The American College of Cardiology Scientific Sessions ACC.14 meeting was held in Washington DC from Friday 28 to Monday 31 March 2014. This report is comprised of a selection of the sessions that I attended.

Attendees at future meetings should note the necessity of having the means to access the internet on a smart phone or pad during the meeting to allow acquisition of the meeting programme, the viewing of live streaming of events, the downloading of presentations and the recording of CME points.

PREVENTION: HYPERTENSION

SYMPLICITY HTN-3 Trial

10% of hypertensive patients are regarded as having resistant hypertension. The results of non-blinded studies have indicated that catheter based renal artery denervation (RDN) results in a reduction in blood pressure. SYMPLICITY HTN-3 Trial was a multicentre, randomised, blinded, sham controlled trial of renal denervation of 535 patients with resistant hypertension to evaluate the safety and efficacy of percutaneous RDN in patients with severe resistant hypertension.

The “usual” criteria were used to define patients with resistant hypertension: patients with hypertension on a stable medication regimen requiring 3 or more antihypertensive agents (one of which had to be a diuretic) with an office systolic BP >160 mm Hg at 2 visits. Patients with a 24 hour ambulatory BP average of <135 mm Hg, eGFR <45 ml/min/1.73m² or renal artery anomalies making successful denervation unlikely were excluded.

Major adverse events were defined as all cause mortality, end stage kidney disease, an embolic event resulting in end-organ damage, renal or other vascular complications, a hypertensive crisis in the first 30 days or new renal artery stenosis within 6 months. The primary efficacy endpoint was the comparison of the change in office BP from baseline to 6 months between the treated vs. sham operated groups. A superiority margin of 5 mm Hg was defined.

364 patients were allocated to RDN and 171 to sham operation. The baseline demographics and anti-hypertensive medications were similar between the two groups. Patients were followed for 6 months after the procedure. Within 6 months there were 2 deaths amongst the RDN group and one in the sham operated group. 11 patients and 1 patient respectively were not seen at 6 months. Follow-up at 6 months was 96.2% and 98.8%.

The safety end point occurred in 1.4%, significantly below the performance goal that had been set. Office systolic BP fell in both groups during the trial; from 180 mm Hg to 166 mm Hg in the RDN group and from 180 mm Hg to 168 mm Hg in the sham operated group, thus differing by only 2 mm Hg. On 24 hour ambulatory recording the difference was also only 2 mm Hg. Both differences were non-significant. No differences were found amongst the tertiles of baseline BP nor amongst any of the subgroups examined.

The authors concluded that while RDN was safe, it was not associated with significant additional reductions in office or ambulatory BP.
SYMPLICITY Registry

The Global SYMPLICITY Registry is exploring the safety and effectiveness of RDN in real world patients with uncontrolled hypertension. So far it has included 1,000 patients drawn from across the world who were candidates for RDN as defined by local regulations and who will be followed for up to 5 years. This report concerned the results at 6 months. It seemed that not all patients underwent renal artery denervation for the “classical” hypertension indication. Those with a systolic BP >160 mm Hg and an average ambulatory BP >135 mm Hg comprised 32.7% of all patients. Diuretics were used in 78.2% of patients with spironolactone (considered separately) in 18.6%.

The investigators found a similar degree of safety with the procedure as with SYMPLICITY HTN-3. Using the results from the sham operated patients in HTN-3 as a comparator, ambulatory systolic BP fell by 3.1 mm Hg. Greater reductions in BP at 6 months were recorded in patients entering the study with a systolic BP >160 mm Hg or ambulatory BP >135 mm Hg (50% >20 mm Hg and 77% >5 mm Hg). Patients with office systolic BP <140 mm Hg at the outset exhibited an increase in BP of 14.2 mm Hg.

The authors concluded that RDN has an excellent safety profile and that there were significant reductions in both office and ambulatory BP from baseline which were numerically greater than that reported in HTN-3, though a placebo effect could not be excluded.

