THE ADAPT CENTRE

&

BLOOD PRESSURE UNIT

Beaumont Hospital

ANNUAL REPORT, PUBLICATIONS

AND

SCIENTIFIC PRESENTATIONS

2003
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Introduction

History

The Blood Pressure Unit was founded in collaboration with Professor Kevin O’Malley 25 years ago in the Charitable Infirmary, Jervis Street, with support provided by the Charitable Infirmary and the Royal College of Surgeons in Ireland. From the outset the Unit has concentrated on research into the pharmacology of blood pressure lowering drugs, particularly in the elderly, and on the development of blood pressure measuring techniques, especially techniques of ambulatory blood pressure measurement. To-date over 600 publications on these research areas have been produced by the Unit in peer-reviewed journals.

ADAPT Clinic and Centre

The Arterial Disease Assessment Prevention and Treatment (ADAPT) Clinic was established in collaboration with Professor David Bouchier-Hayes and Professor Desmond Fitzgerald in 1997. The rationale for this unique clinic was based on the concept that disease of the arterial organ was a fundamental denominator in all cardiovascular disease. The ADAPT Clinic was established to ensure that all patients with cardiovascular disease, regardless of the speciality to which they presented, received the most comprehensive risk factor assessment with appropriate life-style modification, and that appropriate drug treatment would be directed at the arterial organ.

The ADAPT concept was further developed in 1999 with the establishment of the ADAPT Centre. This cardiovascular laboratory is equipped to perform state-of-the-art cardiovascular assessment, which includes echocardiography, electrocardiography with stress testing, Holter monitoring, applanation tonometry, pulse wave velocity analysis, 24-hour ambulatory blood pressure monitoring, beat-to-beat non-invasive blood pressure monitoring, 24-hour silent ischaemia monitoring, fundal photography and imaging, and carotid wall (intima-media thickness) imaging. Through its association with the Department of Clinical Pharmacology, the Centre for Proteomics, SURGEN, and BIOSYS at RCSI, the Laboratory can assess biochemical and genetic markers of risk, thrombosis, and endothelial damage.

The ADAPT centre is under the direction of Professor O’Brien. Senior staff include Professor Desmond Fitzgerald, Professor David Bouchier-Hayes, Dr. Patricia McCormack, Dr. Alice Stanton and Dr. Joan Moroney; the Centre is staffed by three research registrars, five research nurses, a technician, computer analyst and two secretaries.

The goal of ADAPT is to apply common protocols of risk factor management to all patients with cardiovascular disease. This has been achieved for patients with hypertension, dyslipidaemia, surgical vascular disease, stroke and transient cerebral ischaemic events and the elderly with hypertension. This year the ADAPT concept was extended to general practitioners in the RHASP (Reduction of Heart Attack and Stroke through Prevention) Pilot Project, supported by the Department of Health and Children as part of the Cardiovascular Strategy. As a consequence of these ADAPT developments the out-patient service continued to grow with over 13,000 patients attending the Blood Pressure, the Elderly with Hypertension, Stroke/TIA, Lipid, Cardiac and ADAPT Clinics.

Clinical Research Centre

The ADAPT Centre continued its close collaboration with the Clinical Research Centre, and I am pleased to acknowledge with gratitude the considerable help given to ADAPT personnel by the Director of the CRC, Dr. Dermot Kenny, not only in providing research facilities, but also in making it possible to welcome and entertain overseas visitors in the Board Room. The ADAPT Centre continued to participate in the successful HEA grant awards, which will fund scientific research in the Centre.

DABL® Program

The efficient outpatient management of cardiovascular disease has been achieved by utilising a management system that is dependent on a specially designed computer program - dabl®, Cardiovascular, which has been developed over the past decade. During the year this program was further developed to include many additional functions, such as automatic generation of drug treatment and diagnoses, a flow chart, a pharmacopoeia, a scheduling system and security features.
The *dabl*® Anticoagulant program was used to transfer 2000 patients attending the Anticoagulant Clinic from a manual to computerised system. The *dabl*® Program has also been applied to a number of research projects being conducted by the ADAPT Centre. The *dabl*® Programs are now being incorporated for cardiovascular disease management in Florence, Milan, Leuven, London, New York and many institutions and practices in Ireland.

