



Menzies
Research
Institute



Pragmatic method to assess treated blood pressure from home blood pressure diaries - OPTIMAL study.

James E. Sharman, Leigh Blizzard,

Wojciech Kosmala, Mark R Nelson.


research thanks to you

- \uparrow BP is the commonest condition managed in GP (1)
- Its management is less than ideal (2)
- It is usually managed by a single clinic measurement rather than a community-based dataset which is more representative of true BP (3)
- HBP > clinic measures for TOD, MACE & and mortality (4)
- HBP is usually *ad hoc*
- Time-poor GPs unlikely to calculate average BP from HBP

(1) Britt H et al. General Practice Activity in Australia 2011-2012. (2) Reid CM et al. Australians @ Risk: management of cardiovascular risk factors in the REACH registry. (3) . Sharman JE et al Home Blood Pressure Monitoring in Clinical Practice: Australian Consensus Statement with Practical Guide Documents for Doctors and Patients (4) Ward AM, et al. Home measurement of blood pressure and cardiovascular disease: Systematic review and meta-analysis of prospective studies.

- In the OPTIMAL study we sought to develop a rapid pragmatic method to assess BP control from patient diaries to inform BP management



- *Post hoc* analysis of a RCT database of 7-day home BP and 24-ABP measured in 286 patients with uncomplicated treated hypertension from 3 Australian centres
- We determined the optimal ratio of home systolic BP (SBP) readings above threshold (≥ 135 mmHg) from the last 10 recorded that would best predict elevated 24-ABP.
- Uncontrolled BP was defined as 24-ABP SBP ≥ 130 mmHg or 24-ABP day SBP ≥ 135 mmHg.
- Sensitivity was tested by association with markers of end-organ damage.



Participant characteristics

Variable	Value
Age (years)	64 ± 8
Sex (% female)	53
Body mass index (kg/m ²)	29.4 ± 4.8
Antihypertensive medications (daily defined dose)	2.4 ± 1.4
Clinic BP (mmHg) – AOBP technique	127 ± 14 / 75 ± 10
24 hour ambulatory BP (mmHg)	133 ± 12 / 77 ± 8
7-day home systolic blood pressure (mmHg)	128 ± 13 / 74 ± 8



Outcome and statistic	Unadjusted		Adjusted for age, sex and body mass index	
	Cut-point	Value	Cut-point	Value
24-ABP SBP \geq130 mmHg				
AUC *	3+ elevations	0.712	3+ elevations	0.722
NRI †	3+ elevations	0.005	3+ elevations	0.004
NRIcf ‡	3+ elevations	0.010	3+ elevations	0.192
rIDI §	3+ elevations	1.021	3+ elevations	1.018
Deviance ¶	3+ elevations	321.9	3+ elevations	321.1
24-ABP day SBP \geq135 mmHg				
AUC *	2+ elevations	0.717	2+ elevations	0.724
NRI †	2+ elevations	0.072	2+ elevations	0.072
NRIcf ‡	2+ elevations	0.144	2+ elevations	0.137
rIDI §	2+ elevations	1.306	2+ elevations	1.237
Deviance ¶	2+ elevations	331.9	2+ elevations	330.3

24-ABP = 24-hour ambulatory blood pressure, SBP = systolic blood pressure. * AUC = area under curve (criterion: largest value) for ROC curve produced from all 10 cut-points (1+ elevations, 2+ elevations, 3+ elevations, ..., 9+ elevations, 10 elevations). † NRI = net reclassification index (criterion: last classification before that producing first negative value). ‡ NRIcf = category-free net reclassification index (criterion: last classification before that producing first negative value). § rIDI = relative integrated discrimination improvement (criterion: last classification before that producing first value below unity). ¶ Deviance = model deviance (criterion: last classification before that producing first higher value).

