

## Use of shopping centres in screening for hypertension

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**Summary:** In two Edmonton shopping centres 9591 people were screened for hypertension: 3.3% were found to be normotensive but taking antihypertensive medication and another 8.8% were found to have elevated blood pressure. Systolic hypertension alone accounted for 45.3% of the hypertensive cases and diastolic hypertension, with or without systolic, for 54%. Of the group with elevated blood pressure 34.5% had been previously unaware of their condition, 18.7% had never received medication for it, 18.2% had received medication in the past but had discontinued it, 26.1% were still on medication and 2.5% were not taking antihypertensive medication and were uncertain if they had ever done so in the past. Eighty-eight percent of the hypertensives who were receiving no medication went to their physician; 41% were prescribed antihypertensive medication, and 87% were still on treatment three months later and 74% one year after detection. Eighteen percent of those started on treatment had their medication discontinued by their doctor over the next year and 8% stopped treatment on their own. Of those hypertensives already receiving medication 88% went to their doctor and 33% had their medication altered.

Physician measurements of blood pressure tended to be lower than those recorded at the screening. At least part of the explanation for this discrepancy is that physicians often used blood pressure cuffs that were too wide for the patient's arm; 25% of the people screened required cuffs narrower than the standard cuff used by most physicians.

The prevalence of hypertension was similar among women taking oral contraceptives and women not taking these agents.

**Résumé:** *Les centres commerciaux utilisés pour dépister l'hypertension*

Deux centres commerciaux d'Edmonton ont servi au dépistage de l'hypertension chez 9591 personnes. Nous avons découvert que 3.3% de ces personnes avaient une tension normale mais prenaient des hypotenseurs et que 8.8% étaient hypertendus. L'hypertension systolique,

à elle seule, représentait 45.3% des cas d'hypertension et l'hypertension diastolique, avec ou sans la systolique, portait sur 54%. Parmi les personnes composant le groupe des hypertendus, 34.5% ignoraient leur état, 18.7% n'avaient jamais pris de médicament à cet effet, 18.2% avaient pris des médicaments dans le passé mais les avaient abandonnés, 26.1% recevaient encore une médication et 2.5% ne prenaient pas d'hypotenseurs et n'étaient pas certains d'en avoir déjà pris. Parmi les hypertendus qui ne prenaient aucune médication 88% rendirent visite à leur médecin qui prescrivit un hypotenseur à 41% d'entre eux. Trois mois plus tard 87% étaient encore sous traitement et 74% un an après la découverte de l'hypertension. Dix-huit pour cent de ceux qui avaient reçu un médicament l'abandonnèrent sur le conseil du médecin durant l'année suivante et 8% l'abandonnèrent de leur propre chef. Parmi les hypertendus qui recevaient déjà une médication 88% visitèrent leur médecin qui modifia la prescription chez 33%.

La mesure de la tension artérielle par le médecin était généralement inférieure à celle qui avaient été découverte lors du dépistage de masse. Ces divergences peuvent s'expliquer partiellement par le fait que les médecins emploient souvent des brassards trop larges pour le bras de leurs malades. En effet, au cours du dépistage chez 25% des malades examinés, il avait fallu utiliser des brassards plus étroits que les brassards classiques employés par la majorité des médecins.

La prévalence de l'hypertension n'était pas plus élevée chez les femmes prenant des contraceptifs oraux que chez les autres.

Surveys estimate that between 10 and 15% of the adult population has hypertension and in the majority it is undetected, untreated or inadequately treated.<sup>1-3</sup> By the time hypertension is discovered many people have evidence of damage to the heart,<sup>4-6</sup> kidneys,<sup>4</sup> eyes<sup>5</sup> or other organs. Yet the benefits of early treatment in preventing cardiovascular complications are now well established.<sup>7-10</sup> In people under the age of 65 in the United States the cost of hypertensive complications is estimated to be \$5 billion per year.<sup>11</sup>

How can the hypertensive who is not regularly visiting a physician be found? Door-to-door screening has been found to be inefficient because people are often not at home or refuse entry to the interviewer.<sup>1,2</sup> Screening for high blood pressure in shopping centres, however, appears to be a satisfactory method, for it attracts large numbers

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of people of both sexes, of all ages and from all walks of life.<sup>1,2</sup>

This report describes an experience in screening for hypertension in two shopping centres in Edmonton (approximate population 500,000) over a six-month period.

