body mass index, systolic BP, lipids, renal function, diabetes, smoking, statin, and antihypertensives initiation during follow-up. In addition to traditional risk factors, cumulative DBP improved the discrimination C index (95% CI) from 0.73 (0.72-0.74) to 0.74 (0.73-0.75) (Likelihood ratio test P=0.019), whereas inclusion of enrollment DBP did not improve prognosis.

Conclusions: Among individuals with normal systolic BP, cumulative DBP may augment risk stratification beyond a single DBP measure and other traditional risk factors.

RESIDENCE AT HIGH ALTITUDE IS ASSOCIATED WITH LOWER CONVENTIONAL AND AMBULATORY BLOOD PRESSURE THAN LIVING AT SEA LEVEL IN THE GENERAL POPULATION OF PERU. HIGHCARE-LAPS STUDY

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Objective: Acute exposure to hypoxia at high altitude (HA) leads to an increase in blood pressure (BP) in healthy individuals and in hypertensive patients. Little is known, however, about the effect of long-term HA residence on BP. Available data based on conventional BP measurements are inconsistent and no general population studies using 24-h ambulatory BP monitoring (ABPM) have been conducted.

Aim of HIGHCARE-LAPS was to compare BP levels and cardiovascular risk profile among population-based samples of subjects residing in Peruvian communities living at different altitudes. BP-related data are reported in this paper.

Design and method: Study participants were recruited by sex- and age-stratified random multistage cluster sampling from the general adult population residing permanently in urban areas at different altitudes in Peru (Lima, <500m, Huancayo 3287m, Juliaca 3824m, Cerro de Pasco 4330m). In all participants questionnaire-based information, conventional BP (3 seated measurements with a validated oscillometric device, HEM7121 OMRON, Japan), 24-hour ambulatory BP (A&D TM2430, Japan) and laboratory variables were obtained.

Results: The study included 206 lowlanders and 595 highlanders. Highlanders were slightly younger, had lower BMI, oxygen saturation and prevalence of antihypertensive medication use and higher haematocrit. In highlanders all conventional and ambulatory BP values were lower and heart rate values higher than in lowlanders. Comparisons between lowlander and highlander samples and for individual sites at different altitudes are reported in the Table.

Variable	Lowlanders (Lima) N=206	Highlanders N=595	p-value (high vs. low)	Huancayo 3287 m N=210	Juliaca 3824 m N=201	Cerro de Pasco 4330 m N=184
Age (years)	47 [38-60]	45 [34-57]	0.0121	47 [33-60]	45 [34-56]	43 [33.5-56]
Males	103 (50%)	287 (48%)	0.6623	99 (47%)	96 (48%)	92 (50%)
BMI (kg/m^2)	28 [25-32]	26 [24-29]	<.0001	26 [24-28]	27 [24-31]	26 [23-29]
Smokers	21 (10%)	49 (8%)	0.5312	18 (9%)	10 (5%)	21 (11%)
AHT	29 (14%)	13 (2%)	<.0001	8 (4%)	1 (0%)	4 (2%)
SpO_2 (%)	98 [97-99]	89 [87-91]	<.0001	90 [89-93]	89 [88-91]	86 [85-89]
Hct (%)	42 [39-46]	51 [47-55]	<.0001	48 [45-52]	51 [48-55]	55 [50-59]
Conv. SBP	123 [110-137]	111 [110-137]	<.0001	111 [101-122]	115 [104-126]	109 [101-117]
Conv. DBP	78 [71-87]	74 [69-81]	0.0001	74 [67-81]	75 [72-82]	74 [69-80]
24-h SBP	125 [116-139]	119 [110-128]	<.0001	120 [111-129]	119 [111-129]	117 [109-125]
24-h DBP	74 [68-79]	70 [66-76]	<.0001	71 [66-77]	70 [66-75]	70 [65-76]
24-h HR	71 [67-77]	75 [69-79]	0.0002	74 [70-79]	76 [70-81]	74 [69-78]
Day SBP	129 [120-144]	124 [115-134]	<.0001	124 [115-134]	126 [117-135]	123 [113-132]
Day DBP	76 [71-82]	74 [69-81]	0.0058	74 [69-80]	74 [69-79]	74 [69-82]
Night SBP	114 [101-127]	105 [97-115]	<.0001	107 [99-122]	106 [97-115]	102 [95-109]
Night DBP	64 [60-72]	61 [56-67]	<.0001	62 [56-69]	61 [56-67]	60 [55-65]

Table. Main study variables by altitude and site. Data shown as median [interquartile range] for continuous variables and as counts (percentages) for categorical variables. p-values (Wilcoxon test or Chi-square) for differences between lowlanders and highlanders are reported. AHT – antihypertensive treatment; BMI – body mass index; Hct – haematocrit; HR – heart rate; SBP – systolic blood pressure; DBP – diastolic blood pressure

The difference in 24-hour systolic BP between highlanders and lowlanders remained significant (7.2 mmHg, p<0.001) in a linear multiple regression model adjusting for age, sex, BMI, 24-hour heart rate, respiratory rate, and haematocrit. These covariates were selected by LASSO method from a set also including lifestyle-related variables.

