CARDIO

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Elective report

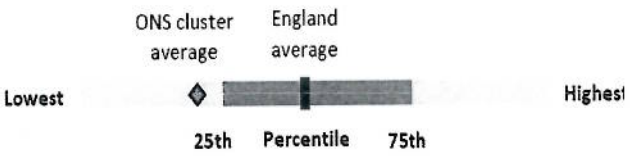
1. What is the prevalence of chronic illnesses in England, and how does it compare to the major cities in the world (NYC, Paris, Tokyo).

Cardiovascular disease is common and has a high prevalence. In the UK the main cause of death is cardiovascular death accounting for at least 147,000 deaths in England in 2010. Those deaths can be further analysed by the conditions affecting the heart. Coronary heart disease (CHD) accounts for around 45% and stroke for a further 27% of those deaths. Derby is part of the East midlands Cardiac & Stroke Network, as part of the south east public health observatory. This network is setup to help observe epidemiological data to help in planning and providing healthcare in this region.

Figure 1.0

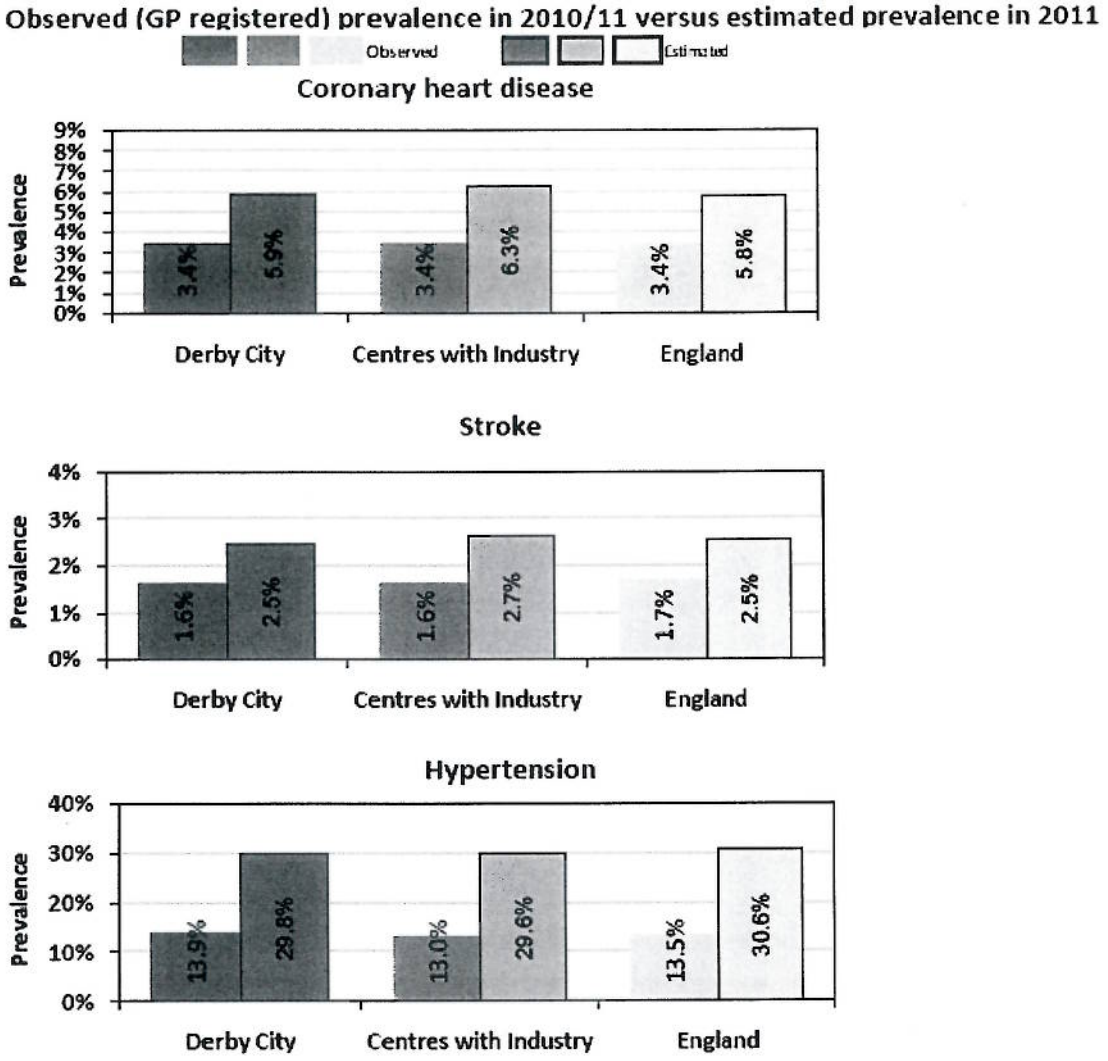
	Indicator	Local Value	Eng Avg	Eng Low	England Range	Eng High
1	Cardiovascular mortality (under 75)	76.9	64.7	36.2		118.4
2	Stroke mortality	36.8	40.9	22.1		58.6
3	Estimated % smokers (16+)	25.7	22.1	0.0		33.5
4	Estimated % obese (16+)	23.4	24.1	0.0		30.7
5	4 week quitters per smokers (%)	5.0	4.1	1.9		7.3
6	% of long term conditions who smoke	17.6	17.5	11.4		27.2
7	Obs/Exp CHD prevalence	0.58	0.59	0.31		0.82
8	Obs/Exp Hypertension prevalence	0.47	0.44	0.30		0.53
9	CHD emergency admissions	235.5	225.9	145.3		399.0
10	Stroke emergency admissions	72.0	85.7	58.2		172.7
11	30 day mortality in STEMI	9.0	9.3	0.0		17.3
12	% stroke discharged to usual residence	76.0	77.3	56.7		97.5
13	% HF who die at usual place residence	42.1	59.2	17.9		98.9
14	Angiography rates	180.4	272.0	121.3		593.9
15	Revascularisation rates	138.3	136.6	93.7		231.1