## Materials and methods

### Volunteers

Nursing alumni groups throughout the city were told about the recent advances in hypertension treatment and the importance of detecting the untreated hypertensive. Over 200 nurses volunteered time for the screening project, and the services of another 100 volunteers, both medical and lay people, were obtained through free radio, television and press advertisements.

### Training

Several churches offered their auditoriums as training areas. The volunteers were given printed information and attended lectures on the anatomy and physiology of the heart and circulation, the epidemiology of hypertension and the principles and benefits of dietary and drug treatment. They also received instruction concerning the completion of the questionnaire to be used in the project. In order to qualify as interviewers the volunteers were required to pass a practical test of determining blood pressure.

### Physician education

Prior to the initiation of the screening survey a brochure

was prepared that reviewed recent concepts in hypertension and provided guidelines for work-up and treatment. This brochure was prepared in cooperation with the Alberta Medical Association and local and provincial health departments, and was sent to all Edmonton practitioners.

### Public education

General information on hypertension and details of the screening program itself were disseminated through radio and television broadcasts and in the press. In their monthly advertising flyers both shopping centres advertised the screening project.

A single-page information sheet and two booklets on hypertension (prepared by Merck, Sharp & Dohme Canada Ltd. and G. D. Searle & Co. of Canada Ltd.) were distributed at the screening booths. These pamphlets explained what high blood pressure is, what causes it and why it merits treatment.

### Blood pressure booths

Several signs throughout the shopping centres and posted around the booths advertised the project. Each screening area was within the actual shopping complex but in one of the less noisy areas. Three or four volunteers were in attendance at any one time depending upon the time of day. A row of chairs outside the booths allowed people to sit and peruse the literature provided while waiting for their blood pressure measurement. The actual screening area was enclosed by curtains supported by aluminum rods. The area was divided into four booths, each five feet square. Each booth was furnished with two chairs and a table.

### Interview questionnaire

In addition to standard demographic data and the manometer readings the interview form included questions about history of hypertension and the use of contraceptive pills. Interviews lasted an average of five minutes. The blood pressure was recorded at the beginning and at the close.

**Table I—Hypertensive values (in mm Hg) according to age**

	Under 40	40-64	65 and over
Systolic	≥ 155	≥ 160	≥ 165
Diastolic	≥ 95	≥ 95	≥ 100

**Table II—Prevalence of systolic and/or diastolic hypertension by age and sex\***

Age	Male			Female			Total		
	No. of cases	No. with high blood pressure	% of each age group with high blood pressure	No. of cases	No. with high blood pressure	% of each age group with high blood pressure	No. of cases	No. with high blood pressure	% of each age group with high blood pressure
1 - 4	1	—	—	—	—	—	1	—	—
5 - 9	31	—	—	30	—	—	61	—	—
10 - 14	222	—	—	241	2	0.8	463	2	0.4
15 - 19	465	2	0.4	516	1	0.2	981	3	0.3
20 - 24	390	7	1.8	403	4	1.0	793	11	1.4
25 - 29	360	10	2.8	348	5	1.4	708	15	2.1
30 - 34	327	17	5.2	381	7	1.8	708	24	3.4
35 - 39	304	20	6.6	442	11	2.5	746	31	4.2
40 - 44	384	24	6.3	513	31	6.0	897	55	6.1
45 - 49	383	36	9.4	486	42	8.6	869	78	9.0
50 - 54	359	44	12.3	522	47	9.0	881	91	10.3
55 - 59	301	63	20.9	453	64	14.1	754	127	16.8
60 - 64	252	58	23.0	361	67	18.6	613	125	20.4
65 - 69	252	46	18.2	299	68	22.7	551	114	20.7
70 - 74	151	41	27.2	192	53	27.6	343	94	27.4
75 +	94	25	26.6	124	49	39.5	218	74	33.9
Total	4276	393	9.2	5311	451	8.5	9587	844	8.8

\*Four people who refused to give their age are not included in the table.