Reference: Bohm M et al. Rational and design of a large registry on renal denervation: the global SYMPLICITY registry. Eurointervention, 2013; 9, 484-92

Commentary: RDN promised a solution to the problem of resistant hypertension. However the exact mechanism by which blood pressure might be reduced by this technique is not yet completely understood. Furthermore, the ability of multiple localised injuries to the renal artery intima to completely eliminate renal sympathetic innervation remains in question. Previous non-randomised studies have strongly suggested that a significant and sustained BP reduction occurs after RDN. The two studies presented at ACC.14 suggest otherwise. The randomised HTN-3 study could show only a minor incremental reduction in systolic BP after RDN, with equivalent reductions in BP across a range of baseline BP. The study participants in HTN-3 were rigorously selected and blinded to their treatment. In comparison the global registry patients represent a much wider spectrum of hypertensive patients, with HTN-3-like individuals comprising only a third of the study population, with many fewer patients receiving a diuretic (78.2% vs 99.7%) amongst their anti-hypertensive therapies. Despite recent communications from Medtronic Inc., the manufacturer of the device, tacitly supporting the continuation of RDN, this writer will reserve his opinion on the appropriateness of the procedure until the emergence of further data confirming which (if any) patients are responsive to RDN and the future development of alternative methods of achieving complete denervation.

PREVENTION: DYSLIPIDAEMIA

The safety of statins

The new ACC/AHA guidelines have regenerated significant interest in statin treatment and its side effects. Christie Ballantyne reviewed the information on new onset diabetes (NOD), concluding that while the incidence of NOD is increased by statin treatment, this effect is outweighed by the cardiovascular and mortality benefits that statins offer. Statin treated patients who develop NOD have a predisposition to the condition and should be strongly encouraged the reduce weight and do sufficient
exercise when starting statin treatment. Should there be reasonable uncertainty about the need for statin therapy, particularly amongst patients requiring primary prevention, the result of an imaging study such as a coronary calcium scoring may help make the decision.

Thompson discussed statin induced myalgia. Statins may reduce the ability of muscle to repair after exercise. In the STOMP trial, there was an increase in myalgia in statin compared to placebo treated patients. Statin induced muscle symptoms may be associated with low levels of Vit D. Thompson was not optimistic about the effect of co-enzyme Q10 preventing statin associated myalgia. He favoured withholding statins for as long as 2 months if patients complain of myalgia thought to be due to statin treatment.

Cognitive impairment has been put forward as another side effect of statin treatment. Meta-analyses have not been able to establish the veracity of this claim and indeed in one study showed a 29% reduction in dementia developing during chronic therapy (Mayo Clin Proc, 2013 & Ann Int Med, 2013).

Sanjay Kaul reviewed whether an on-treatment LDL level might be considered too low. He found no cause for concern.

**PCSK9 inhibition**

A series of studies were presented that assessed the effects of Amgen’s injectable PCSK9 inhibitor, evolocumab, showing that PCSK9 substantially reduces LDL cholesterol when used alone and is more potent when used in combination with statin therapy. There are no reports of significant side-effects. Two of these studies were presented by South Africans, Prod FD Raal from Wits and Dr D Blom from UCT. In statin intolerant patients who had repeatedly endured statin myopathy, only 8% experienced a recurrence of myalgia on evolocumab. Of interest, a similar degree of lipid lowering was observed whether the agent was given in a lower dose every 2 weeks or a higher dose every month. In a study in which statins were combined with evolocumab, a similar 63-75% LDL reduction was achieved whether daily high dose rosuvastatin, high dose atorvastatin, low dose atorvastatin or simvastatin 40 mg were given.

**PREVENTION: DIABETES MELLITUS**

**ALECARDIO – PPAR alpha/gamma inhibition in type 2 diabetes post-ACS**

Lincoff reported on a trial of the PPAR alpha – gamma inhibitor aleglitazar, an oral hypoglycaemic agent which reduces HbA1C and triglycerides, in type 2 diabetic patients following presentation with ACS. The trial enrolled 7 226 patients and was terminated prematurely by the DSMB for an excess of adverse events. While HbA1C, HDL cholesterol and triglycerides were reduced by aleglitazar, LDL cholesterol was raised and apoB was decreased. A reversible rise in creatinine, an increase in kidney injury, gastrointestinal haemorrhage, bone fractures and hypoglycaemia were observed.


