National Health and Nutrition Examination Survey

August 2021-August 2023 Data Documentation, Codebook, and Frequencies

Blood Pressure - Oscillometric Measurements (BPXO_L)

Data File: BPXO_L.xpt

First Published: September 2024

Last Revised: NA

Component Description

This section provides data for three consecutive blood pressure (BP) and pulse measurements using an oscillometric device.

Eligible Sample

Participants aged 8 years and older were eligible. Participants with any of the following on both arms were excluded from the exam: rashes, gauze dressings, casts, edema, paralysis, tubes, open sores or wounds, withered arms, and A-V shunts. Also, women who have had an axillary nodal biopsy or resection, or a unilateral radical mastectomy, do not have their blood pressure measured in the affected arm.

Protocol and Procedure

All BP measurements are taken in the mobile examination center (MEC). Prior to obtaining BP measurements, upper arm circumference is measured, which is done to guide selection of cuff size.

After resting quietly in a seated position for 5 minutes, three consecutive BP measurements (systolic and diastolic) were taken 60 seconds apart using a digital upper-arm electronic blood pressure measurement device, Omron HEM–907XL. This device has been previously validated by both the Association for the Advancement of Medical Instrumentation (AAMI) and the International Protocol of the European Society of Hypertension for taking BP measurements in populations aged 13 years and older (White et. al., 2002; Ombani et. al., 2007; Ostchega et. al., 2010).

BP measurements were taken in the right arm unless specific conditions prohibited the use of the right arm, or if participants reported any reason that the BP measurements should not be taken in the right arm.

Details on the protocol for obtaining upper arm circumference and BP are described in the NHANES August 2021–August 2023 procedure manuals.

Quality Assurance & Quality Control

The BP examiners were certified for BP measurement through a training program and followed a strict standardized BP protocol. In addition, examiners were observed to assure that BP

readings were obtained following the standardized protocol. Health technician performance was also monitored using data reviews.

Data Processing and Editing

The following are some specifications used in capturing the BP data:

- Systolic BP cannot be greater than 300 mmHg;
- Systolic blood pressure must be greater than diastolic BP;
- If there is no systolic BP, there can be no diastolic BP. However, there can be a systolic measurement without a diastolic measurement.

Analytic Notes

After the 2017-2018 survey cycle, NHANES stopped collection of auscultatory BP measurements using a mercury sphygmomanometer. During the 2017-2018 survey cycle, blood pressure was collected using both auscultatory (with a mercury sphygmomanometer) and oscillometric (with the Omron HEM–907XL) methods. Additional details and results from the study, comparing auscultatory and oscillometric BP measurements, are available in an NCHS Vital and Health Statistics Series 2 Report at NCHS website (Ostchega et. al., 2021).

Exam sample weights should be used for analyses. Please refer to the NHANES Analytic Guidelines and the on-line NHANES Tutorial for further details on the use of sample weights and other analytic issues.

References

- Ombani S, Riva I, Giglio A, Caldara G, Groppelli A, Parati G. Validation of the Omron M5–I, R5–I and HEM–907 automated blood pressure monitors in elderly individuals according to the international protocol of the European Society of Hypertension. Blood Press Monit 12(4):233–42. 2007.
- Ostchega Y, Nwankwo T, Chiappa M, Wolz M, Graber J, Nguyen DT. Comparing blood pressure values obtained by two different protocols: National Health and Nutrition Examination Survey, 2017-2018. National Center for Health Statistics. Vital Health Stat 2(187). 2021.
- Ostchega Y, Nwankwo T, Sorlie PD, Wolz M, Zipf G. Assessing the validity of the Omron HEM–907XL oscillometric blood pressure measurement device in a national survey environment. J Clin Hypertens (Greenwich) 12(1):22–8. 2010
- White WB, Anwar YA. Evaluation of the overall efficacy of the Omron office digital blood pressure HEM–10. El Assaad MA, Topouchian JA, Darné BM, Asmar RG. Validation of the Omron HEM–907 device for blood pressure measurement. Blood Press Monit 7(4):237–41. 2002.