## Equipment

Mercury manometers were employed with blood pressure cuffs of different widths since the ideal cuff width is 20% more than the diameter of the arm.<sup>12</sup>

The diastolic blood pressure was recorded as the point where the Korotkoff sounds disappeared or, if the sounds failed to disappear, the point at which they became muffled. Where possible the blood pressure was measured in the right arm while the patient was seated.

## Hypertension standards

The lower of two systolic readings and the lower of two diastolic readings were recorded as the individual's pressure. A person was considered to have high blood pressure if either the lower systolic or the lower diastolic pressure was at hypertensive level according to the schedule in Table I.

Diastolic hypertension was classified as "mild" when the diastolic blood pressure was less than 104, "moderate" when its range was from 105 to 114 and "severe" when it exceeded 114 mm Hg.

## Post-survey contact of hypertensive subjects

Three months after the initial interview a sample of the individuals identified as hypertensive were contacted by telephone to determine whether they had gone to their physician, whether he had prescribed medication or a diet and whether they had continued the recommended treatment. If they had not seen a physician or had discontinued the prescribed medication the reasons were recorded. After a further period of three months those who had previously reported they had not seen a doctor were contacted again to determine if they had seen a doctor subsequent to the first telephone call. One year after detection 100 of those who had been placed on medication and were still taking it three months later were called again to ascertain whether they were still on treatment.

## Survey of medical records of hypertensive subjects

Medical records were obtained from the physicians of 204 patients who were on no medication, had been told that their blood pressure was elevated and had subsequently visited a doctor. The group's average blood pressure measured in the shopping centre was compared with the average blood pressure taken by the physician.

## Results

### Public response

The booths in the first shopping centre were in operation Monday through Friday for 12 hours a day (10:00 a.m. to 10:00 p.m.). An average of 125 people per day had their blood pressure taken.

**Table III—Relationship of severity of diastolic hypertension to age**

Age	Severity of diastolic hypertension						Total
	Mild*		Moderate*		Severe*		
	No. of cases	% of age group	No. of cases	% of age group	No. of cases	% of age group	
< 40	55	78.6	12	17.1	3	4.3	70
40 - 64	233	70.8	72	21.9	24	7.3	329
> 64	32	50.8	19	30.2	12	19.0	63
Total	320	69.3	103	22.3	39	8.4	462

\*"Mild" diastolic hypertension: age <65, 95-104 mm Hg. Ages 65 and above, 100 to 104 mm Hg.

"Moderate" diastolic hypertension: 105-114 mm Hg at all ages.

"Severe" diastolic hypertension: >114 mm Hg at all ages.

An average of only 88 people per day visited the booths at the second shopping centre but at this one shorter operating hours were in effect. Monday through Wednesday the booth was open 7½ hours (10:00 a.m. to 5:30 p.m.) and averaged 62 people per day. The average rose to 114 on Thursdays and Fridays when it was open 11 hours (10:00 a.m. to 9:00 p.m.) and to 112 on Saturdays when the booth was open 7½ hours (10:00 a.m. to 5:30 p.m.).

## Prevalence and type of hypertension

A total of 9591 people were screened; 45% were male and 55% female. Elevated blood pressure was found in 844 (8.8%) individuals, 393 (9.2%) males and 451 (8.5%) females (Table II).

Of the 844 hypertensive cases systolic hypertension without diastolic hypertension occurred in 382 (45.3%) — in 16 (18.6%) of 86 cases in the less-than-40 age group, in 147 (30.9%) of 476 cases in the 40-to-64 age group and in 219 (77.7%) of 282 cases in the 65-and-over age group.

The other 54.7% of hypertensive individuals had diastolic hypertension with or without systolic hypertension. In 69.3% it was mild, in 22.3% moderate and in 8.4% severe (Table III).

## Treatment status

Of the people screened 314 (3.3%) were taking anti-hypertensive medication and their blood pressure was normal. Treatment status of the 8.8% whose blood pressure was elevated fell into five groups (Tables IV and V): 34.5% were unaware of their hypertension, 18.7% were aware that they had hypertension but had never taken any medication for it, 18.2% were aware of their condition, had taken medication in the past but had stopped taking it, 26.1% were still hypertensive while on medication, and 2.5% were uncertain if they had been hypertensive in the past or had been treated for it. Thus, of the 12.1% of the population that had hypertension 46.1% were being treated for it (although only 58.8% of these cases had normal pressure) and 53.9% were not on treatment. Therefore, 72.9% of the hypertensives detected were either undiagnosed, untreated or inadequately treated.