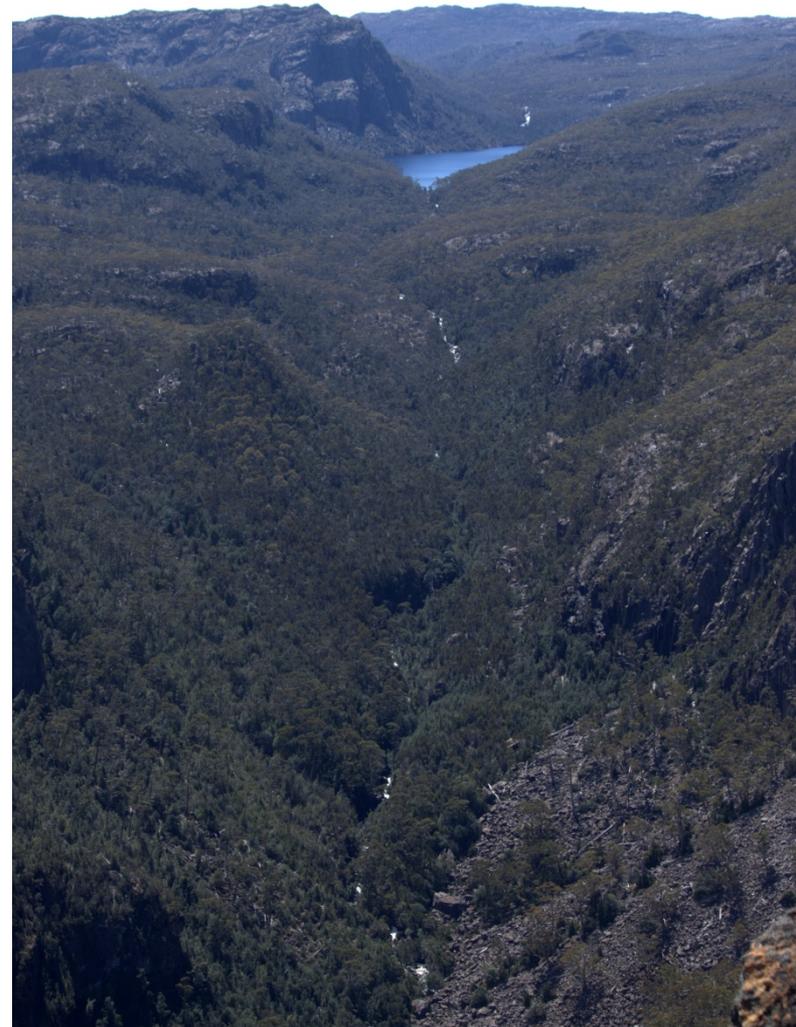


Menzies
Research
Institute

Test performance

www.menzies.utas.edu.au

- 3 measures
 - Sensitivity 62%
 - Specificity 80%
 - AUC 0.722





Sensitivity analysis

(association with TOD).

Does 2+ or 3+ elevations provide the most clinically-relevant cut-point for groups of subjects classified by the number of elevations (≥ 135 mmHg) in the last 10 home recordings of SBP?

5 HT related parameters

- aortic stiffness
- LV relative wall thickness
- LV mass index
- left atrial area
- E/e'

- a cut-point of 3+ elevations produced differences in mean values that are either similar to or greater than those for 2+ elevations
- only for E/e' does more than 3 elevations provide a classification with a greater prognostic value.

Having ≥ 3 of the last 10 (i.e. $\geq 30\%$) home SBP readings ≥ 135 mmHg provided the best prediction of 24-ABP SBP above treatment/target threshold (AUC=0.72).

Above this level compromise between sensitivity and specificity.

These individuals also had evidence of TOD, with significantly higher aortic stiffness, left ventricular relative wall thickness and left atrial area compared with those who did not meet these criteria.



OLD

- Single measure by the doctor.
- If high repeat until get a low BP, round down, lie them down etc.
- Home measures erratic and recorded on a scrap of paper except for some who collect systematically.
- Inevitably therapeutic inertia rules – easier to do nothing than something.

NEW

- Multiple measures systematically collected with an oscillometric device
- Requires a summary statistic (usually a mean).
- What may happen in clinical practice is the lowest again is taken as the 'true'.
- $\geq 30\%$ of the last 10 home SBP readings were ≥ 135 mmHg (the threshold for hypertension based on home BP)
 - good likelihood of uncontrolled BP according to 24-ABP
 - greater propensity towards TOD

This pragmatic approach is a valid aid for doctors to assess BP control (not Dx) and help facilitate greater use of home BP monitoring in clinical practice.