**The RHASP Project**

The ADAPT Centre has collaborated with the Department of Health and Children in linking the *dabl*® data base at Beaumont Hospital to six selected practices in primary care so as to transmit information on cardiovascular risk from specialist hospital clinics to primary care physicians. This project is on schedule and is due to be independently audited by Professor John Cairns from the Department of Health Economics in Aberdeen University. RHASP is bringing best management of cardiovascular disease to primary care so as to effect the 30% reduction in stroke and heart attack that has been possible in the ASCOT Study with rigorous drug treatment of hypertension and stroke. It is hope that RHASP may serve as a model to reduce Ireland’s burden of cardiovascular disease, which is one of the highest in Europe.

**Publications and communications**

In 2003 the ADAPT Centre continued to contribute to hypertension research, publishing more than 30 scientific papers, and delivering research presentations at home, in the UK, Italy, Switzerland, South Africa and the United States.

**International collaborative research**

The ADAPT Centre continued to participate in a number of important international collaborative studies, which included the ASCOT Study (*vide infra*); completion of the Syst-Eur Phase II Study, a follow-up study of the original Syst-Eur Study to determine if calcium-channel blocking drugs are beneficial in the long-term management of isolated systolic hypertension; completion of the OvA Study, which is designed to determine if ambulatory blood pressure measurement is superior to office blood pressure in the long-term management of hypertension, and which was published in the *New England Journal of Medicine*; completion of the THOP Study, which is designed to show if less antihypertensive medication will be prescribed using self-blood pressure measurement rather than office blood pressure; the HYVET Study, which is examining the value of treating hypertension in the very elderly; and the ADVANCE Study, which explores the value of both better blood pressure and glycaemic control in non insulin dependent diabetes mellitus. Participation in these studies has necessitated collaborative research with a number of institutions and universities abroad; these include St. Mary’s Hospital, London, the University of Louvain, the University of Ghent, the Hammersmith Hospital, Glasgow University, and Mount Sinai Hospital in New York.

**ASCOT Study**

The Anglo-Scandinavian Cardiovascular Outcome Trial (ASCOT) is the largest international endeavour in which we have participated. ASCOT has recruited over 20,000 patients at high risk from cardiovascular complications of hypertension to determine which blood pressure lowering or cholesterol-lowering drug is most beneficial in preventing stroke and heart attack. Dr. Alice Stanton has supervised a team of doctors and nurses specially recruited for the ASCOT programme. The ADAPT Centre, is one of the major centres (with over 500 participating patients) in ASCOT. The Lipid Lowering arm of the study was closed prematurely because the benefit to patients receiving statin treatment was of the order of 30% reduction in heart attack and 25% in stroke compared with those patients receiving placebo. The results of this study, which has major implications for the future management of cardiovascular disease, were published in *The Lancet*. The main blood pressure limb of the ASCOT Study continues as previously. 26 sub-studies of the ASCOT Study are being co-ordinated from the ADAPT Centre.

**Epidemiological research projects**

The Allied Irish Bank, Phase III Study, the purpose of which is to replenish the valuable genetic bank originally provided in the AIB Phase II Study, commenced and is proceeding well. The data from the Phase II Study, which will provide information for the first time on the changes in 24-hour
ambulatory blood pressure with age and the relationship of such change to target organ status, is being prepared for publication.

The ADAPT Centre data base contains comprehensive blood pressure data on over 26,000 patients. Risk factor data, especially for clinic and 24-hour ambulatory blood pressure measurement from some 14,000 of these patients has been carefully analysed and is now being assessed for predictive value in some 700 cardiovascular deaths in this cohort.

Other research projects conducted during the year included are listed under ‘On-going Research’.

Working Parties

I continued to act during the year as Chairman of the Blood Pressure Measurement Working Group of the European Society of Hypertension. Dr. Alice Stanton is Chairman of the Irish Heart Foundation Council on High Blood Pressure. I continue as a member of the EU Standards Committee on Blood Pressure Measurement, the British Standards Institute and the Association for the Advancement of Medical Instrumentation in the US. I am a member of the ASCOT Steering Committee and Chairman of the ASCOT Sub-study Committee, and Professor Desmond Fitzgerald and Dr. Alice Stanton are members of the ASCOT Genetics Committee. During the year, I was asked by WHO in Geneva to select and Chair a Committee of experts to determine how best to measure blood pressure in the Developing World. As a member of Board of the International Centre for Health and Cooperation at Fordham University, I continued to participate in humanitarian endeavours.