The relationship of treatment status to severity of diastolic hypertension is shown in Table VI. About one third of the persons with mild to moderate diastolic hypertension were unaware of its presence, while this was the case in only one eighth of those with severe diastolic hypertension; about one quarter of those with mild or moderate diastolic hypertension were on treatment, while almost one half of those with severe diastolic hypertension were on treatment.

## Effect of using the second of two blood pressure readings

When based on second reading the number of cases of hypertension was reduced from 1105 to 942. By using the lower systolic and the lower diastolic values, the number of cases was further reduced to 844. The mean blood pressure was 128.8 ± 21.4 mm Hg systolic and 75.4 ± 13.2 mm Hg diastolic on the first reading, 126.1 ± 20.8 systolic and 74.6 ± 13.2 diastolic on the second reading and 125.0 ± 20.6 systolic and 73.1 ± 13.2 diastolic when the lower systolic and diastolic values were used.

## Type of cuff used

Assuming that the correct width of the blood pressure cuff exceeds the diameter of the arm by 20%,<sup>12</sup> it was found that the adult-type cuff (14.3 cm in width) was required in 69% of cases. Narrow cuffs (11.5 cm) were required in 25% and wide cuffs (15.5 cm) in 6%. The narrow cuff was required in 55% of people 20 years old and less, in 25% of those between the ages of 21 and 30 and in 16.8% of those over the age of 30.

**Comparison of average blood pressure of hypertensives at screening and at physician's office**

As previously mentioned, the records of 204 patients with high blood pressure who visited their physician were reviewed. All 120 physicians concerned had utilized the 14.3-cm-wide adult blood pressure cuffs. Employing standards as previously outlined, 75% of the 204 patients had hypertensive readings when their blood pressure was measured by their physician. The relationship of this reading to the one obtained at the shopping centre can be seen in Table VII. Overall, the shopping centre readings averaged 11.8/2.5 mm Hg higher than the physicians' readings. This difference was even more pronounced for those persons whose blood pressure had been measured with the narrow cuff at the screening and with the adult cuff by their physician: the shopping centre readings in this group averaged 14.2/8.2 mm Hg higher than the physicians' readings. Where the screening groups used a very wide cuff and the physician the usual adult cuff there was no significant difference between the two readings.

**Table V—Relationship of treatment status in systolic and/or diastolic hypertension and age\***

Age	40		40-64		64		Total	
	No. of cases	%	No. of cases	%	No. of cases	%	No. of cases	%
Unaware	43	50.6	153	33.1	95	34.4	291	35.4
Aware — never took medication	19	22.4	95	20.6	44	15.9	158	19.2
Aware — stopped medication	12	14.1	90	19.5	52	18.8	154	18.7
Aware — on medication	11	12.9	124	26.8	85	30.8	220	26.7
Total	85	100	462	100	276	100	823	100