Conclusions: Permanent residence at high altitude is independently associated with lower conventional and ambulatory BP levels than low altitude residence in the general population of Peru. This relationship does not seem to be explained by lifestyle differences. Mechanisms behind this difference and its impact on cardiovascular risk should be further investigated. Also, comparative studies with other highland populations with different adaptive characteristics would allow to understand better the effects of HA residence on cardiovascular health.

COMPARING BLOOD PRESSURE CONTROL TARGETS GLOBALLY: AN ANALYSIS OF THE MAY MEASUREMENT MONTH 2022 CAMPAIGN IN 60 COUNTRIES

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Objective: Many contemporary hypertension guidelines recommend controlling blood pressure (BP) to less than 130/80 mmHg in most people, but it is unclear how control rates compare globally to the hitherto ubiquitous control target of 140/90 mmHg. In this analysis, we compare global and regional BP control rates based on targets of 140/90 mmHg versus 130/80 mmHg from the latest May Measurement Month 2022 (MMM22) campaign, an opportunistic screening campaign which aims to raise awareness of BP.

Design and method: In MMM22, adults aged 18 years or over were screened via convenience sampling in 60 countries using a single standardised protocol. Three seated BP measurements were taken, and a questionnaire was administered collecting information including demographics, co-morbidities and antihypertensive medication use. Hypertension was defined as systolic BP 140 mmHg or more, and/or diastolic BP 90 mmHg or more, based on the average of the second and third BP readings, or the taking of antihypertensive medication. Multiple imputation using chained equations was used to estimate BP readings, where missing for any participant.

Results: A total of 765,718 participants were screened during MMM22, of whom 282,488 (36.9%) were hypertensive. Of those with hypertension 51.4% were on antihypertensive medication, of whom 52.7% were taking only a single drug. Of those on antihypertensive medication, 54.2% had BP <140/90 mmHg and 28.2% had BP <130/80 mmHg. Of all hypertensives, 27.8% had BP <140/90 mmHg and 14.5% had BP <130/80 mmHg. There were large differences between regions, ranging from 13.5% of those on medication being controlled to <130/80 mmHg in South-East Asia and Australasia, to 37.4% in Europe.

Region	Number with hypertension	Percentage of total participants with hypertension (%)	Percentage of hypertensives on medication (%)	Percentage of those on medication with BP <140/90 mmHg (%)	Percentage of those on medication with BP <130/80 mmHg (%)	Percentage of all hypertensives with BP <140/90 mmHg (%)	Percentage of all hypertensives with BP <130/80 mmHg (%)
East Asia	50,830	26.6	23.4	58.1	29.2	13.6	6.8
Americas	86,632	43.1	60.5	60.3	28.6	36.5	17.3
South-East Asia and Australasia	27,965	42.0	65.3	34.2	13.5	22.4	8.8
Sub-Saharan Africa	23,969	30.6	31.8	46.5	21.8	14.8	6.9
South Asia	29,426	32.2	45.5	55.7	25.7	25.4	11.7
Europe	56,389	49.3	67.5	55.6	37.4	37.5	25.2
Northern Africa and Middle East	7,277	31.5	47.7	49.0	20.7	23.4	9.9
Worldwide	**282,488**	**36.9**	**51.4**	**54.2**	**28.2**	**27.8**	**14.5**

Conclusions: MMM22 identified significant numbers of people worldwide with inadequately treated hypertension. Of those treated for hypertension, only half were controlled to <140/90 mmHg and less than one third to the stricter target of <130/80 mmHg. Most of those on antihypertensive medication were prescribed only a single drug class, highlighting the scope for achieving better control using antihypertensive drug combinations as recommended by current guidelines.

U-SHAPED RELATIONSHIP BETWEEN BLOOD PRESSURE AND ALL-CAUSE MORTALITY IN OLDER ADULTS: THE SHIZUOKA STUDY

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Objective: Not only high blood pressure (BP) but also low BP was suggested to be associated with all-cause mortality in older adults. However, the actual mechanism responsible for the association between low BP and mortality has not been identified. This study aimed to investigate a possible confounding of antihypertensive drug use, potential comorbidities, and functional disability, as well as random error in BP measurement, in the association between low BP and all-