Servier Chair of Cardiovascular Pharmacology

The Servier Chair of Cardiovascular Pharmacology, to which I was appointed in 2001, is a unique partnership between the Institute of Biopharmaceutical Sciences at the Royal College of Surgeons in Ireland and the Servier Group in Paris. The Chair was endowed with the purpose of facilitating research into the treatment and management of cardiovascular disease with a particular emphasis on risk factor management and the identification of techniques to measure cardiovascular target organ involvement. The Chair has allowed me to devote time to clinical research and particularly to providing a means for bringing the clinical facilities in Beaumont Hospital into close liaison with the laboratory facilities in RCSI to provide a unified approach to research into cardiovascular disease.

Websites

The ADAPT web site (http://www.ecf.ie/adapt_website) provides a comprehensive bibliography of publications from the Blood Pressure Unit since 1978 and it is possible to obtain PDF copies of recently published papers; frequently requested papers from earlier years are also available. The site also provides details on the dabl® Program and the ADAPT risk factor management system.

A website devoted to blood pressure measurement - http://www.dableducational.com, which was sponsored by dabl Limited, with support from RCSI, was launched during the year. This site clarifies the current stage of knowledge about equipment used to measure blood pressure, and provides a valuable resource for all lay and medical consumers and for those with responsibility for purchasing blood pressure devices.

Acknowledgements

The research outlined in this report was facilitated by a grant from the Charitable Infirmary Charitable Trust, which has given valuable support to our research over many years and without which our many achievements would not have been possible. Research has also been funded by grants from RCSI, Imperial College, London, Servier Laboratories, HEA PRTLI Cycle 3, Pfizer International, Institute for International Health, University of Sydney, Boehringer Ingelheim and MacMaster College, Department of Health and Children and the European Society of Cardiology, all of which we acknowledge with gratitude. I would like to pay tribute to the diligence and loyalty of all the staff in the Blood Pressure Unit and the ADAPT Centre, characteristics, which facilitate the team approach so necessary in scientific research.

Eoin O'Brien

31st December 2003
The ADAPT Centre & Blood Pressure Unit

Staff 2003

Medical

Eoin O'Brien
Desmond Fitzgerald
David Bouchier-Hayes
Alice Stanton
Joan Moroney
Patricia McCormack

Milos Stojanovic
Emily Ho
Ailsa Fulton
Basil Al Aloul
Eamonn Dolan
Sarah Sexton

Blood Pressure Unit Nursing

Evelyn Clark
Dee Stoneman

Cora McTiernan
Helen O’Neill

ADAPT Centre Nursing

David Farrell
Louise Hacke
Mary Twohill

Geraldine McCarthy
Cathal Collier
Anne Murphy

Technical

Echocardiographer
Simon Lyons

Computer Analyst
Neil Atkins

Dieticians
Patricia Gordon / Daniel McCartney

Secretarial

Valerie Hughes
Barbara Gallagher
Kim Smyth

Eunice Carey
Orla Lambe
SCIENTIFIC AND EDUCATIONAL PUBLICATIONS 2003

Original papers


12. O’Brien E. Ambulatory blood pressure measurement is indispensable to good clinical practice. *J Hypertens* 2003;21(suppl 2):S11-S18


7


17. Den Hond E, Staessen JA on behalf of the APTH and THOP investigators. Relation between left ventricular mass and systolic blood pressure at baseline in the APTH and THOP trials. *Blood Press Monit* 2003, 8:173–175


Editorials


3. O’Brien E. Ambulatory blood pressure measurement is indispensable to good clinical practice. *Br J Cardiol* 2003;10:110

4. O’Brien E. Ambulatory blood pressure measurement is now indispensable to the good clinical management of hypertension. *Cardiovascular J South Africa* 2003;14:157-163

**General and Educational**

SCIENTIFIC AND EDUCATIONAL COMMUNICATIONS 2003


Statnon A. Chairman.

O’Brien E. Blood pressure measurement and assessment of the hypertensive patient.


O’Brien E. Inaccurate blood pressure measurement leads to inappropriate management.


O’Brien E. Inaccurate blood pressure measurement leads to inappropriate management.

South African Society of Hypertension. Durban. 14 – 18th March 2003

O’Brien E. Advances in BP measurement and white coat hypertension.

O’Brien E. Comprehensive guideline on blood pressure measurement. European Society Guidelines

American College of Cardiology. Chicago. 31st March 2003

Sever P on behalf of the Steering Committee. The Anglo-Scandinavian Cardiac Outcomes Trial: Morbidity-Mortality Outcome from Lipid-Lowering in a Hypertensive Population.

