	25–100 (2)
	minoxidil (Loniten†)	2.5–80 (1–2)

Annex V

Performance and Monitoring Checklist: Systemic Hypertension

Instructions: For each of the tasks listed below, place a check in the "Yes" or "No" box. As appropriate, indicate whether or not the task was achieved. If a particular task is not applicable, enter NA ("not applicable") in the "Comments" column. Use the "Comments" Column also to note details about why a particular task was not achieved or other information that may be useful in identifying or resolving inappropriate practices. Note that it will require several patient visits to achieve all of these tasks – the checklist should be applied after several consecutive encounters with the same patient.

Task	Achieved?		Comments
	Yes	NO	
A. History: Patient is asked about:			
1. Duration of hypertension			
2. Blood pressure readings in past 3 months (if applicable)			
3. Factors that increase potential risk or influence control of hypertension			
4. Family history of hypertension, MI, CVA, diabetes or renal disease			
5. Weight gain			
6. Intake of sodium, alcohol, saturated fats and/or caffeine			
7. Any medication use that may raise BP or interfere with effectiveness of drugs			
8. Any stress from work or family environment			
9. Symptoms suggesting secondary causes of hypertension			
10. Results and adverse effects of previous hypertensive therapy (if applicable)			
11. Symptoms suggestive of target organ damage			
B. Physical Examination			
1. Takes and records vital signs in chart: pulse, temperature, respiratory rate			
2. Verifies BP in both arms			
3. Measures height and weight; calculates BMI			
4. Examines optic fundi or refers for fundus examination			
5. Cardiovascular exam			
a. Evidence of heart disease			
b. Pulmonary: bronchospasm, respiration rate			
c. Abdomen: bruits, enlarged kidneys, masses			

C. Patient Education			
1.Uses simple, clear language			
2.Periodically checks if patient understands instructions			
3. Asks patient if s/he has any questions			
4. Informs patient about diagnosis and severity of condition			
5. Explains use and possible side effects of prescribed medications			
6. Explains chronic nature of hypertension and the necessity of patient involvement in management			
7. Explains that the following lifestyle modifications are important:			
a. Weight reduction, cessation of smoking			
b. Aerobic physical activity (20-30 minutes, 4-5 times per week)			
c. Sodium intake should be limited to no added salt			
d. Maintain adequate intake of potassium by taking daily fruits such as oranges or bananas or juice			
e. Reduce intake of dietary saturated fat and cholesterol			
8. Encourages home BP measurement to encourage positive attitudes about achieving therapeutic goals			
9. Explains to patient under what conditions referral to hospital or consultant is needed			
D. Diagnostic Tests/Procedures/ Orders:			
1. Blood chemistry: potassium, creatinine, fasting glucose, total cholesterol			
2. Urinalysis for blood, protein & glucose			
3. Electrocardiogram in patients > 40 years			
4. Other optional tests with Justifications			
5.Checks that hypertension stage and associated risks are recorded			
Treatment Plan			
Appropriate drug prescription according to guidelines			
Referral			
Appropriate referral for consultation according to guidelines			

Annex VI

Home care of Hypertension

Introduction:

Although hypertension is a life-long and potentially deadly disease, it can be controlled with some changes in your style of living, and with often relatively simple medications. As long as your blood pressure is maintained in a normal range, even though by means of diet and medications, your risk of serious complications will remain low. However, many people do not take the effort to ensure that the life-style changes and medication are actually reducing their blood pressure to the normal level, or may stop their efforts after a period of time. This lack of attention again increases their risk of serious complications, such as heart failure, heart attack, or stroke.