**Metformin in patients without diabetes**

Prior evidence suggests that metformin might have myocardial protective effects in diabetics. A small trial in STEMI patients without diabetes given metformin 500 mg bd failed to show an improvement in LVEF (measured by MRI) nor any difference in NT-proBNP.

**PREVENTION: THE STABILITY TRIAL**

The level of lipoprotein-associated phospholipase A$_2$ is independently associated with coronary heart disease risk. By its action it sustains inflammation and promotes expansion of the necrotic core in atheromatous plaque. Darapladib is an Lp-PLA2 inhibitor which has been shown in experimental animals to reduce the expansion of the atheromatous necrotic core. The presentation concerned 15 828 patients with chronic coronary artery disease on optimised guideline-mandated secondary preventive treatment who were studied over 3.7 years. The outcomes in patients who were treated with darapladib were almost identical to those of the placebo treated group. Subgroup analysis suggests an increase in the time to first occurrence of a coronary event with darapladib, which will be the subject of further analysis. STABILITY is the largest trial to date to investigate the effect of anti-inflammatory therapy in the management of atherosclerotic cardiovascular disease.


**MYOCARDIAL ISCHAEMIA AND INFARCTION**

*Triage for chest pain in the ER*

14 636 patients attending the emergency room for chest pain at the Karolinska Institute in Stockholm were evaluated. 61% of these patients had an initial hs-troponin T <5 ng/L (Electrosys) and a normal ECG. This group was generally younger, more often female and had a lower risk factor profile for atherosclerotic cardiovascular disease (chronic kidney disease, chronic cardiovascular disease or diabetes) than those who proved to have a myocardial infarction (MI). Of these only 39 (0.44%) developed MI within the next 30 days, giving a negative predictive value for MI of 99.8%. Of those who developed MI, 15 had no ECG change and 24 had changes. In the subgroup that developed MI the hs-troponin T had been measured <2 hours after the onset of symptoms in 72%. There were only 2 cardiovascular deaths in the entire group within the succeeding year. This information may be important in decreasing the number of unnecessary admissions to rule out MI.


**Debatable issues in PCI for STEMI**

A series of debates were held addressing 1. which form of percutaneous revascularisation should be employed during the treatment of STEMI, 2. whether it is appropriate to address non-culprit lesions acutely, 3. whether thrombus aspiration is appropriate, and, on the more esoteric side, 4. what the current role is for stem cell therapy. The consensus was that drug-eluting stents should be used as they are associated with better outcome; that there is uncertainty whether to address non-culprit lesions during primary PCI other than for patients in shock, and that thrombus aspiration is often appropriate. Stem cell therapy is developing but has not yet been proven to improve outcome after STEMI.

*Anti-platelet treatment*
Montelescot presented evidence from the literature showing that pre-treatment with P2Y12 inhibition is inappropriate before the result of angiography is known and before the decision to proceed to intervention has been made. His view is that such pre-treatment promotes unnecessary haemorrhage.

Mega and Gurbel discussed the genetic background to clopidogrel resistance. Predominantly cytochrome 2C9 has been studied as it mediates the conversion of clopidogrel to its active form. A single nucleotide polymorphism influences the response to clopidogrel. Heterozygotes are partially resistant whereas homozygotes do not respond to clopidogrel even at high doses. Evidence is emerging that similar mechanisms involving the cytochromes may play a role in prasugrel resistance. Gurbel recommended that genotyping be considered when it is necessary to decide which P2Y12 is appropriate for a given patient, whereas platelet function testing is more appropriate when making on-treatment decisions that depend upon whether clopidogrel is active or not.

Myocardial viability

A symposium dealt with the detection and application of myocardial viability studies. PET scanning, FDG scanning and MRI were discussed. In addition, one speaker showed that similar images can be obtained by advanced CT techniques. Although these images are of interest, the STICH trial found that the presence of viable myocardium, even though associated with a better prognosis, did not influence the outcome of revascularisation. In that trial comorbidities played the predominant role in determining outcome. Three cases were presented in which each patient had sustained an anterior myocardial infarction. After myocardial viability studies one was revascularised with a good result, one was revascularised with no benefit and the third was still to have a decision made regarding revascularisation. The overall impression gained was that these searches for viable myocardium, while interesting, have not yet proved their clinical value and that such studies are not a prerequisite for deciding on revascularisation.

