



# HEARTS

## IN THE AMERICAS Regional Workshop

I have no personal or financial conflicts of interest



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# HEARTS

IN THE AMERICAS  
Regional Workshop

## Accuracy of blood pressure measurement: a matter of quality of the health and safety of the patient

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“...BP is one of the most important measurements in all clinical medicine...”

“...and still one of the most inaccurately performed”

# Why is BP so important?

High BP is the strongest modifiable risk factor for CVD worldwide

Reduction of BP with medication, diet or lifestyle reduces risk for CVD death and disability

Gakidou E... *Lancet* 2017;390:1345-1422  
Whelton PK...*JAMA* 2002;288:1882-1888

# Why is BP one of the most inaccurately performed?

Measurement errors (wrong cuff size or placement, body position, white coat effect.....)

Validation of BP devices (all should be tested for accuracy using accepted standardised protocols)

# Validation = Testing for Accuracy

Automated BP devices



compared with  
gold standard

Mercury auscultation



Using rigorous, internationally recognised, standardised protocols

# Validation of blood pressure measuring devices in adults

Working Group on Blood Pressure Monitoring of the European Society of Hypertension.

## The British Hypertension Society protocol for the re-evaluation of blood pressure measuring devices

Eoin O'Brien\*, James Petrie\*†, William Littler\*‡, Michael de Swiet\*§, Paul L. Padfield\*¶, Douglas G. Altman††, Martin Blood†‡, Andrew Coats§§ and Neil Atkins

(2010;15(1):45.

## on of measuring accuracy.

## for automatic blood press

Working Group on Blood Pressure Monitoring of the European Society of Hypertension International Protocol for Validation of blood pressure measuring devices in adults

O'Brien<sup>a</sup>, Thomas Pickering<sup>b</sup>, Roland Asmar<sup>c</sup>, John Myers<sup>d</sup>, Gianfranco Parati<sup>e</sup>, Jan Staessen<sup>f</sup>, Mengden<sup>g</sup>, Yutaka Imai<sup>h</sup>, Bernard Waeber<sup>i</sup> and

latini<sup>j</sup> and with the statistical assistance of Neil Atkins<sup>a</sup>

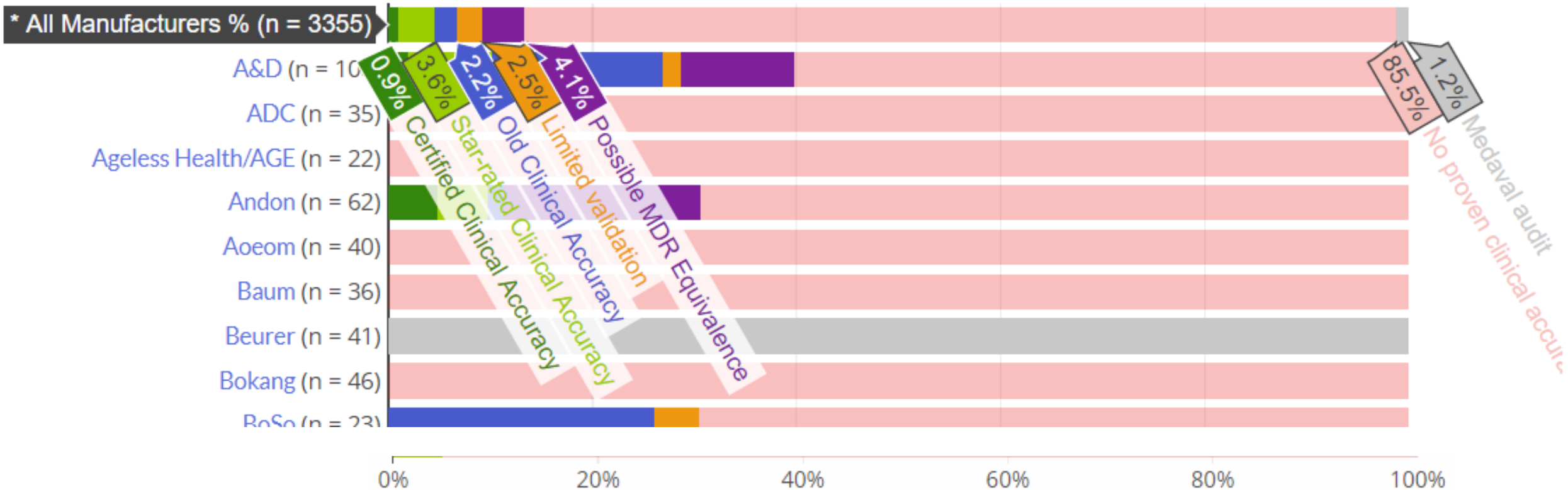
Gerin<sup>k</sup>, on behalf of the Working Group on Blood