This means that much of the attention to blood pressure must be done by the patient himself or herself in their home setting, with direction and guidance from their doctor. It includes several elements, the most important of which are as follows:

- Consider purchasing a home-based blood pressure monitoring device, and record your blood pressure at home at least once or twice each week. (see below for more information).
- Stop smoking:
  - Talk to your doctor if you need help to stop smoking. There are several medications and approaches that can help.
- Avoid exposure to secondary smoke (being in the same room with smokers).
- Avoid alcohol, or if you take alcohol, limit your intake to one glass per day (30 ml of whiskey; 100 ml of wine).
- Avoid caffeine and other stimulants.
- Eat a heart-healthy diet (see below for more information):
  - Limit your intake of saturated fat – limit red meats, processed meats (sausage or canned meat), whole milk, and animal fats in cooking.
  - Take modest quantities of monounsaturated fats, such as olive oil.
  - Avoid additional salt in your diet, and stay away from salty snacks (potato crisps, salted nuts).
  - Eat foods rich in omega-3 fats, such as fresh fish.
  - Take good amounts of whole grains, vegetables, fruits, and fiber in your diet every day (see below for more information).
- If you have been prescribed medications to control high cholesterol, do not skip doses.
- Take any prescribed blood pressure medications as directed:
  - Don't skip doses of your medication.
  - Avoid running out of your medications.
  - Don't stop your medication when you feel better.
  - If you are suspecting side effects of the medication, talk to your doctor before stopping your medication.
  - Be aware of potential drug side effects.
- Manage stress (see below for more information):
  - Stress and anxiety can elevate your blood pressure.
- Get regular exercise:
  - Talk to your doctor before you start an exercise program to be sure you will get the maximum benefit from the exercise.
- Maintain a normal body weight:
  - You should weigh yourself every week and record the results.

  - Notify your doctor if you gain or lose more than 2 kg in one week.
- Do not use non-prescription cold and allergy medications without your doctor's consent:
  - Decongestant medications can elevate your blood pressure
  - Non prescription asthma inhalers can elevate your blood pressure
- Take prescription medication as directed :
  - Skipping doses of your blood pressure medicine will raise your blood pressure.
  - Watch out for drug side effects and potential drug interactions that cause your blood pressure to go up or down.
  - Patients with kidney impairment should avoid nonsteroidal anti-inflammatory medications (like ibuprofen, naproxyn, aspirin) and other medications that are metabolized by the kidney. Paracetamol can be used for pain and fever control because it is not metabolized by the kidney.

Food Choices in Hypertension

A healthy diet for hypertension (such as the DASH diet) includes:

- Control Calories:
  - Eat just enough calories to achieve and maintain a healthy weight.
  - Choose primarily grains and cereals, vegetables, and fruits for the majority of meals. Use the following DASH Eating Program as a guide to selection of foods:

DASH Eating Program

Food	Servings per day	Serving Size
Grains	7-8 daily servings	½ cup cooked rice or pasta; 1 slice whole grain bread
Vegetables	4-5 daily servings	1 cup raw vegetables or fruit ½ cup cooked vegetables or fruit
Fruits	4-5 daily servings (unless diabetic, then reduce to 2-3 daily servings)	1 cup raw fruit 1 medium banana 1 orange, ½ grapefruit
Low-fat or fat-free dairy products	2-3 daily servings	1 cup of low-fat milk or yoghurt
Lean meat, poultry and fish	2 or less daily servings	90 grams cooked lean meat 90 grams cooked chicken
Nuts, seeds, and dry beans/lentils	Less than 1 serving per day	15 grams of nuts ¼ cup cooked beans, peas, or lentils, humus
Fats and oils	2-3 daily servings.	1 teaspoon olive oil
Sweets - limited	Less than 1 serving per day	1 small piece of pastry or sweet

http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf

- Suggestions for starting the DASH eating program:
  - Add more vegetables, rice, pasta, and dry beans or lentils to your diet.
  - Use fruit with meals or as a snack. Canned and dried fruits are easy to use; choose fresh fruits in season.
  - Use whole grains such as brown rice, whole wheat bread, bulghur wheat, or oats as much as possible.
  - Use only small amounts of butter, margarine, or salad dressing, and use low-fat or fat-free condiments and olive oil.