Cardiac protection in the peri-operative period

Three late breaking trials addressed potentially protective therapies in the post-operative period. Non-cardiac surgery in patients over the age of 45 years carries an 8% risk of post-operative myocardial infarction with a 10% mortality rate. The first 2 reports from the 2X2 factorial trial POISE-2 concerned non-cardiac surgery patients. Neither aspirin¹ nor clonidine² were associated with an improved outcome. Bleeding was increased 23% with aspirin and hypotension increased by clonidine, both of which were associated with a higher risk of MI. In the steroids in cardiac surgery (SIRS) trial of methylprednisolone no benefit was demonstrable. The steroid treatment was associated with a 22% increase in MI as well as increased hyperglycaemia and a greater insulin requirement.


CORONARY INTERVENTION

Intravascular imaging

Inter alia Waksman and Mintz discussed the use of FFR, IVUS and OCT in coronary intervention. The clear message was that FFR evaluates the physiology and is the correct means to assess whether an intermediate lesion should be stented. IVUS is useful to assess the success of stent implantation, in particular to detect correct stent length, edge dissection and stent distortion particularly in bifurcation stenting. Stent malapposition poses less of a problem. 60 mHz IVUS provides much greater definition
of the arterial wall. There are no firm guidelines as to what the minimal luminal area (MLA) is that mandates intervention. Little or no data regarding OCT MLA is available. OCT should not be used to guide intervention until sufficient data becomes available. Speakers commented the OCT is unsuitable for the assessment of the ostium of the left main stem.

**ATRIAL FIBRILLATION**

*Maintenance of sinus rhythm in atrial fibrillation*

Prystowsky criticised the AFFIRM study because its results have been extrapolated to a much wider group of patients than those who had participated in the trial and far beyond its 2-3 year duration. A more individualised approach is needed. In addition he noted that “it’s not just about heart failure and stroke.” Cognitive impairment, the potential influence of many years of atrial fibrillation and the impact on quality of life must be considered. Kowey considered that ablation does not offer freedom from AF to a sufficient numbers of patients for an adequate length of time. He commented that “people often believe that they're thinking when they are simply rearranging their prejudices.” He is embarking on a study of low dose dronederone plus ranolazine for the maintenance of sinus rhythm (HARMONY). Speaking on AF ablation, Steinberg emphasised that the procedure has to target both the triggers for AF (in the pulmonary veins) as well as the substrate (scarring within the left atrium) to be effective. Packer emphasised the need for careful selection of patients for ablation and the performance of the procedure in a experienced units to ensure the best outcome.

**HEART FAILURE**

*Long term follow-up of cardiac resynchronisation and defibrillator therapy (CRT-D) in patients with mild heart failure (MADIT-CRT)*

The 7 year follow-up of MADIT-CRT patients with mild heart failure, left bundle branch block (LBBB) and CRT-D had a combined rate of death and hospitalisation for heart failure of 21% compared to 42% in those with CRT only. No effect was observed in those without LBBB.


**VALVE DISEASE**

*Self-expanding (CoreValve) transcutaneous aortic valve replacement (TAVR) vs. surgical aortic valve replacement.*

Previously the PARTNER A and PARTNER B trials respectively showed that TAVR with a balloon expandable valve (SAPIEN XT) improved the survival of inoperable patients when compared to medical therapy and that the outcome with this valve was similar to surgical valve replacement in high risk patients. Recently the results in a group of symptomatic patients with severe aortic stenosis at extreme risk who received a balloon expandable valve (CoreValve) was reported. This study showed that TAVR reduced the risk of death from any cause or major stroke in comparison to a performance goal.