- Significantly Higher than England average
- Significantly Lower than England average
- Not significantly different from England average
- No significance available



For Derby, the cardiovascular early mortality (for those under 75) is significantly higher than the average for England (76.9 vs 64.7), figure1.0 . This rate has decreased from 1995. The CHD emergency admissions are slightly higher than the national average (235.5 vs 225.9). The rate of angiography is significantly lower for Derby city but has a higher than national average revascularisation rates. For those who are diagnosed with a STEMI, the 30 day mortality is slightly lower than the national average. The observed and estimated rate of chronic diseases such as CHD, hypertension and stroke from GP data is shown below. The observed rate of CHD in Derby and England is the same at 3.4%. In figure 1.1, the observed rate of hypertension in Derby (13.9%) is slightly higher than the average in England (13.5%). The observed rate of stroke in Derby (1.6%) is also slightly lower than the average for England (1.7%) compared to the national average is not available. Overall, Derby has a picture similar to the national average in many respects and some particular cardiovascular health needs.

Figure 1.1



The percentage of those with heart failure who die at their usual place of residence is not significantly differently to the national average.

The estimated percentage of smokers, over sixteen, in Derby is significantly above the national average (25.7 vs 22.1). However the percentage of 4 week quitters is also above the national average. Furthermore, but the % of those with long term conditions who smoke is 0.1% higher than the national average but not significantly different. The estimated percentage obesity is lower than national average respectively (23.4 vs 24.1).

The picture for stroke is slightly different. The stroke mortality is slightly lower than the England average (36.8 v 40.9). This is also applies for those percentage of those with a stroke who are discharged to their usual residence. In figure 1.2 (below) is a table based on data collected from quality service framework showing how Derby compares to the average in England and other similar cities with industry.

Figure 1.2

2010/11

Significantly lower than England **The same as England** Significantly higher than England

Coronary heart disease

	Derby City	Centres with Industry	England
% newly diagnosed angina patients referred for exercise testing or assessment	94.9	93.9	94.6
% CHD patients with record of blood pressure in last 15 months	98.1	97.8	97.8
% CHD patients in whom last blood pressure reading was 150/90 or less	90.5	89.8	90.2
% CHD patients with a record of total cholesterol in last 15 months	93.4	93.6	93.7
% CHD patients in whom last cholesterol measurement was 5mmol/l or less	84.4	81.8	82.1
% CHD patients taking aspirin, an alternative anti-platelet therapy or an anti-coagulant in last 15 months	92.6	93.4	93.5
% CHD patients currently treated with beta blocker	74.9	72.9	73.5
% patients with history of myocardial infarction currently treated with ACE inhibitor or angiotensin II antagonist	87.3	89.1	88.8
% CHD patients immunised against influenza in Sept-March 05	93.2	92.1	92.4

Stroke

	Derby City	Centres with Industry	England
% stroke patients with a record of blood pressure in last 15 months	96.9	96.9	96.8
% stroke patients whose blood pressure was 150/90 or less	88.9	88.1	88.6
% stroke patients with record of cholesterol in last 15 months	89.6	91.4	91.5
% stroke patients whose cholesterol was 5mmol/l or less	79.4	77.7	77.3
% stroke patients immunised preceding Sept-March	90.7	89.2	89.6
% non-haemorrhagic/with history of TIA stroke patients taking anti-platelet agent/anti coagulant	93.5	93.9	93.7
% new patients with a stroke referred for further investigation	92.3	89.0	89.8