Monitoring of the European Society of Hypertension

Validity of BP devices tested using Internationally recognised validation protocols can be confirmed online (Validated Device Listings, Google, Medaval.....)

**88.5%** no proven clinical accuracy

Manufacturers with 20+ BPMs listed on Medaval  
Percentage of Clinically Accurate Blood Pressure Monitors





**Medaval** **88.5%** no proven clinical accuracy  
Certified Accuracy

**3,717** BP devices

**>450** manufacturers

**>40** manufacturers sell between 20 to >50 separate devices that have no proven clinical accuracy

**8** manufacturers with 100% clinical accuracy (9 devices)

**11.5%** average prevalence of proven clinical accuracy

# BP devices with no proven clinical accuracy

Can be purchased online globally (Australia)

Are cheaper than validated BP devices (↓25%)

Are less likely to be accurate (15% vs 68% prevalence)

Are widely used for home BP monitoring (61% prevalence)

Picone D... *Hypertension* 2020 (in review)

Akpolat T... *BP Monitoring* 2009;14:26-31

Jung M... *BP Monitoring* 2015;20:215-220

“...BP is one of the most important measurements in all clinical medicine...”

“...and still one of the most inaccurately performed”



Consequences of the worldwide abundance of BP devices that have not been rigorously tested for accuracy?