- Use healthy oils for cooking and eating:
    - Use olive oil and other unsaturated fat oils such as sunflower oil.
    - Eat foods rich in omega-3 fats such as fresh fish.
  - Take low-fat or no-fat dairy products (yoghurt, cheese or milk) three times a day.
  - Use only low fat meats like chicken, fish or lean beef, and limit the quantity to no more than 180 gms/day.
  - Instead of typical high fat or sweet snacks (chips, candy, etc.), eat unsalted pretzels or nuts, raisins or dried apricots, plain crackers or biscuits, low-fat and fat-free yogurt and frozen yogurt; unsalted plain popcorn with no butter, fresh fruit or raw vegetables.
  - Read food labels carefully to choose products that are lower in sodium. Avoid the following high sodium (salt) items:
    - flavoring cubes (Maggi cubes) and soy sauce
    - canned and/or dried soup
    - canned vegetables
    - processed meats and luncheon meats
    - salted snacks like chips, pretzels, pickles
- Avoid fad (magazine-published) diets;
  - Eat a balanced diet instead
  - Eat small, frequent meals
  - Avoid large and heavy meals
- Check with your doctor about supplementing your diet with B vitamins
- Reduce salt in your diet
  - Avoid cooking with salt
  - Avoid fast food
  - Avoid salty food ,such as pickles, cured meals, salty snacks, and canned soup
  - Avoid seasonings that contain sodium , such sauces, ketchup and monosodium glutamate
  - Do not add salt to your food after it is prepared
  - Read food labels and buy foods that are low in sodium
  - When eating out ,ask that your food be prepared without salt
- Take foods rich in fiber every day
  - Dietary fiber is a plant material that humans cannot digest. Fiber increases the amount of stool in your intestine. The most well known fiber is bran.
  - In addition to lowering cholesterol and blood sugar levels, some studies have shown that people with hypertension who increase fiber in the diet for at least 8 weeks can significantly lower their blood pressure. As an added benefit, high fiber foods usually contain important vitamins and minerals.
  - Fiber comes in 2 forms, based on whether it will dissolve in water : soluble and insoluble. Most experts believe that about ¾ of fiber intake should be in the form of **insoluble fiber**
    - Water Soluble Fiber sources: fresh fruits, dried fruits, vegetables, green leafy vegetables, oats, barley, legumes
    - Insoluble Fiber sources : vegetables, whole wheat, bran, whole grain brown bread
  - Raw foods tend to have more fiber than cooked, canned or pureed items. Even chopping and peeling skins removes some fiber.
  - Fiber can also be taken in common fiber supplements like Metamucil, or whole wheat bran can be purchased very inexpensively from a miller. Use 2-3 teaspoons of bran in many cooked dishes.

- When taking high fiber foods, be sure to take at least 2 liters of water or other fluids every day. Fiber tends to bind water, which leads to softer stools and a more rapid transit of material through the intestines.

- Examples of a high – fiber diet:
  - **Breads and grains** : e.g. : Barley, whole grain breads , whole grain baked pastries and muffins
  - **Fruit :** Apple, orange, banana, dates, peach, pear
  - **Vegetables:** Carrots, spinach, tomato, potatoes, cabbage, zucchini
  - **Substitutes for meats**: Meat has no fiber and contains various amounts of cholesterol and saturated fats. There are many high-fiber foods that can help replace meat protein in the diet, such as almonds, kidney beans, peanuts, sesame seeds, sunflower seeds.

Self-monitoring of Hypertension

- You should take your blood pressure at least once per week and record the results in a logbook or something similar. Show these values to the doctor at each visit, and they will greatly help him in determining the best treatment plan for you.
  - Notify your doctor for repeated B.P readings over 140/90 mmHg.
  - Notify your doctor for repeated B.P readings that are 20 points higher than usual.

Taking your Blood Pressure:

- A number of devices are available for home blood pressure measurement. A simple blood pressure cuff with a stethoscope is the most accurate way to measure blood pressure, and is often the most inexpensive. However, it requires attention to detail for accurate results. Digital blood pressure devices are easy to use, and automatically calculate the pulse and blood pressure, but are more expensive. Avoid finger-tip or wrist digital blood pressure machines; they have been shown to be very inaccurate compared to those that are placed on the upper arm.
- Tips for measuring an accurate blood pressure using a standard cuff and stethoscope:
  - Remain seated or supine with the arm supported at heart level
  - Do not smoke or ingest caffeine for 30 min. prior to measurement
  - Rest for 5 min. before taking your blood pressure
  - The blood pressure air bladder should nearly encircle the arm: persons with large arms may require an extra large adult cuff. Cuffs are usually marked to indicate the acceptable size range
  - Apply cuff ½ inch above elbow crease
  - Locate brachial pulse and place the stethoscope bell at this location
  - With the valve closed, pump up cuff bulb to approximately 210 mm Hg, or a point where no sounds are heard through the stethoscope.
  - Open the valve slowly (2-3 mmHg/sec) and listen for the point where the tapping sounds are first heard. The corresponding reading on the dial is the systolic pressure, Then listen for the point where the tapping sounds stop, which is the diastolic blood pressure
  - Perform 2 or more readings during each session, separated by 5 minutes to be sure that they are similar.

Take Control of Your Hypertension

Many people believe they have no control over their health and wellness. Many ignore personal health decisions or simply leave them to doctors. Some patients have misconceptions about medication and the benefit of any treatments and any alternatives. You and your doctor must work together to jointly decide the best course of action to manage your health. This process is called "shared decision making", in which your doctor becomes a guide and teacher and helps steer you toward the best treatment. Most doctors welcome this partnership, but you must learn about your illnesses for shared decision–making to work.

What is a treatment plan?

A treatment plan is what you and your doctor decide to do for management of your illness, and is very important to the success of long-term treatment of hypertension. Commitment to your doctor's instruction is so essential to get to the treatment goals.

3 simple questions can help you get the most from your treatment plan:

- What is my main problem?
- What do I need to do?
- Why is it important for me to do these things?

Other important points to consider:

- Be sure to understand your treatment plan.
- Stick with the treatment plan and allow time for improvements.
- Don't stop medicines when you feel better, check with your doctor.
- Your doctor should tell you what to expect and when to follow –up or call. However, if your condition worsens between follow-up appointments, call your doctor.

What should you know about your medications?

Every year many people become ill because of problems with medications. Remember to ask:

- What side effects to expect?
- What drug interactions are possible; both between two different medications, and with any foods, vitamins , nicotine and alcohol?
- Find out if a new medicine reacts with those that you are taking now.
- Many over-the-counter drugs and dietary supplements can also cause serious side effects and drug interactions; discuss these with the doctor before purchasing them.
- Make sure you can drive or operate machines safely while taking a medicine; ask if the medication could cause sleepiness or decrease in reflexes.
- Ask your doctor how much a prescription costs; Is there a less expensive option or generic version?

Management of Stress

Although emotional stress and anxiety are often associated with hypertension, there is significant debate regarding the role of stress in causing hypertension. However, because it is commonly seen, the following are some words of wisdom that can be helpful in reducing stress and anxiety in your life:

- Accept what you cannot change
- Allow yourself to cry
- Allow yourself to experience simple pleasures that give you joy
- Ask for help if you need it
- Associate with people you enjoy and who treat you well

- Avoid drug and alcohol
- Do not be dominated by one thing ,such as work or relationships
- Do not feel guilty when you have to say " no" to extra duties or tasks
- Donate some of your time to help others
- Energize your body with regular exercises
- Engage in hobbies ,or other entertainments
- Fuel your body with healthy foods
- Have the courage to be less than perfect
- Schedule time for fun or other things
- Seek professional help when you are overwhelmed
- Stay on a regular sleep schedule
- Avoid stimulants ,like caffeine ,nicotine, alcohol, decongestants and allergy medication

Hypertension warning Signs

Notify your doctor immediately or go directly to the hospital emergency for any of the following:

- Repeated BP readings that are 20 points higher than usual
- Chest pain
- Confusion
- Memory loss
- Vision loss
- Difficulty speaking
- Difficulty swallowing
- Difficulty walking
- Difficulty with balance
- Loss of coordination
- One – sided numbness in the limbs and face, unilateral: Facial, arm, leg, arm and leg
- One- sided weakness in the limbs or face , unilateral: facial, arm, leg, arm and leg