Atrial fibrillation

% atrial fibrillation patients currently treated with anti-coagulation drug therapy or an anti-platelet therapy	94.5	93.9	93.6

Heart failure

% heart failure patients diagnosed after 1st April 2006 with diagnosis confirmed by an echocardiogram or specialist assessment	96.5	95.8	95.8
% patients with a current diagnosis of heart failure due to LVD currently treated with an ACE inhibitor or angiotensin receptor blocker	88.7	89.4	89.5

Hypertension

% hypertension patients with record of blood pressure in last 9 months	90.9	91.6	91.6
% hypertension patients (with record in last 9 months) in whom last blood pressure was 150/90 or less	78.8	78.9	79.3

Source: Quality and Outcomes Framework 2010/11

The data clearly shows 4 indicators for CHD, 3 for heart failure, and 1 for atrial fibrillation which is higher than those for England which can be addressed by planning with the service providers to provide the relevant services to address those health needs. However again most indicators are not significantly different from the rest of England.

As cardiovascular disease is a broad umbrella definition. I will concentrate on one disease and concentrate on worldwide prevalence. A disease which is common and relevant to my practise is hypertension. Table 1.0 has the prevalence of hypertension in many countries from different continents.

Table 1 Prevalence of hypertension by world region

Region	Country	Study year	Study population	Age range	% Male	Blood pressure methods: Device	No. of measures/ No. of visits	Preparation	Crude prevalence of hypertension: Men (%)	Women (%)	Total (%)	Age-adjusted prevalence of hypertension: Men (%)	Women (%)	Total (%)
EME	United States [11]	1999–2000	National sample of 5448	≥18	48.0	Standard mercury	6/2 visits	5 min rest	27.1	30.1	28.7	24.2	22.4	–
	Canada [12]	1986–1992	National sample of 23 129	18–74	49.2	Standard mercury	4/2 visits	5 min rest	26.0	18.0	22.0	23.5	15.6	21.4
	Spain [13]	1990	National sample of 2021	35–64	–	Random zero	3/1 visit	–	46.2	44.3	45.1	41.7	39.0	40.0
	Belgium [14]	1985–1992	Multi-site sample of 4904	25–64	52.0	Random zero	2/1 visit	5 min rest	26.7	20.0	–	–	–	–
	England [15]	1998	National sample of 11 529	≥20	45.3	Electronic	3/1 visit	5 min rest	43.4	35.0	38.8	34.7	25.7	29.6
	Finland [16]	1997	Multi-site sample of 5746	25–64	47.6	Standard mercury	2/1 visit	5 min rest	51.0	35.0	–	–	–	–
	Germany [17]	1997–1999	National sample of 7124	18–79	–	Standard mercury	3/1 visit	5 min rest	60.2	50.3	55.3	55.4	56.6	–
	Greece [18]	1997	Regional sample of 665	18–91	41.8	Standard mercury	3/1 visit	5 min rest	30.2	27.1	28.4	18.5	15.9	16.9
	Italy [19]	1998	National sample of 8233	35–74	–	Standard mercury	2/1 visit	5 min rest	44.8	30.6	37.7	42.0	43.3	–
	Sweden [20]	1999	Regional sample of 1823	25–74	–	Standard mercury	2/1 visit	5 min rest	44.8	32.0	38.4	39.6	40.9	–
	Australia [21,22]	1989	National sample of 19 315	25–64	–	Standard mercury	2/1 visit	–	31.9	20.7	–	30.8	20.1	–
	Japan [23]	1980	National sample of 10 346	30–74	44.0	Standard mercury	1/1 visit	–	50.1	43.3	–	42.7	35.0	38.3
FSE	Poland [24]	1987–1988	Multi-site sample of 1835	45–64	47.7	Standard mercury	2/1 visit	5 min rest	68.9	72.5	70.7	–	–	–
IND	North India [25], Rural	1994–1995	Regional sample of 2559	21–70	48.1	Random zero	3/2 visits§	5 min rest	3.4	6.8	5.2	3.5	7.5	5.5
	North India [26], Urban	1997	Regional sample of 1806	25–64	50.1	Standard mercury	3/1 visit	5 min rest	25.0	22.3	–	24.5	23.2	23.8
	North India [27], Rural	1997	Regional sample of 1935	≥25	50.9	Standard mercury	1 or 2/1 visit†	5 min rest	20.8	20.8	20.8	21.5	24.9	23.1
	West India [28], Urban	1995†	Regional sample of 2122	≥20	63.0	Standard mercury	2 or 3/1 visit	5 min rest	30.0	33.0	30.9	31.8	27.8	30.7
	West India [29], Rural	1994†	Regional sample of 3148	≥20	54.0	Standard mercury	2 or 3/1 visit¶	–	24.0	17.0	21.0	23.3	19.8	22.0