# People Unaware of these problems

Incorrect diagnosis &  
treatment decisions

Based on **clinic or  
home** BP

Opportunity lost to perform best-  
practice care for CVD prevention

# Essential products and investigations



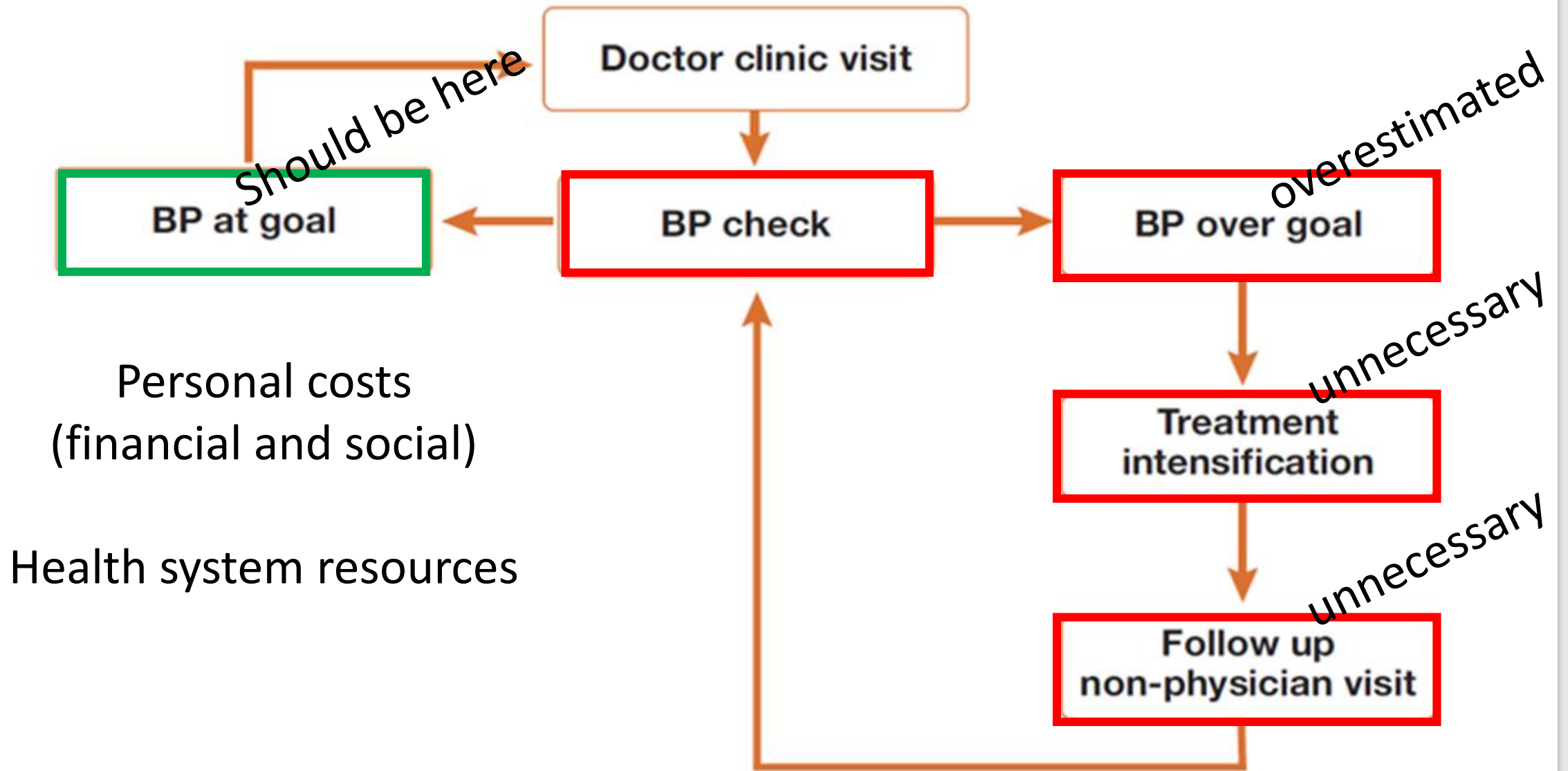
Technical package for cardiovascular disease management in primary health care