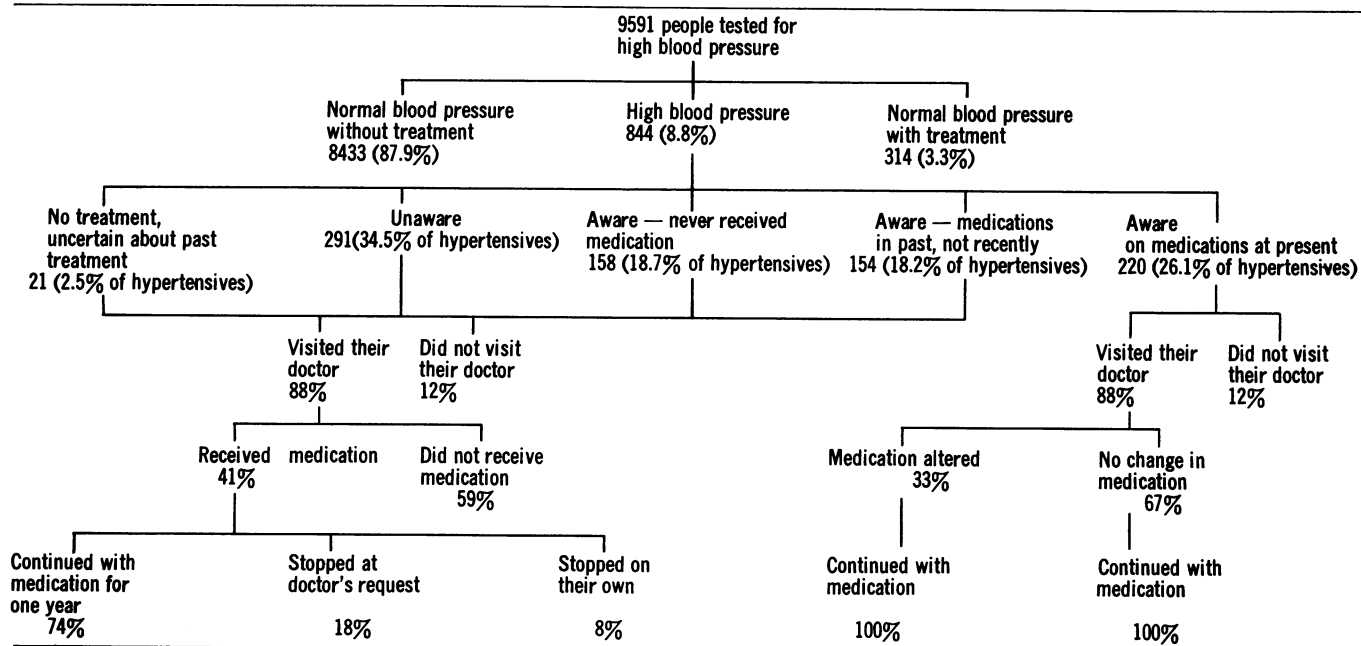
\*Excluded are 21 hypertensive individuals who were not sure of their treatment status.

**Table VI—Relationship of treatment status of hypertensives to severity\* of diastolic hypertension**

Treatment status	Mild		Moderate		Severe	
	No. of cases	%	No. of cases	%	No. of cases	%
Unaware	114	36.7	34	32.7	5	13.5
Aware — never took medication	61	19.6	19	18.3	8	21.6
Aware — stopped medication	54	17.4	28	26.9	8	21.6
Aware — on medication	82	26.4	23	22.1	16	43.2
Totals	311	100	104	100	37	100

\*See definitions in Table III footnote.

**Table IV—Findings from the survey and post-survey follow-up**



ured by their physician. The relationship of this reading to the one obtained at the shopping centre can be seen in Table VII. Overall, the shopping centre readings averaged 11.8/2.5 mm Hg higher than the physicians' readings. This difference was even more pronounced for those persons whose blood pressure had been measured with the narrow cuff at the screening and with the adult cuff by their physician: the shopping centre readings in this group averaged 14.2/8.2 mm Hg higher than the physicians' readings. Where the screening groups used a very wide cuff and the physician the usual adult cuff there was no significant difference between the two readings.

**Oral contraceptives and hypertension**

Of the 2087 women between the ages of 20 and 44, 394 (18.9%) stated they were taking contraceptive pills. Two percent of these women were hypertensive in comparison with 2.8% of the 1693 women not taking these agents.

The mean blood pressure for the group on contraceptive pills was 116.6 ± 13.9 mm Hg systolic and 69.5 ± 11.6 mm Hg diastolic and for the group not on contraceptive pills 115.1 ± 14.5 systolic and 70.0 ± 11.4 diastolic. There was no significant difference in the blood pressures or prevalence of hypertension between the two groups.