LAC	Barbados [30]	1996	National sample of 807	25–74	–	Standard mercury	3/1 visit	10 min rest	25.4	29.6	27.9	–	–	–
	Jamaica [30]	1996	National sample of 817	25–74	–	Standard mercury	3/1 visit	10 min rest	19.0	29.2	24.7	–	–	–
	St. Lucia [30]	1996	National sample of 1060	25–74	–	Standard mercury	3/1 visit	10 min rest	24.7	28.7	26.8	–	–	–
	Mexico [31]	1992–1993	National sample of 14 657	20–69	41.3	Standard mercury	1/1 visit	5 min rest	37.5	28.1	32.0	38.6	30.1	33.5
	Paraguay [32]	1993–1994	National sample of 9880	20–74	69.8	Aneroid	2/1 visit	10 min rest	28.8	40.9	32.5	32.4	41.9	35.4
	Venezuela [33]	1996	National sample of 7424	≥20	49.0	Standard mercury	3/1 visit	–	45.2	28.9	36.9	47.7	32.2	39.7
	Cuba [34]	1994	Regional sample of 1633	≥15	45.6	Standard mercury	2/1 visit	10 min rest	45.9	41.5	43.5	–	–	–
MEC	Egypt [35]	1991	National sample of 6733	25–95	43.5	Standard mercury	4/1 visits	5 min rest	25.7	25.9	26.3	25.9	29.3	27.4
	Iran [36]	1993–1994	Regional sample of 6532	≥19	41.1	Standard mercury	3/1 visit	10 min rest	23.3	27.3	25.6			
	Turkey [37]	1995	Regional sample of 1466	≥18	56.5	Aneroid	2/1 visit	5 min rest	26.0	34.1	29.6	21.8	30.9	25.7
CHN	China [38]	2000–2001	National sample of 15 854	35–74	48.5	Standard mercury	3/1 visit	5 min rest	28.6	25.8	27.2	28.8	26.6	27.7
OAI	Korea [39]	1990	National sample of 21 242	≥30	43.7	Standard mercury	2/1 visit	5 min rest	–	–	19.8	21.8	19.4	–
	Thailand [40]	2000–2001	National sample of 5350	≥35	39.4	Standard mercury	3/1 visit	5 min rest	21.3	19.8	20.5	22.1	21.4	21.7
	Singapore [41]	1998	National sample of 4723	30–69	–	–	2/1 visit	–	30.2	23.0	26.6	–	–	–
	Hong Kong [42]	1995–1996	National sample of 2875	25–74	–	–	–	–	18.3	17.4	–	–	–	–
	Kinmen [43]	1992–1994	National sample of 3825	≥30	45.3	–	3/1 visit	5 min rest	43.6	32.0	37.3	4.07	34.8	–
	Mauritius [44]	1992	National sample of 5160	25–74	45.8	Standard mercury	2/1 visit	–	20.4	17.5	–	–	–	–
	Taiwan [45]	1991	National sample of 4894	≥19	49.7	Standard mercury	2/1 visit	5 min rest	33.1	28.0	30.5	27.1	20.8	23.7
SSA	South Africa [46]	1998	National sample of 13 802	15–65	41.6	Electronic	3/1 visit	5 min rest	22.9	24.6	23.9	22.9	23.4	23.1
	Cameroon [47]	1998†	Multi-site sample of 1798	25–74	42.8	Standard mercury	3/1 visit	30 min rest	17.9	11.2	14.1	18.5	12.6	15.0
	Cameroon [48]	1995	Regional sample of 1467	≥25	45.7	Standard mercury	3/1 visit	10 min rest	14.2	15.3	15.4	–	–	–
	Tanzania [49]	1996–1997	Multi-site sample of 1698	≥15	–	Standard mercury	2/1 visit	–	31.3	31.0	31.1	30.2	32.3	31.3
	Zimbabwe [50]	1995	Regional sample of 775	≥25	49.5	Electronic	3/1 visit	5 min rest	41.0	28.0	34.1	25.3	41.0	33.1
	Nigeria [48]	1995	Multi-site sample of 2509	≥25	46.7	Standard mercury	3/1 visit	10 min rest	14.7	14.3	14.5	–	–	–
	Senegal [51]	1992	Regional sample of 2300	15–99	45.3	Standard mercury	2/1 visit	5 min rest	23.6	21.5	22.4	27.8	31.3	29.4
	Gambia [52]	1997†	National sample of 6021	≥15	44.8	Electronic	1 or 2/1 or 2 visits#	–	–	–	24.2	–	–	–

In the absence of age-specific rates, only crude rates were available, and this is indicated in the table by the presence of dashes. *Hypertension defined as average blood pressure (BP) ≥140/90 mmHg. All other studies defined hypertension as average BP ≥140/90 mmHg and/or use of antihypertensive medication. †Year of publication of study as year of survey not described. ‡If BP ≥140/90 mmHg, a second reading was taken in the lying position after a 5 min rest. §Two BP readings were recorded on a single day and a third reading was taken after an interval of 5–7 days. ¶Third BP was recorded after 30 min if either of first two readings ≥140/90 mmHg. #All persons with diastolic BP (DBP) > 90 mmHg were asked to return for a second measurement; where two measurements were available, the lowest reading was used for analysis.