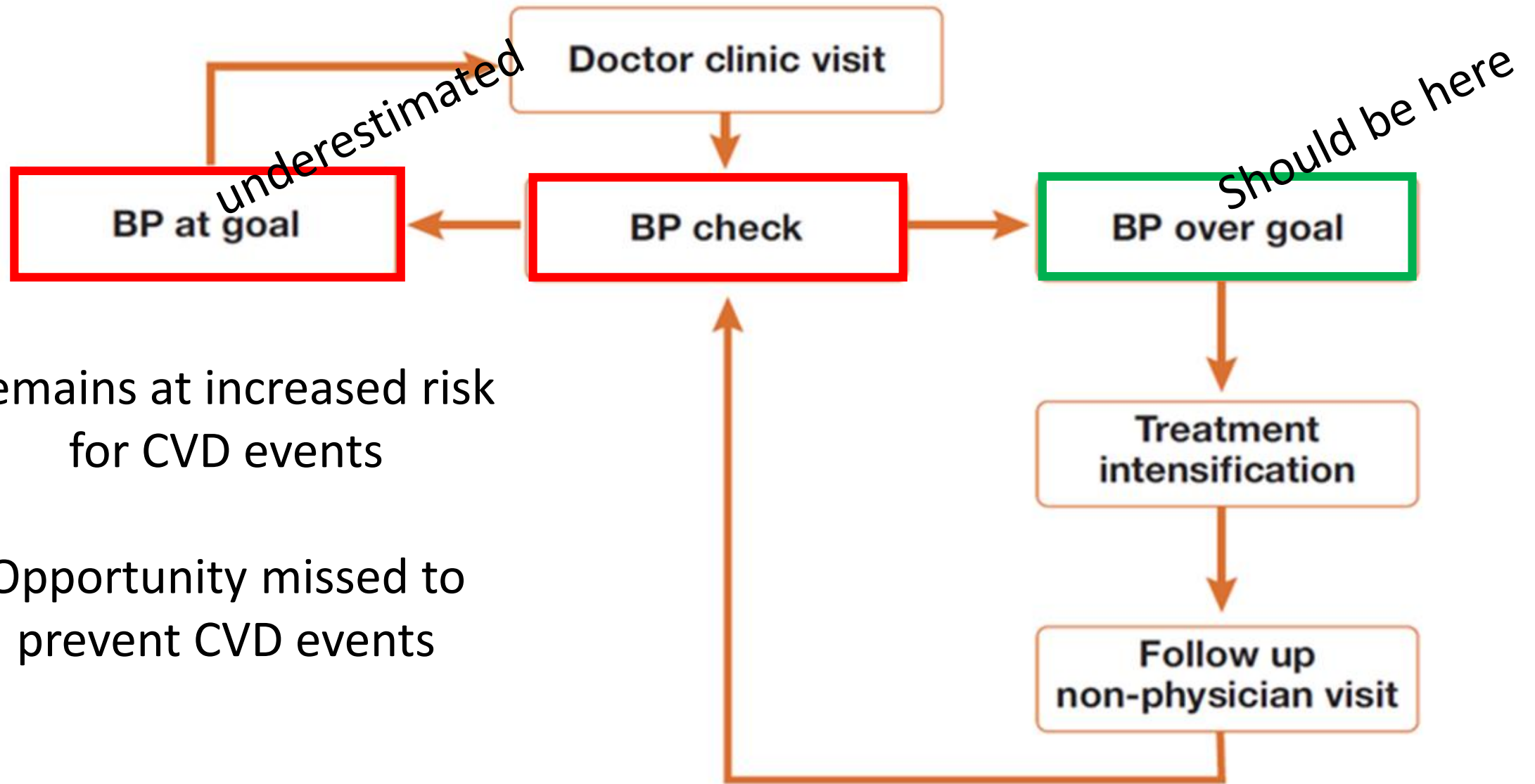
## Access to essential medicines and technology

Essential technologies/lab investigations	Tools
stethoscope blood pressure measurement device* measuring tape weighing machine (scale) glucometer blood glucose test strips urine albumin test strips urine ketones test strips	BMI chart
<b>Add, when resources permit:</b>	
blood cholesterol assay lipid profile serum creatinine assay serum potassium haemoglobin a1c urine microalbuminuria test strips	

\*Validated blood pressure measurement devices with digital readings are preferable.

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Each example of BP  
inaccuracy.....

INCREASED COSTS  
IMPAIRED HEALTH  
OUTCOMES

Individual and Society



Technical package for cardiovascular disease management in primary health care



Systems for monitoring

Other possible effects within HEARTS...

Incorrect data

HEALTH FACILITY

SUBNATIONAL

NATIONAL



LEVELS

True effect of interventions?

Future planning?