At ACC.14 the results of the subsequent US CoreValve Pivotal Trial in High Risk patients was presented. 795 subjects with an average age of 83 years with aortic stenosis were enrolled and randomised to either TAVR or surgery. Patients were selected because their mortality risk was judged
to exceed 15% within 30 days of surgery. The risk eventually proved to be lower than projected and so this patient group could be considered as at intermediate rather than at high risk. Selection was initiated at the investigational site and then vetted by a central screening committee which had access to all the data. 45 sites participated. Patients with recent gastrointestinal bleeding, stroke, myocardial infarction, coronary stenting, severe kidney injury or an ejection fraction <20% were excluded, as were those with significant untreated coronary artery disease or with a life expectancy <1 year due to co-morbidity. Baseline characteristics were well balanced between the two groups with the exception of diabetes mellitus which was significantly more frequent amongst the surgical group (34.9% vs. 45.4%; P<0.01). After randomisation, there were 2 withdrawals from the TAVR group and 36 from the surgical group.

The primary endpoint was all cause mortality at 1 year. Follow-up at 1 year occurred in 98.5% of TAVR patients and 93.6% of surgical patients.

30 day and 1 year outcomes were reported. The authors found that, compared to surgical aortic valve replacement, TAVR with the CoreValve significantly reduced the risk of death from any cause at 1 year. Mortality at 30 days was 3.3% in the TAVR group vs 4.5% with surgery. At 1 year “as treated” mortality was respectively 14.2% vs 19.1% (P=0.04 for superiority). Subgroup analysis showed similar results for age less or more than 85 years, gender, BMI less or more than 30 kg/m², left ventricular ejection fraction less or more than 60%, the presence or absence of diabetes, hypertension, peripheral arterial disease and prior coronary bypass surgery and an STS score greater or less than 7%. Provisional results at 2 years on a lesser number of patient observations show persistence of the superiority. At 1 year strokes had occurred respectively in 8.8% and 12.6%; major strokes 5.8% and 7.0%. The haemodynamic performance of the valves, the NYHA class and quality of life comparisons were similar between the two patient groups.

The TAVR group had an excess of major vascular complications (5.9% vs. 1.7%), permanent pacemaker implantation (19.8% vs. 7.1%), and moderate or severe paravalvar regurgitation (6.1% vs. 0.5%). In the surgical arm there was an excess of bleeding (35.0% vs. 13.6%), new onset or worsening atrial fibrillation (30.5% vs. 11.7%) and acute kidney injury (15.1% vs. 6.0%).


The balloon expandable valve (SAPIEN) vs self-expanding (CoreValve) TAVR.

5 experienced centres participated in the German CHOICE study, which was another TAVR experience reported at ACC.14. 241 patients with severe symptomatic aortic stenosis considered inoperable or at high risk for surgery were randomised to receive either the balloon expandable valve (SAPIEN @ Edwards Lifesciences) or self-expanding (CoreValve @ Medtronic Inc) prosthesis. Patients >75 years of age and / or with a logistic Euroscore >20% and / or STS score >10% and / or with a contraindication to conventional surgery were included. The native aortic annulus had to measure 20-27 mm and the patient had to be suitable for transfemoral access.

The primary endpoint of the study was device success which included successful delivery and deployment of the device in the correct anatomical position with satisfactory haemodynamic performance without moderate or severe regurgitation and the need for only one valve to be implanted. Aortic regurgitation was assessed by echocardiography, angiography and in a subgroup, MRI. Secondary endpoints included cardiovascular mortality, major and minor vascular complications, major and minor bleeding, the need for a permanent pacemaker and the improvement in NYHA class.
The patients’ baseline characteristics were well balanced except for an excess of women in the CoreValve group (71.7% vs. 57.0%; P=0.02). Follow-up at 30 days was 100% in the SAPIEN XT group and 97.5% in the CoreValve group.

As assessed by this study’s criteria device success was achieved in 95.9% with the balloon-expandable valve vs. 77.5% with the self-expandable valve (RR=1.24; P<0.001). Similar results were found in all subgroups examined. There was an excess of aortic regurgitation observed with the CoreValve. Moderate or severe post-procedural aortic regurgitation was present on angiogram in 18.3% vs. 1.4%. There were no differences between the groups with respect to 30 day death, stroke, myocardial infarction, bleeding or vascular complications. However the CoreValve fared less well with respect to rehospitalisation for heart failure (4.3% vs. 0%; P=0.02), NYHA class improvement (86.7% vs. 94.3%; P=0.06), quality of life score (65.9% vs. 71%; P=0.02) and the need for a permanent pacemaker (37.6% vs. 17.3%). A second valve was required more often (5.8% vs. 0.8%) with the CoreValve.