The range in prevalence is large, ranging as high as 72.5% in Poland and as low as 3.4% in parts of India. There are many countries which have allocated a single hypertension rate rather than an age-adjusted blood pressure but given the complexity aswell as the magnitude of the task I will be using a single crude figure. However clear trends can be demonstrated between different areas. For example, in Established Market Economies(EME) such as USA, Canada, and western European countries, the prevalence of hypertension varies between twenty to fifty percent. In China the prevalence is around 27%. In contrast the prevalence in India varies between five to twenty percent. The biggest changes seen in the prevalence of hypertension in India is between the rural and urban areas. In the Former Socialist Economies of Europe, the studies are scarce but there is an alarmingly high prevalence of hypertension being at 70% in the Poland study. In Latin America and the Caribbean (LAC) the prevalence of hypertension has been carried out on a national scale. For example, in Paraguay and Venezuela the rate varied between 30% to 40%. The prevalence was similar but slightly lower for the Caribbean countries with three studies confirming an average prevalence of 26.6%.

In Africa the prevalence varied between 15 to 30%. In South Africa, White and Asian men had higher prevalence rates than woman, where as black men had a lower prevalence than woman. The

prevalence of age-adjusted hypertension in South africa is 23.1%. The overall data confirms high blood pressure as a world wide problem which is undertreated

2. Compare how a particular chronic illness, e.g. asthma, is managed in the UK and compare it to protocols to the major cities in the world. (NYC, Paris, Tokyo), and contrast the evidence base for each protocol.

To continue the theme in question 1, I will concentrate on hypertension as the chronic disease of choice. Worldwide many of the established economies have available to them the same supply routes of medications. However the evidence base, resource allocations and strategic differences dictate the difference, if any, in formal guidelines produced to treat hypertension.

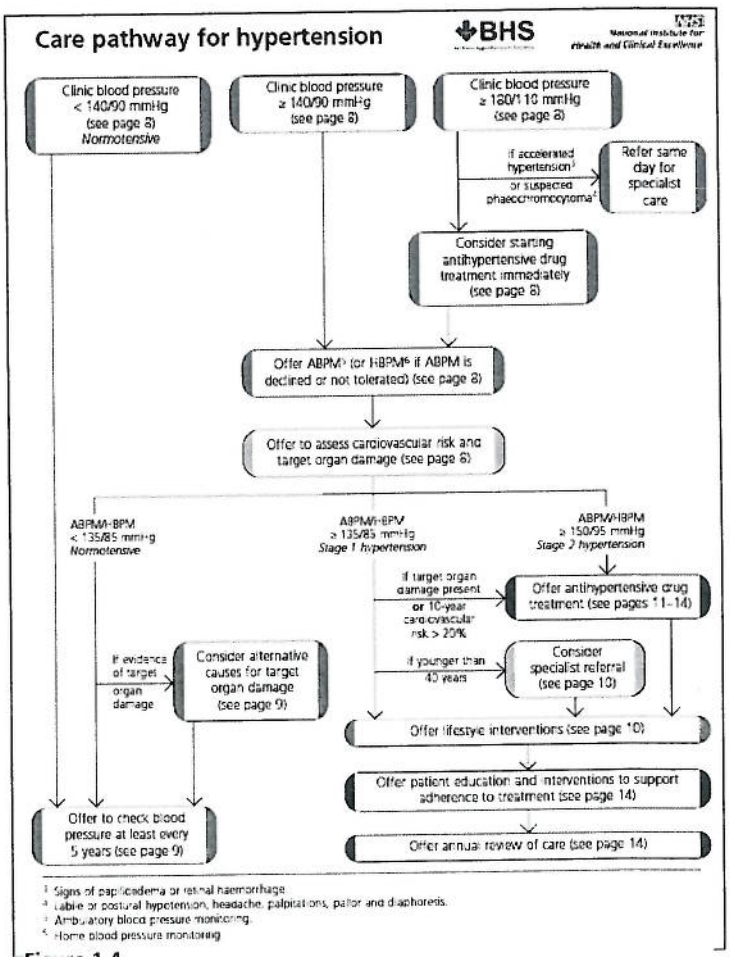
In the UK a holistic approach is taken to diagnose the type of hypertension and treat accordingly. The guideline for hypertension is made jointly by British Hypertension Society (BHS) and National institute for Clinical Excellence (NICE).