**Follow-up of patients (see Table V)**

As explained previously, a sample of 380 hypertensive people not on medication was contacted by telephone three months after the screening. Of these, 281 (74%) had visited a doctor and 99 (26%) had not. After an additional three months a second phone call to the 99 persons elicited the information that by now 54 of them had seen their doctor. This means that 88% of those initially found to be hypertensive and not on medication saw their doctor within six months. Of the 335 who went to see their doctor 151 (45%) received treatment — 13 (4%) diet alone and 138 (41%) medication with or without diet. Eighty-seven percent of the hypertensives who were prescribed medication were continuing treatment at the time of the telephone contact three months after detection. The 7% who had discontinued treatment had done so at their physician's request. The main reasons given by the other 6% for discontinuing the medication were the presence of side effects from the drugs and failure to understand that the prescrip-

tion had to be refilled. One hundred people who were still on medication three months after detection were contacted nine months later: 86% were still on medication, 12% had had their medication stopped by their physician and 2% had stopped it on their own. Thus, of those placed on medication after detection 74% were still on medication one year later, 18% had had their medication stopped by their physician and 8% had stopped it on their own.

In addition to the untreated hypertensives detected by the screening project 150 hypertensive people already receiving medication were contacted by telephone three months after screening. Eighty-eight percent had seen their physician within three months and one third reported that their medication had been altered. All 150 persons were continuing treatment three months later.

*At what blood pressure will physicians institute treatment?*

By examining the physician readings of hypertensive people it was found that physicians treated systolic hypertension in 32% of cases, mild diastolic hypertension (up to 104 mm Hg) in 46%, moderate diastolic hypertension (105 to 114 mm Hg) in 85% and severe diastolic hypertension (more than 114 mm Hg) in 100%.

*Cost of screening program*

During the six-month period one full-time secretary was employed at a cost of \$3000. The cost of the blood pressure equipment, stationery and miscellaneous items was \$2000.

**Discussion**

The survey found 12.1% of the sample population to be hypertensive, with 27% of these (3.3% of the total population) under control by medication. These results are not dissimilar from those reported from the United States<sup>1-3</sup> despite the fact that Canada, unlike the United States, has government-sponsored medical care plans to provide medical care to all its citizens. Of the population tested 2.3% had elevated blood pressure despite treatment and 6.5% had elevated blood pressure without treatment. Of those who were not on medication 88% visited their physician within six months of learning that their blood pressure was elevated. A review of the records of patients subsequent to a visit to their physician demonstrated that 75% still had hypertension according to the criteria set out in this paper. Similar results have been reported for hypertensive patients in other screening surveys who had their blood pressure rechecked.<sup>1,2,13,14</sup>

Forty-one percent of the previously untreated hypertensives were placed on medication: 87% were still taking the medication three months after detection and 74% one year after detection. Thus, of the 6.5% of the total population who were hypertensive and not receiving treatment when first discovered, 31% were on treatment three months later and 26% one year later. Therefore, of every 25 people found to have hypertension and who were not on medication, 22 went to a physician, 17 were found to have hypertension, 9 received medication, 8 were still on medication

**Table VII—Comparison of blood pressure obtained by screening group and by physicians, using different sized cuffs**

Group	No.	Mean (mm Hg)	Standard deviation (mm Hg)	R	Probability pf T
<i>Overall</i>	204				
Screening group systolic		175.5	18.1		
Physician systolic		163.7	23.1	0.46, P<0.01	<0.01
Screening group diastolic		97.4	13.2		
Physician diastolic		94.9	12.1	0.42, P<0.01	>0.05
<i>Average size cuffs used by both groups</i>	138				
Screening group systolic		175.0	17.1		
Physician systolic		161.9	21.8	0.47, P<0.01	<0.01
Screening group diastolic		96.1	13.0		
Physician diastolic		94.4	11.4	0.47, P<0.01	<0.01
<i>Narrow cuffs used by screening group, average size cuffs by physicians</i>	41				
Screening group systolic		177.3	21.0		
Physician systolic		163.1	22.1	0.53, P<0.01	<0.01
Screening group diastolic		101.6	13.4		
Physician diastolic		93.4	13.3	0.41, P<0.01	<0.01
<i>Wide cuffs used by screening group, average size cuffs by physician</i>	25				
Screening group systolic		175.4	18.5		
Physician systolic		174.9	29.0	0.40, P<0.05	>0.05
Screening group diastolic		97.7	13.4		
Physician diastolic		100.2	12.9	0.34, P>0.05	>0.05

three months after detection and 7 were still on medication one year after detection.