Commentary: TAVR has been developed over the last several years to the point where cardiologists can confidently offer the procedure to non-operable and very high risk patients with symptomatic severe aortic stenosis. The novel information flowing from the CoreValve US Pivotal trial strongly suggests that not only are surgery and TAVR equivalent procedures but that TAVR is associated with better survival in high risk / very high risk patients with aortic stenosis. This very important finding with the self-expanding CoreValve has to be considered in the light of the German CHOICE study finding which indicates that better results may be obtained using the SAPIEN XT prosthesis which had a better implantation success rate, a lesser requirement for permanent pacemaker implantation and less subsequent aortic regurgitation, the latter a marker for poorer long term outcome in previous studies. Although 30 day survival did not differ between the two TAVR methods, longer term follow up will be required to verify whether the CoreValve is as safe as the SAPIEN XT.

PERICARDITIS

*Colchicine for frequently recurrent pericarditis (CORP-2)*

Italian investigators reported beneficial effects from adding colchicine 0.5 – 1 mg daily to anti-inflammatory treatment with aspirin, ibuprofen or indomethacin in patients with relapsing, non-infective, non-malignant pericarditis. Strict criteria were employed for the diagnosis (fever, friction rub, ECG changes, demonstration of pericardial effusion). Patients were followed for 20 months. Colchicine reduced the rate of recurrence from 42.5% to 21.6% (HR .46; P=0.0006), reduced the persistence of symptoms at 72 hours (44.2% to 19.2%) and increased the remission rate at 1 week (59.2% to 83.3%). Pericarditis-related hospital admission was reduced from 10.0% to 1.7%. Gastric intolerance was greater when giving a loading dose of colchicine, but the rate of gastric intolerance was similar in both the colchicine treated and the placebo treated group.

The authors concluded that, taken together with the results of other controlled trials and in the absence of contraindications, colchicine should be regarded as a first line treatment for either acute or recurrent pericarditis.

PULMONARY EMBOLISM

Thrombolysis for pulmonary embolism

There are difficulties in deciding on the correct treatment for pulmonary embolism when the patient is haemodynamically stable. However, an enlarged right ventricle and elevation in troponin T are indicators for treatment beyond heparin alone. Full dose thrombolysis for massive and submassive pulmonary embolism was used in the PEITHO trial. Bleeding occurred in 41% with major bleeding in 2% and haemorrhagic stroke in 2.3%. Patients >75 years derived less benefit than younger patients. Sharifi proposed using ½ dose tenecteplase (50 mg given over 2 hours) with IV heparin for 24 hours, commencing rivaroxaban 2 hours after stopping heparin. Rivaroxaban is given in a dose of 15 mg bd for 3 weeks then 20 mg daily. Although radiologic changes may not improve dramatically, patients recover well and are suitable for early discharge. An alternative to this approach is to use catheter directed ultrasound assisted thrombolysis with which some success has been achieved. The Brigham and Women’s Hospital has established a collaborative group to treat patients with pulmonary embolism. While the majority of the cases they have treated in the past 18 months have had heparin only, their patients with acute massive embolism had a 50% mortality.

HEALTH CARE CHALLENGES IN THE EMERGING WORLD

Lessons learned and future challenges

A symposium was held on Friday before the start of the ACC proper to discuss cardiovascular health care in the emerging world. Ralston CEO of WHO in Geneva noted that non-communicable disease (NCD) accounted for 60-65% of deaths in 2011. NCD has not been considered a priority. Donor funding was <3% in 2008.

Speakers from India, Mexico and China outlined problems encountered in their respective countries which are not dissimilar to those in South Africa.