# Preliminary data from Trinidad and Tobago – Survey 16 Regional Health Facilities

## 56 BP devices

**14** (25%) not validated (across 6 facilities)

**13** (23%) validated (across 10 facilities)

**29** (52%) to confirm



Acknowledgement: Dr Rohit Doon and Dr Allana Best



## Declaración de posición del Grupo de la Comisión Lancet de Hipertensión con respecto a la mejora mundial de las normas de exactitud para los dispositivos de medición de la presión arterial\*

James E. Sharman,<sup>1</sup> Eoin O'Brien,<sup>2</sup> Bruce Alpert,<sup>3</sup> Aletta E. Schutte,<sup>4</sup> Christian Delles,<sup>5</sup> Michael Hecht Olsen,<sup>6</sup> Roland Asmar,<sup>7</sup> Neil Atkins,<sup>8</sup> Eduardo Barbosa,<sup>9</sup> David Calhoun,<sup>10</sup> Norm R.C. Campbell,<sup>11</sup> John Chalmers,<sup>12</sup> Ivor Benjamin,<sup>13</sup> Garry Jennings,<sup>14</sup> Stéphane Laurent,<sup>15</sup> Pierre Boutouyrie,<sup>16</sup> Patricio Lopez-Jaramillo,<sup>16</sup> Richard J. McManus,<sup>17</sup> Anastasia S. Mihailidou,<sup>18</sup> Pedro Ordunez,<sup>19</sup> Raj Padwal,<sup>20</sup> Paolo Palatini,<sup>21</sup> Gianfranco Parati,<sup>22</sup> Neil Poulter,<sup>23</sup> Michael K. Rakotz,<sup>24</sup> Clive Rosendorff,<sup>25</sup> Francesca Saladini,<sup>26</sup> Angelo Scuteri,<sup>27</sup> Weimar Sebba Barroso,<sup>28</sup> Myeong-Chan Cho,<sup>29</sup> Ki-Chul Sung,<sup>30</sup> Raymond R. Townsend,<sup>31</sup> Ji-Guang Wang,<sup>32</sup> Tine Willum Hansen,<sup>33</sup> Gregory Wozniak<sup>24</sup> y George Stergiou<sup>34</sup>, en nombre del Grupo de la Comisión Lancet de Hipertensión.

## Consensus Document

OPEN

## Lancet Commission on Hypertension group position statement on the global improvement of accuracy standards for devices that measure blood pressure

James E. Sharman<sup>a</sup>, Eoin O'Brien<sup>b</sup>, Bruce Alpert<sup>c,\*</sup>, Aletta E. Schutte<sup>d</sup>, Christian Delles<sup>e</sup>, Michael Hecht Olsen<sup>f,g</sup>, Roland Asmar<sup>h</sup>, Neil Atkins<sup>i</sup>, Eduardo Barbosa<sup>j</sup>, David Calhoun<sup>k</sup>, Norm R.C. Campbell<sup>l</sup>, John Chalmers<sup>m</sup>, Ivor Benjamin<sup>n</sup>, Garry Jennings<sup>o</sup>, Stéphane Laurent<sup>p</sup>, Pierre Boutouyrie<sup>p</sup>, Patricio Lopez-Jaramillo<sup>q</sup>, Richard J. McManus<sup>r</sup>, Anastasia S. Mihailidou<sup>5</sup>, Pedro Ordunez<sup>t</sup>, Raj Padwal<sup>u</sup>, Paolo Palatini<sup>v</sup>, Gianfranco Parati<sup>w,x</sup>, Neil Poulter<sup>y</sup>, Michael K. Rakotz<sup>z</sup>, Clive Rosendorff<sup>aa,bb</sup>, Francesca Saladini<sup>cc</sup>, Angelo Scuteri<sup>dd</sup>, Weimar Sebba Barroso<sup>ee</sup>, Myeong-Chan Cho<sup>ff</sup>, Ki-Chul Sung<sup>gg</sup>, Raymond R. Townsend<sup>hh</sup>, Ji-Guang Wang<sup>ii</sup>, Tine Willum Hansen<sup>jj</sup>, Gregory Wozniak<sup>z</sup>, and George Stergiou<sup>kk</sup>, on behalf of the Lancet Commission on Hypertension Group



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Accuracy of blood pressure measurement: a matter of quality of the health and safety of the patient **and systems of health care to address CVD prevention**

James Sharman

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