Why were antihypertensive agents prescribed for only 41% of the hypertensive individuals who visited their physician? A review of the patients' medical records revealed that 25% of the people referred did not have hypertensive levels according to their doctor's readings. There are several possible reasons for these lower readings: many people may have labile hypertension; many physicians allow the mercury column to fall at a faster rate than did the interviewers (2 to 3 mm Hg per second); and many physicians used the adult 14.3-cm cuff while a narrow 11.5-cm cuff was used at the screening, and in such cases it was found that the physician's mean blood pressure reading was 14.2/8.2 mm Hg lower than the survey reading. The use of a cuff of correct size is critical for obtaining accurate blood pressure readings<sup>12,15</sup> and every office, emergency room and hospital ward should be equipped with a range of sizes (this is rarely the case).

The other 75% of referred individuals were, however, hypertensive both at screening and at their physician's office, yet only 41% were prescribed antihypertensive medications by their physician. This may indicate that physicians disagree with the criteria used to define hypertension. Our survey found that many physicians do not treat systolic hypertension or mild diastolic hypertension as only 32% of cases of the former and 46% of the latter were treated. In contrast, treatment was prescribed for 85% of those with moderate and 100% of those with severe diastolic hypertension. There is insufficient information to determine whether treatment of systolic or mild diastolic hypertension reduces morbidity or mortality.<sup>8,9,16</sup> Insurance and epidemiological statistics, however, demonstrate an increased risk in these groups.<sup>17</sup>

The failure of many known hypertensives to obtain adequate treatment is exemplified by the fact that 18.7% of the population with elevated blood pressure had prior knowledge of their condition but had never received medication for it and 18.2% had been on medication but had discontinued it. In addition, 12% of the detected hypertensives failed to visit their physician and 8% of those who had started treatment after going to their doctor discontinued the medication on their own. These facts reflect attitudes towards hypertension of a large portion of the general public, including those with hypertension,<sup>18-20</sup> and are borne out by the recent Harris survey.<sup>19</sup> A high percentage of the population was found to be unaware of, or had misconceptions about, what high blood pressure is, its causes and consequences and the benefits of treatment. Given the patient's probable ignorance, the development of side effects from the medication, the complexity of the drug regimen, the cost of the medication, the asymptomatic nature of the condition in its early years and the frustrations of waiting in a physician's office to have one's blood pressure checked, it is not surprising that a high percentage of patients who begin treatment fail to return to their physician after the first few months.<sup>20</sup> Even when patients are instructed intensively for a prolonged period of time many will discontinue treatment if the teaching ends,<sup>21,22</sup> which suggests that a lifelong educational process is necessary to maintain patient compliance. The time-consuming job of patient education can be assumed by the physician, but other medical personnel such as nurses,<sup>23</sup> pharmacists<sup>21</sup> and other health aides<sup>20</sup> are increasingly accepting this role.

Responsibility for control of hypertension rests with physicians, local health authorities, other health personnel and the community. Involvement of physicians is essential. The Harris survey demonstrated that 68% of adults in the United States see a physician each year, yet many of their examinations do not include measurement of blood pressure.

If all physicians, including those in specialties such as general surgery, ophthalmology, etc. included blood pressure measurement as a routine part of their examination and treated or referred hypertensives, very few hypertensives would go undetected. Similarly, if high blood pressure is noticed incidentally in the emergency room or while a patient is in hospital it should not be ignored (as is frequently the case<sup>24,25</sup>) but should be treated or the patient referred. In order to encourage the detection, treatment and adequate follow-up of patients, physicians must develop more positive attitudes toward the control of hypertension. Increased emphasis must be placed on the treatment of hypertension in medical schools, residency programs and meetings of general practice and subspecialty groups.

Local health authorities could enhance public awareness of hypertension through the media, and in screening for other conditions (e.g. tuberculosis) they could include blood pressure measurement. If physicians have hypertensive patients who refuse to take medications or neglect to return for follow-up, public health nurses could be sent to their homes to extend the education process. Other health personnel such as dentists,<sup>26</sup> pharmacists,<sup>21</sup> blood bank technicians<sup>27</sup> and physiotherapists could also routinely screen people for hypertension. Finally, community groups such as the heart or kidney foundation could increase public awareness through the media and through the organization of screening programs.