The approach adopted for hypertension is to address dietary factors and any possible secondary causes and treating the underlying condition with pharmacological therapy. Recent advances even include surgical options but this is not yet an established route in the guidelines. There are different guidelines for established economies such as the UK, Canada and the US as well as China. However the principals are similar if not the same. The overall aim of these treatment pathways are to prevent the complications of hypertension and if possible cure the diseases underlying cause. The strategic approach depends on each countries approach to providing health service and the resources available. However the European and American evidence based do certainly have similar parallels.

The dietary advice by the BHS is similar to the American Heart Assocations (AHA) simple 7 plan is similar to the the BHS/NICE guidelines in principal in reducing the BMI, cholesterol levels, smoking and improving ones diet. Addition the NICE/BHS reccomend reducing sodium and alcohol levels.

The pharmacological therapy guideline for hypertension is made jointly by NICE and BHS. The physician usually initiates medication after signs of consistently high blood pressure, damage to end-organs or a high than threshold 10-year CVD risk or lifetime risk.

The algorithm ,in figure 1.4, is from the NICE guideline for the treatment of hypertension.



The AHA equivalent for treating the elderly with hypertension is below

Figure 1.5

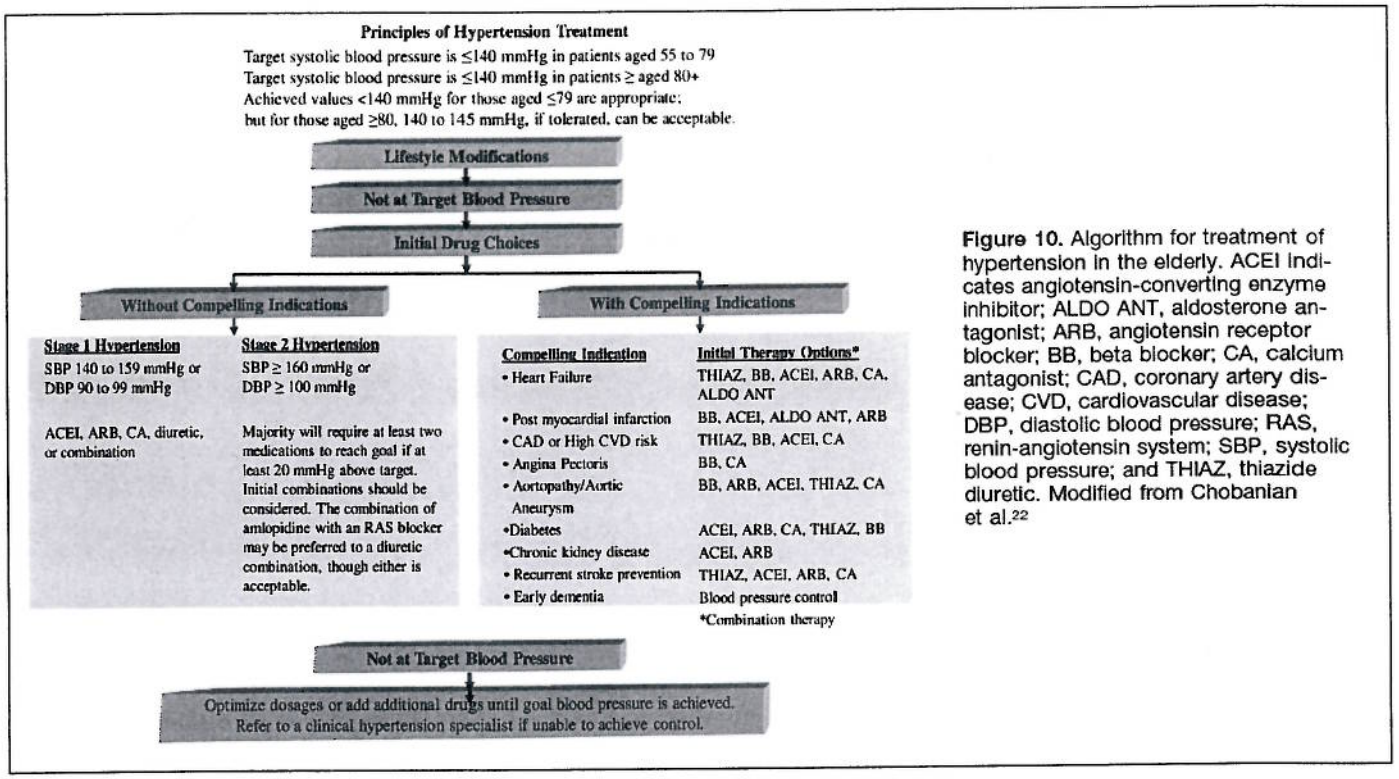
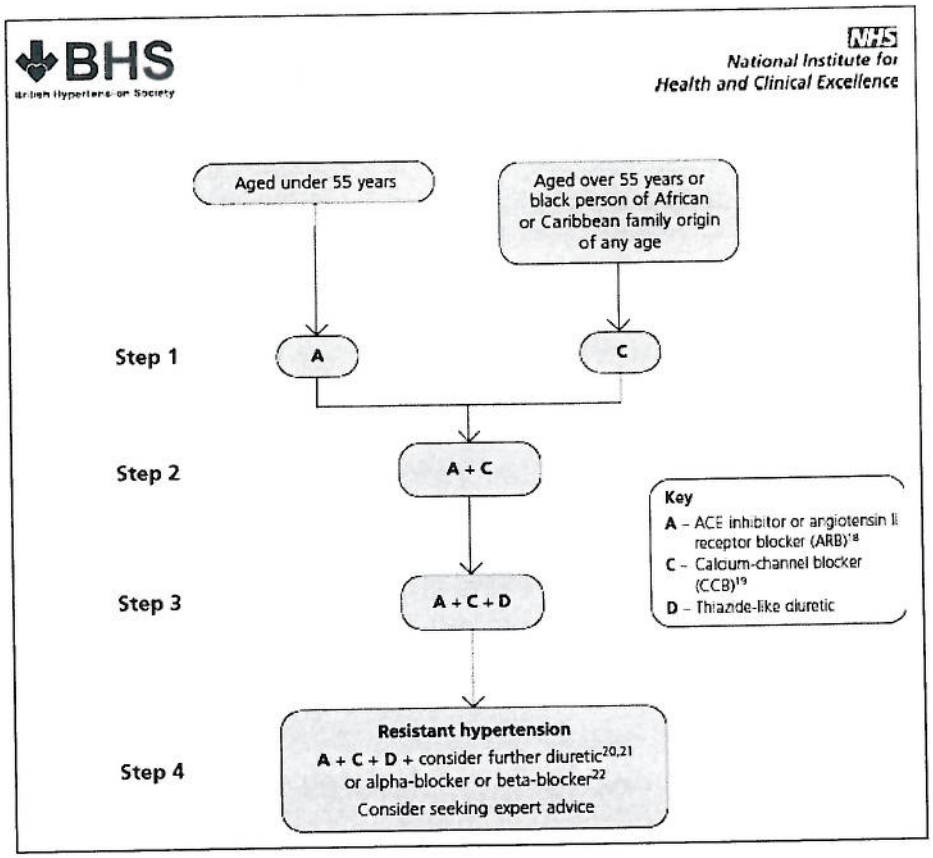