Lipitor National Faculty Speaker Meeting, Texas, USA, April 2003.

Stanton A. “Statins in the Prevention of Cardiovascular Events – Implications of Recently Reported Endpoint Trials.”

Heartwise Annual Cardiovascular Symposium. Kilkenny. 11th – 12th April 2003

O’Brien E. Chairman

O’Brien E. When is high blood pressure hypertension?


Chairman: E. O’Brien

O’Brien E. Is there a future for the mercury sphygmomanometer?

O’Brien E. A website for blood pressure measuring devices.


O’Brien E. The ASCOT Trial: Implications for Clinical Practice.


O’Brien E. Ambulatory BP Monitoring is Mandatory in 21st Century Practice?

Thirteenth European Meeting on Hypertension. Congressi Center, Fiera, Milan. June Tuesday 13th to Saturday 17th.


Dolan E, O’Brien E, Stanton A, Atkins N, McClory S, etc. The dabl database: methodology
Scientific Communications in 2003

O’Brien E. ASCOT Sub-studies

Stanton A. Cardiovascular Phenotypic Studies in ASCOT.

Moore N, Stojanovic M, Lyons S, O’Brien E, O’Brien J, Stanton A. A newly discovered polymorphism in the renin gene enhancer region is associated with elevated ambulatory BP levels in a large community population.

Eurostage Clinical Cardiovascular Genetics Meeting, Dublin, Ireland, October 2003.
Stanton A. Why have Genetic Studies of the Renin Angiotensin System been Disappointing?

Servier Symposium. EUROPA. Dublin. 22nd October 2003.
O’Brien. E. Chairman


Grogan L. The use of ABPM in clinical practice could be greatly facilitated by two developments: Standardisation and Physician Assisted Interpretative Reports.

American Heart Association November 2003

Moore N, Stojanovic M, Lyons S, O’Brien E, Shields D, O’Brien J, Stanton A. A newly discovered polymorphism in the renin gene enhancer region is associated with elevated ambulatory BP levels in a large community population


Treating to Target. Anglo-Irish Meeting. Dublin. 28th – 30th November 2003
O’Brien E. When is high blood pressure hypertension?

O’Brien E. When is high blood pressure hypertension?
## ON-GOING RESEARCH 2003

### 1. CARDIOVASCULAR GENETICS

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<td><strong>1</strong></td>
<td><strong>ASCOT Pheno-Geno Study</strong>&lt;br&gt;ASCOT Sub-study: An intensive phenotyping study to enable the future examination of genetic influences on hypertension associated cardiovascular disease – an ASCOT sub-study</td>
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<tr>
<td><strong>2</strong></td>
<td><strong>Renin and ACE2 Gene Study</strong>&lt;br&gt;Genetic variants in the genes for renin and ACE2: Influences on BP levels, on responses to blockade and on atherosclerosis.</td>
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<tr>
<td><strong>3</strong></td>
<td><strong>Genetic Variance in Oxidant Stress – Studying the impact on Atherosclerotic Burden</strong>&lt;br&gt;Novel single nucleotide polymorphisms detected by DHPLC variant scanning in Xanthine Oxidoreductase</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td><strong>Genetic Variance in Oxidant Stress – Studying the impact on Atherosclerotic Burden</strong>&lt;br&gt;Effects of promoter and coding polymorphisms in Xanthine Oxidoreductase on uric acid levels and on blood pressure.</td>
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<tr>
<td><strong>5</strong></td>
<td><strong>Genetic Variance in Oxidant Stress – Studying the impact on Atherosclerotic Burden</strong>&lt;br&gt;Influence of Oxidant Stress on Enzyme Genetic Variance</td>
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<td><strong>6</strong></td>
<td><strong>Genetic Variance in Oxidant Stress – Studying the impact on Atherosclerotic Burden</strong>&lt;br&gt;Isoprostane formation and Carotid Intima-media Thickness</td>
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<td><strong>Allied Irish Bank Study Phase III</strong></td>
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### 2. MEASURES OF CARDIOVASCULAR RISK AND TARGET ORGAN DAMAGE