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## References

1. WILBER JA, BARROW JG: Hypertension — a community problem. *Am J Med* 52: 653, 1972
2. WILBER JA, MILWARD K, BALDWIN A, et al: Atlanta community high blood pressure program methods of community hypertension screening. *Circ Res* 30 (suppl 2): 11, 101, 109; 1972
3. SCHOENBERGER JA, STAMLER J, SHEKELLE RB, et al: Current status of hypertension control in an industrial population. *JAMA* 222: 559, 1972
4. HART JT: Semicontinuous screening of a whole community for hypertension. *Lancet* II: 223, 1970
5. HAKKILA J, SILTANEN P, JAASKELAINEN J, et al: Screening of hypertensive heart disease by mass radiography. *Ann Clin Res* 5: 27, 1973
6. GYNTJELBERG F: Screening for hypertension in an epidemiological study. *Acta Med Scand* 193: 393, 1973
7. Veterans Administration Cooperative Study Group on Antihypertensive Agents: Effects of treatment on morbidity in hypertension. Results in patients with diastolic blood pressures averaging 115 through 129 mm Hg. *JAMA* 202: 1028, 1967
8. *Idem*: Effects of treatment on morbidity in hypertension. II. Results in patients with diastolic blood pressure averaging 90 through 114 mm Hg. *JAMA* 213: 1143, 1970
9. *Idem*: Effects of treatment on morbidity in hypertension. Influences of age, diastolic pressure and prior cardiovascular disease. *Circulation* 45: 991, 1972
10. HAMILTON M, THOMPSON EN, WISNIEWSKI TKM: The role of blood-pressure control in preventing complications of hypertension. *Lancet* I: 235, 1964
11. STAMLER J: High blood pressure in the United States — an overview of the problem and the challenge. National conference on high blood pressure education. Bethesda Md, DHEW, publ no (NIH) 73-486
12. Subcommittee of Postgraduate Education Committee, American Heart Foundation: Recommendations for human blood pressure determinations by sphygmomanometers. *Circulation* 36: 980, 1967
13. FINNERTY FA JR, SHAW LW, HIMMELSBACH CK: Hypertension in the inner city. *Circulation* 47: 76, 1973
14. CHARMAN RC: Hypertension management program in an industrial community. *JAMA* 227: 287, 1974
15. KING GE: Taking the blood pressure. *JAMA* 209: 1902, 1969
16. KOCH-WESER J: The therapeutic challenge of systolic hypertension. *N Engl J Med* 289: 481, 1973
17. LEW EA: High blood pressure, other risk factors and longevity: the insurance view point. *Am J Med* 55: 281, 1973
18. STOKES JB, PAYNE GH, COOPER T: Hypertension control — the challenge of patient education. *N Engl J Med* 289: 1269, 1973
19. HARRIS I, et al: The public and high blood pressure: a survey. Bethesda Md, DHEW, publ no (NIH) 74-356
20. FINNERTY FA JR, MATTIE EC, FINNERTY FA III: Hypertension in the inner city; analysis of clinic dropouts. *Circulation* 47: 73, 1973
21. MCKENNY JM, SLINING JM, HENDERSON HR, et al: The effect of clinical pharmacy services on patients with essential hypertension. *Circulation* 48: 1104, 1973
22. WILBER JA, BARROW JG: Reducing elevated blood pressure. *Minn Med* 52: 1303, 1969
23. GRIFFITH EW, MADERO B: Primary hypertension: patient's learning needs. *Am J Nurs* 73: 624, 1973
24. MROCZEK WJ: Diagnosis and treatment of hypertension. *Am Heart J* 85: 718, 1973
25. FROHLICH ED, EMMOTT C, HAMMARSTEN JE, et al: Evaluation of the initial care of hypertensive patients. *JAMA* 218: 1036, 1971
26. GUARINO MA, GIOVANNOLI SM, BERMAN CL: Hypertension detection by dentists. *Health Serv Rep* 88: 291, 1973
27. BARCLAY WR, MACENSKI CW: High blood pressure — blood banks (editorial). *JAMA* 226: 561, 1973