Figure 10. Algorithm for treatment of hypertension in the elderly. ACEI indicates angiotensin-converting enzyme inhibitor; ALDO ANT, aldosterone antagonist; ARB, angiotensin receptor blocker; BB, beta blocker; CA, calcium antagonist; CAD, coronary artery disease; CVD, cardiovascular disease; DBP, diastolic blood pressure; RAS, renin-angiotensin system; SBP, systolic blood pressure; and THIAZ, thiazide diuretic. Modified from Chobanian et al.[22]

NICE/BHS latest algorithm released in June 2011 for the approach to start therapy In this algorithm you decide based on the blood pressure measurement and following tests and risk score whether or not the drug therapy should be started. In principal the transition between no treatment to treatment is the point at which treatment has more benefit than cost. In all the major countries the medication available is similar but the administration and the guidelines are slightly different.

Once therapy commenced the classic treatment for hypertension was AB/CD treatment. Each letter pertaining to a class of drug. This has however been changed in light of new data which has been published about the side effect of B - Beta-Blockers and D - Diuretics possibly inducing diabetes in those who are susceptible. The new BHS/NICE algorithm published June 2011 is changed into the A/CD treatment is shown below, in figure 1.6. The drugs class for each letter are listed in the abbreviation box. Given that all other things are equal and there aren't any complications or side-effects than for each group the cheapest drug is administered.

Figure 1.6



[18] Choose a low-cost ARB.
[19] A CCB is preferred but consider a thiazide-like diuretic if a CCB is not tolerated or the person has oedema, evidence of heart failure or a high risk of heart failure.
[20] Consider a low dose of spironolactone[21] or higher doses of a thiazide-like diuretic.
[21] At the time of publication (August 2011), spironolactone did not have a UK marketing authorisation for this indication. Informed consent should be obtained and documented.
[22] Consider an alpha-blocker or beta-blocker if further diuretic therapy is not tolerated, or is contraindicated or ineffective.