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<td><strong>The eye as a window to the arterial system</strong>&lt;br&gt;An in vivo study of the human microvascular endothelial function.</td>
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<td><strong>11</strong></td>
<td><strong>Endothelial dysfunction in stroke patients</strong></td>
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<td><strong>Retinal Vascular Geometry in Glaucoma</strong></td>
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<td><strong>Retinal Vascular Geometry in Schizophrenia</strong></td>
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<td><strong>14</strong></td>
<td><strong>Retinal Vascular Geometry in Schizophrenia</strong></td>
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3. EPIDEMIOLOGY OF AMBULATORY BLOOD PRESSURE

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<tr>
<td>16 The Allied Irish Bank Study. Phase II.</td>
<td>A longitudinal study of changes in ambulatory BP parameters in a healthy population. Patterns of age-related changes in ambulatory blood pressure parameters in 600 normal volunteers.</td>
</tr>
<tr>
<td>17 ASCOT ABPM Sub-study</td>
<td>24-h ambulatory BP control as a predictor of outcome in treated hypertensive patients - a sub-study of ASCOT to assess the effect of Atorvastatin on ambulatory BP parameters in the active and placebo limbs of the Lipid Lowering Arm of the ASCOT Study</td>
</tr>
<tr>
<td>18 <em>dabl</em> Data base Outcome Study</td>
<td>An outcome study to determine office and 24-hour ABPM blood pressure predictors of mortality in 700 cardiovascular deaths in 14,000 patients with hypertension followed from 1980 to 2002</td>
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<tr>
<td>19 The OvA (Office versus Ambulatory Blood Pressure Measurement): ABPM in management of hypertension</td>
<td>An on-going analysis of data from the OvA Study, the main results so which were published in <em>NEJM</em> 2003</td>
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4. EFFECTS OF MANAGEMENT AND THERAPY

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<td>20 Efficacy of Renin Inhibition in Essential Hypertension</td>
<td>Blood pressure lowering in essential hypertension with an oral rennin inhibitor, aliskiren</td>
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<tr>
<td>21 CACHET - A comparison of the effects of antihypertensive treatment with angiotensin II blockade and beta-blockade on carotid wall structure and haemodynamics</td>
<td>Determinants of the differential patterns of carotid artery and left ventricular remodelling by candesartan and atenolol in hypertension.</td>
</tr>
<tr>
<td>22 Anglo Scandinavian Cardiac Outcomes Trial (ASCOT).</td>
<td>An on-going study of the efficacy of different blood pressure lowering agents in 20,000 moderate risk patients with hypertension</td>
</tr>
<tr>
<td>23 Action in Diabetes and Vascular Disease, Preterax and Diamicron MR Controlled Evaluation. (ADVANCE) Main Study</td>
<td>A study of best management of cardiovascular risk in diabetic patients</td>
</tr>
<tr>
<td>24 The RADOX Study: a Sub-study of ADVANCE</td>
<td>A study of the effects of blood pressure lowering and blood glucose lowering on oxidative stress (urinary isoprostanes) among individuals with Type 2 diabetes</td>
</tr>
<tr>
<td>25 The AdRem Study: Action in Diabetes and Vascular Disease Retinal Measurements Study - a Sub-study of ADVANCE</td>
<td>A study of the effects of blood pressure lowering and glycaemic control on the retinal microvasculature</td>
</tr>
<tr>
<td>26 OnTarget Study (ONGoing Telmisartan Alone and in combination with Ramipril Global Endpoint Trial)</td>
<td>A study of the effects single and combination therapy in subjects with cardiovascular disease.</td>
</tr>
<tr>
<td>27 TRANSCEND Study (Telmisartan Randomized AssessmentMent Study in aCE iNtolerant subjects with cardiovascular Disease)</td>
<td>A study of the effects of Telmesartan in subjects in subjects with cardiovascular disease who are intolerant to ACE inhibitors.</td>
</tr>
<tr>
<td>28 The HYVET Study. Hypertension in the Very Elderly</td>
<td>Evaluation of antihypertensive medication with Indapamide in the very elderly (over 80 years)</td>
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## 5. Computerisation and Measurement