In India, as amongst the South African Indian community, there is an earlier onset of coronary artery disease (CAD). Health insurance is inadequate and 80% of patients have to fund their own care for the treatment of acute coronary syndromes (ACS). There has been a sharp increase in the frequency of percutaneous intervention (PCI) in India – 10% of which is for acute coronary syndromes (ACS). Government departments have become involved. A central project has stratified the hospitals according to PCI & transport capacity. Initial treatment and onward referral is governed by the hospital status. In India only 10% of patients with congenital heart disease get surgery.

Leiva-Pons from Mexico discussed the epidemiology in their population of 118 million. 3.6 million new cases of CAD are expected in the next decade. As elsewhere they have to provide for the treatment of an increasing proportion of older adults. By 2050 citizens <19 years will have decreased by 63%. There is a high frequency of obesity, alcohol abuse and smokers (30%) in the Mexican population. Cardiovascular disease (CVD) consumes around 50% of budget provided for the management of diabetes mellitus (DM) and obesity.

Yang from China reported that the prevalence of non-communicable disease (NCD) has increased from 53% to 78% since 1973. 52% of males smoke. There has been a sharp increase in hypertension (HT) and DM which correlates with the high salt content of the Chinese diet. Also in South America the salt intake is high at 8-12 gm/day. Programmes are needed to reduce salt intake. Consumer knowledge is lacking regarding salt intake. Amongst the public the term “salt” is preferred to “sodium”. It will be necessary to influence the content of imported foods and ensure accurate food labelling. International
cooperation will be required to achieve this. Small enterprise food vendors also need to change the constituents of their products. The following lines of action were suggested: establish a national baseline salt intake, and confirm the salt content of processed foods. The provision of salt substitutes can reduce BP by 5.4 mm Hg over 12 months.

Between 2000 and 2009 the incidence of CVD had equalised between urban and rural Chinese. Chinese women have a higher prevalence of hypertension. Urban health care is disadvantaged by the lesser qualification of rural practitioners. Rural doctors provide information on how to control hypertension to less than 20% of their patients. Primary care providers can be influenced to improve BP. Self-management programmes must also be encouraged.

In Brazil >70% deaths are due to NCD and nearly half of these are attributable to CVD. An imbalance between guidelines and their implementation in practice has been identified. ACE inhibition, aspirin and statin are prescribed to only 40% of patients requiring secondary prevention. Similar deficiencies occur in the application of effective therapies for acute myocardial infarction (MI): thrombolysis is administered in only 70% of eligible patients. Implementing a structured (system) approach was shown to increase adherence to therapy by 20-25%.

Wright, Executive Director of the Million Hearts in the US project emphasised the importance of setting clear goals, employing simple measures, fostering key partnerships, and developing mechanisms to monitor the achievement of goals, and ensure reporting and sharing of the results achieved.

India has embarked on a programme of “frugal innovation”. By promoting resterilisation, locally produced products and their capacity for economies of scale, the price of stents has been reduced to $100, ECG’s to 15c and dialysis to $30 /day. Costs have also been reduced by providing CT services 24/7 – with lower charges studies done at night. Physician efficiency has been improved by providing remote monitoring for critical care, allowing critical care specialists to advise on the management of patients in remote hospitals.

Technology expansion in Brazil is being promoted by providing graduates with 100 000 local and international fellowships, the majority of which are currently underway.

The US will spend 18.2% of its GDP on health in 2014. The aging population is a factor in the cost increase. Many patients now cover their medical costs personally. In heart failure patients in Flagstaff, Arizona mobile remote monitoring devices have reduced hospitalisations, days hospitalised and hospital costs by about 2/3. Similar results are reported from China – also allowing the identification of patients requiring referral for higher level care.

Commentary: In the entire four hour symposium Africa was never mentioned once by the speakers. Similarly other underdeveloped areas such as areas of South and Central America and the Asian Pacific received no attention. So much for the many millions living in these underdeveloped countries. Until the underdeveloped world’s problems are brought to the attention of benevolent organisations, they will continue to focus their attention on countries which already have strong (though perhaps troubled) economies; India, China and Brazil being the examples vividly portrayed in this meeting. Furthermore, the perception that donor funding will resolve the problems of the underdeveloped world is misguided. What is wanted is pressure on governments to support the prevention of NCD and practical assistance in implementing policies that have proved to be effective elsewhere.