Codebook and Frequencies

SEQN - Respondent sequence number

Variable Name:	SEQN
SAS Label:	Respondent sequence number
English Text:	Respondent sequence number.
Target:	Both males and females 8 YEARS - 150 YEARS

BPAOARM - Arm selected - oscillometric

Variable Name: BPAOARM

SAS Label: Arm selected - oscillometric

English Text: Arm selected - oscillometric

Target: Both males and females 8 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
L	Left	51	51	
R	Right	7603	7654	
< blank >	Missing	147	7801	

BPAOCSZ - Coded cuff size - oscillometric

Variable Name: BPAOCSZ

SAS Label: Coded cuff size - oscillometric

English Text: Mid arm circumference (cm) cuffing parameters - oscillometric

Target: Both males and females 8 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
2	17-21.9 (bladder size = 9.20 x 16.68 cm)	330	330	
3	22-31.9 (bladder size = 12.49 x 23.52 cm)	3404	3734	
4	32-41.9 (bladder size = 14.98 x 31.19 cm)	3442	7176	
5	42-50 (bladder size = 17.98 x 37.89 cm)	435	7611	
.	Missing	190	7801	

BPXOSY1 - Systolic - 1st oscillometric reading

Variable Name: BPXOSY1

SAS Label: Systolic - 1st oscillometric reading

English Text: Systolic - 1st oscillometric reading

Target: Both males and females 8 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
61 to 232	Range of Values	7517	7517	
.	Missing	284	7801	

BPXODI1 - Diastolic - 1st oscillometric reading

Variable Name: BPXODI1

SAS Label: Diastolic - 1st oscillometric reading

English Text: Diastolic - 1st oscillometric reading

Target: Both males and females 8 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
33 to 142	Range of Values	7517	7517	
.	Missing	284	7801	

BPXOSY2 - Systolic - 2nd oscillometric reading

Variable Name: BPXOSY2

SAS Label: Systolic - 2nd oscillometric reading

English Text: Systolic - 2nd oscillometric reading

Target: Both males and females 8 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
59 to 233	Range of Values	7505	7505	
.	Missing	296	7801	

BPXODI2 - Diastolic - 2nd oscillometric reading

Variable Name: BPXODI2

SAS Label: Diastolic - 2nd oscillometric reading

English Text: Diastolic - 2nd oscillometric reading

Target: Both males and females 8 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
32 to 139	Range of Values	7505	7505	
.	Missing	296	7801	

BPXOSY3 - Systolic - 3rd oscillometric reading

Variable Name: BPXOSY3

SAS Label: Systolic - 3rd oscillometric reading

English Text: Systolic - 3rd oscillometric reading

Target: Both males and females 8 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
50 to 232	Range of Values	7480	7480	
.	Missing	321	7801	

BPXODI3 - Diastolic - 3rd oscillometric reading

Variable Name: BPXODI3

SAS Label: Diastolic - 3rd oscillometric reading

English Text: Diastolic - 3rd oscillometric reading

Target: Both males and females 8 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
24 to 136	Range of Values	7480	7480	
.	Missing	321	7801	

BPXOPLS1 - Pulse - 1st oscillometric reading

Variable Name: BPXOPLS1

SAS Label: Pulse - 1st oscillometric reading

English Text: Pulse - 1st oscillometric reading

Target: Both males and females 8 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
35 to 158	Range of Values	7517	7517	
.	Missing	284	7801	

BPXOPLS2 - Pulse - 2nd oscillometric reading

Variable Name: BPXOPLS2

SAS Label: Pulse - 2nd oscillometric reading

English Text: Pulse - 2nd oscillometric reading

Target: Both males and females 8 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
32 to 141	Range of Values	7505	7505	
.	Missing	296	7801	

BPXOPLS3 - Pulse - 3rd oscillometric reading

Variable Name: BPXOPLS3

SAS Label: Pulse - 3rd oscillometric reading

English Text: Pulse - 3rd oscillometric reading

Target: Both males and females 8 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
31 to 154	Range of Values	7480	7480	
.	Missing	321	7801	