The treatment is taken in steps from 1 to 4:

The medication used fit into the groups **A = ACE inhibitors / ARB blockers, B=Beta blocker, C = Calcium channel blocker, D=Diuretic**

Step 1

The reason giving and ACE inhibitor for someone Caucasian and young is that they are likely to have a "high rennin" system. If the A drug is not tolerated than try an Angiotensin II receptor blocker (AT II blocker). If neither ACE inhibitor nor AT II blocker are effective than move onto step 2.

In those who are elderly or from afro-Caribbean background. Then their hypertension is presumed to caused by low renin and so they can be started on calcium channel blocker.

Step 2

In step 2 you combine either A or C or vice-versa:

→ A + C = ACE inihibitor + Calcium channel blocker

If neither combination works try all three drugs together move onto step 3

Step 3

Combine all three drugs A + C + D. If this does not achieve the recommended blood pressure < 140/90, than move to step 4

Step 4

If A+C+D combination does not achieve the targeted blood pressure. Than add further diuretics or alpha blocker or beta blocker(B). Than if neither of the individual additional drugs help than resistant hypertension is present and requires specialist advice.

A = ACE inhibitors inhibit ACE enzymes which prevents the conversion of Angiotensin I to Angiotensin II, a potent vasoconstrictor. ACE inhibitors prevent Angiotensin II from causing vasoconstriction. It prevents the release of aldosterone from the adrenals. Bradykinin deactivation is blocked, so increasing the level of bradykinin (vasodilator). The active bradykinin helps in vasodilation

Side effects include hypotension after first dose. Dry cough is due to the effect of bradykinin. It can deteriorate renal function in those with reno-vascular disease

C = Calcium channel blocker relax vascular smooth muscle and dilate arterioles. Some Calcium channel blocker drugs target the heart to have a negative chronotropic effect and negative ionotropic effect. These can be useful in patients with CHD.

Side effects include headache, swelling of the ankles palpitations and flushing and sweating

D = Diuretics reduce the blood pressure by reducing the Extracellular fluid and are known to reduce the risk of stroke. Their effect is gradual and increasing the dose has no additional benefit. Certain diuretic like Spironolactone are potassium sparring, and so can have less side-effects when used alone.

Side-effects include increased serum cholesterol, hypokalaemia and impaired glucose tolerance and lower HDL. Increase uric acid which can predipitate gout

B = Beta-Blockers reduce the heart rate and force of contraction aswell as the conduction time along the conduction pathyway in the heart. In the long term they reduce rennin release.

Side effect are bradycardia, peripheral vasoconstriction, tiredness, fatigue and they induce diabetes mellitus in hypertensive patients which is why they have been removed from the original AB/CD treatment.

3. Health related objective

• How can GPs target hard to reach demographics?

This is was hard for me to assess. However the main group of people whom I sore having difficulty are those who cannot speak English. For these patients, if they are lucky, the doctor can speak their language. However if this is not viable then there are translation services avalible for over the phone consultation services which allow the patient to speak to the GP in the practise.

Sometimes the patient may have health advocate who is someone who can both translate for the patient and may or may not be working in the practise administration team. The health advocate is someone who may represent an individual or a group of individuals who are a minority in the community and can benefit from an advocate on their behalf when a patient requires help.

• Develop understanding of safe prescribing in primary care

The GP looks at past prescriptions and reviews the patients notes for any contraindications and possible complications that may arise.

Review the patient by performing a relevant history and examinations. The patients allergy status is also important.

Make sure the GP double checks his prescriptions including all the necessary details.

Build a rapport with the pharmcist to make sure the pharmacy and GP work in tandem to provide the right medication for the patients.

• Observe health promotion in the community and how GPs are involved in coordinating their care.

Regarding this PCT and circulatory health in this area. The South East Public Health Observatory (SEPHO) network is very important in gathering data such as that for Cardiac & stroke network. This type of data collection is crucial in planning and providing the right care for this community.

The GP practise encourages patient to participate with the practise in patient surveys and also by promoting 'hot topics'. These measure are aimed at increased involvement of patients in their own health and promoting a healthier lifestyle. For exam, recently health checks were offered at some work places, including taxi drivers as well as holding health promotion clinics in the practise. A particular service offered is HPV vaccine for eligiable groups who may be benefit from vaccination.

Health promotion is done in many ways. One of the most effective ways observed is through building rapport and helping to approach the patient problems and solving them. This relationship allowed the doctor to then slowly but surely address other risk factors which may not be particularly high priority in the patient's life. Other forms of health promotion included information giving and explanation. This includes an easily accessible website and information leaflets at the practise.

4. Personal/professional development goals. We have been asked to include some reflective assessment for our activities and experiences.

• Improve and develop clinical and practical skills that will be useful as an F1.
• Develop an understanding on the management of general practice.

This was carried out during the clinical placement. See also reflective component.