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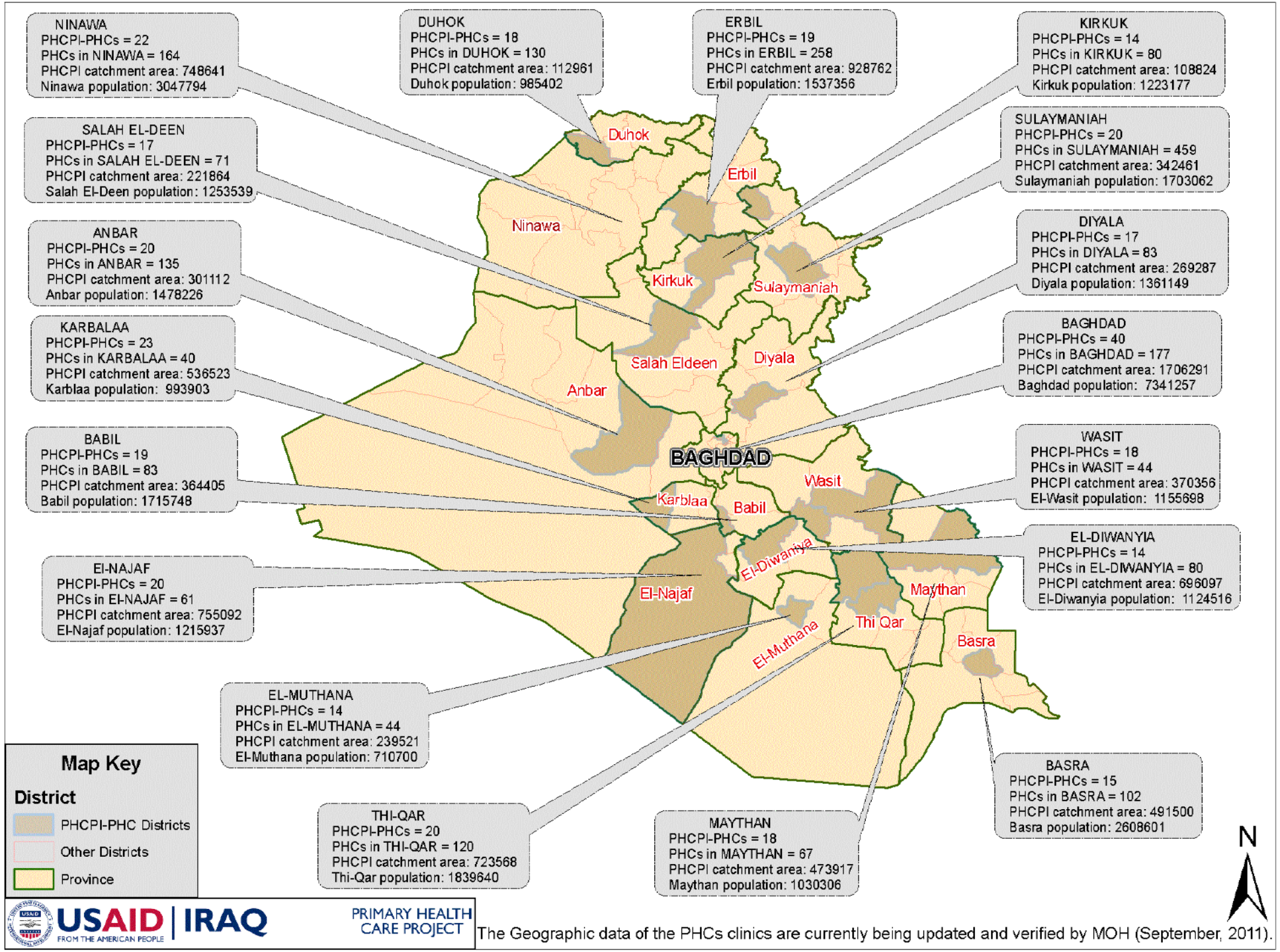
PHCPI-PHCs population mapped to IRAQ population



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PRIMARY HEALTH CARE PROJECT

The Geographic data of the PHCs clinics are currently being updated and verified by MOH (September, 2011).

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