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<td><strong>29</strong> The RHASP (Reduction of Heart Attack and Stroke through Prevention) Pilot Study</td>
<td>A Department of Health sponsored pilot project to assess the feasibility of a shared care approach to the management of cardiovascular disease between general practice and a specialised centre using a common dabl cardiovascular database.</td>
</tr>
<tr>
<td><strong>30</strong> Pragmatic randomised trial of different measurements of blood pressure for white coat hypertension in primary care</td>
<td>A collaborative study with general practices in the UK to determine the detection of white coat hypertension using different measurement techniques.</td>
</tr>
<tr>
<td><strong>31</strong> ASCOT: Sub-study: Omron Audit in ASCOT</td>
<td>An ASCOT sub-study to assess the use of an automated device – OMRON CP-707 – in a large multicentre clinical trial.</td>
</tr>
<tr>
<td><strong>32</strong> Conduit Artery Functional Endpoint Study (CAFÉ Study)</td>
<td>A sub-study of the ASCOT Study to determine the role of Applanation Tonometry in the ASCOT Study.</td>
</tr>
<tr>
<td><strong>33</strong> The international ABPM database</td>
<td>A collaborative international study co-ordinated by Professor T. Pickering in Mount Sinai Hospital to establish an international data base of ABPM.</td>
</tr>
<tr>
<td><strong>34</strong> Computerised systems for Out-patient Management: dabl and ADAPT</td>
<td>Computerisation of cardiovascular clinics to integrate management in the ADAPT, Blood Pressure, Lipid, Elderly, Stroke and TIA and Vascular Surgical Clinics in Beaumont Hospital.</td>
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<tr>
<td><strong>35</strong> Computerised system for Management of anticoagulant Clinics: dabl Anticoagulant</td>
<td>Development and application of a computerised management system for 2000 patients attending the Anticoagulant Clinic at Beaumont Hospital.</td>
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<tr>
<td><strong>36</strong> Computerised system for Ambulatory Blood Pressure Measurement in hospital and general practice: dabl ABPM</td>
<td>Development of a computer program to analyse and interpret ABPM to facilitate introduction of the technique to general practice.</td>
</tr>
<tr>
<td><strong>37</strong> Computerised system for Blood Pressure Measurement in Clinical Trials: dabl Research</td>
<td>Development of a computer program to standardise blood pressure measurement in clinical trials.</td>
</tr>
<tr>
<td><strong>38</strong> Development of the Sphygmocorder</td>
<td>A collaborative venture with Bang &amp; Olufsen Medicom to develop the Sphygmocorder for audio-visual evaluation of blood pressure measurement during device validation.</td>
</tr>
<tr>
<td><strong>39</strong> Establishment of a website for blood pressure measurement: dableducational.com</td>
<td>The establishment of a website devoted to blood pressure measurement to facilitate the availability of information on device accuracy for lay and medical consumers – dableducational.com.</td>
</tr>
<tr>
<td><strong>40</strong> Validation of blood pressure measuring devices</td>
<td>The ADAPT Centre is the leading centre world-wide for the evaluation of blood pressure measuring device according to international protocols.</td>
</tr>
<tr>
<td><strong>41</strong> Specification of blood pressure measuring device for the developing world</td>
<td>A WHO initiative to produce a specification for a blood pressure measuring device for the developing world and to oversee its manufacture.</td>
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</table>
EDITORIAL BOARD MEMBERSHIP

Journal of Human Hypertension: E. O'Brien
Journal of Hypertension: E. O'Brien
High Blood Pressure and Cardiovascular Prevention: E. O'Brien
Blood Pressure: E. O'Brien
Blood Pressure Monitoring: E. O'Brien
The Recorder: E. O'Brien

COMMITTEE MEMBERSHIP


International Centre for Health and Cooperation. Fordham University. New York
E. O’Brien. Board Member

Working Group on Blood Pressure Monitoring. European Society of Hypertension
E. O’Brien. Chairman

Working Party on Blood Pressure Measurement. British Hypertension Society
E. O’Brien. Chairman


CEN/TC205 EEC Committee for Non-active medical devices. E. O’Brien

Association for the Advancement of Medical Instrumentation (AAMI), Arlington, US
E. O’Brien. Individual Liaison Member

Steering Committee. European Study of Systolic Hypertension in the Elderly (Syst-Eur)
E. O’Brien

Side-project on Ambulatory Measurement. European Study of Systolic Hypertension in the Elderly (Syst-Eur). E. O’Brien

Steering Committee. European Study of Ambulatory Blood Pressure Measurement. E. O’Brien

Irish Medicines Board. D. Fitzgerald.


Steering Committee. THOP (Home Pressure and Treatment of Hypertension) Study. E. O’Brien.

Steering Committee Anglo-Scandinavian Cardiac Outcomes Trial (ASCOT): E. O’Brien

Sub-study Committee. Anglo-Scandinavian Cardiac Outcomes Trial (ASCOT):
E. O’Brien. Chairman