CDIA

Annual Report 2013

Contents

CDIA DIRECTOR: Professor Dinky (Naomi) Levitt
MBChB, MD and FCP(SA)

Director's Report

I am pleased to give a brief overview of CDIA's activities in 2013 as an introduction to our annual report, with detailed descriptions following. This year has been the fourth since our launch in 2009 and, importantly, the penultimate year of funding from the National Heart, Lung and Blood Institute (NHLBI)-UnitedHealth Group (NHLBI-UHG) Global Centres of Excellence in Chronic Diseases programme, our major source of support. Consequently, given the nature of five-year funding cycles, our attention for 2013 focused on completing our currently funded projects and completing applications for additional resources.

The thrust of CDIA's projects has been on the development and subsequent testing of interventions aimed at improving primary healthcare delivery for people with non-communicable diseases (NCD), while building capacity. In 2013, we made good progress in the first aspect of our work; the development of tools. Led by Thomas Gaziano, the development of a Markov model to assess the economic impact of prevention and management of interventions for chronic diseases based on South African data has been completed. The economic model is now being applied to a number of cost-effectiveness analyses of screening and intervention strategies. The development and validation of a new and cost-effective tool for cardiovascular risk prediction in low-resource settings, also under Thomas Gaziano's leadership, has now moved to the validation stage. Finally, the multi-component lifestyle modification package, 'Putting Prevention into Practice', now called 'ichange4health', under the joint leadership of Kathy Murphy and Bob Mash, has also evolved to the phase of evaluation and implementation.

TRIALS UNDERTAKEN IN 2013

We have also made substantial progress with the evaluative aspects of our work. These have included three pragmatic trials; two cluster randomised trials at the clinic level and an individually randomised trial (at one multicentre study). These large studies have been extremely challenging, and would not have been successful without the tenacity and commitment shown by the teams of investigators, fieldworkers and support staff. The extensive fieldwork, cleaning of the baseline and follow-up data, creation of a large single data set and initial analysis for the Eden/Primary Care 101 pragmatic cluster randomised trial was completed in 2013. This trial, with Lara Fairall as primary investigator (PI), was designed to test the effectiveness of a guideline-based training programme for nurses on the processes and outcomes of NCD care across hypertension, diabetes, chronic respiratory disease and depression in 39 primary care clinics. The initial data was presented to the Western Cape Provincial Department of Health in late 2013 and the department has undertaken to roll out the enhanced Primary Care 101 package, known as PACK, to the rest of the province. The national Department of Health and some sub-Saharan African countries are also showing interest in implementing PACK. We expect to submit the first publications from the trial in 2014.

2013 saw the submission and acceptance of the trial outcome data of the randomised controlled trial to evaluate the effectiveness of a group diabetic education programme

using motivational interviewing in under-served communities in 34 clinics in South Africa. This trial, led by Bob Mash, has also had an impact on practice; the provincial Department of Health arranged that all health promoters be trained to deliver the education programme.

The STAR (SMS-text adherence support) trial, undertaken in collaboration with Andrew Framer from Oxford University and led by Kirsty Bobrow in the field, was designed to address the important issue of poor treatment adherence in people with hypertension. The clinical data collection in this pragmatic, individually randomised three-arm parallel group trial in 1 372 people with hypertension, based on the use of SMS-text messaging, was completed in 2013. The trial protocol has been published and we eagerly await the final results in 2014.

The final large field study represented a very successful collaboration across four of the 11 NHLBI-UHG centres. In this, we demonstrated that community health workers (CHWs) could be adequately trained to screen for and identify those at high risk for cardiovascular disease (CVD) using the abovementioned non-laboratory-based screening tool in communities across four sites in Bangladesh, Guatemala, Mexico and South Africa. We were also able to demonstrate substantial gains in CHW training time, CVD risk screening time, lack of errors in calculation of a CVD risk score, and end-user satisfaction when using a mobile phone application for calculation of the risk score. These studies have important implications for the concept of task sharing between health professionals and non-professionals. The next stage, which entails examination of the outcome of those who were referred for evaluation by the health services, is yet to be finished, as is an analysis of the costs of the programme. Many of our members have contributed directly to non-communicable disease (NCD) policy initiatives, both nationally and internationally. It is gratifying to see that the work conducted by the network is beginning to impact on policy and practice. Naturally, we were delighted to see the launch of the South African National Strategy for NCD this year and look forward to its implementation.

Our annual meeting, which was held in November, was well attended by network members and a substantial number of representatives from the various provincial departments of health. We were also pleased to welcome our new members; Professor Moffat Nyerende from the Malawi-Liverpool-Wellcome Trust Clinical Research Programme in Blantyre, Malawi, Professor Jannie Hugo from the University of Pretoria and Dr Steven van der Vijver from the African Population Health Research Centre. The regular newsletters have enabled us to profile our new members, students and their activities.

THANK YOU TO FUNDERS AND MEMBERS

We would like to recognise our funders: the NHLBI and the UnitedHealth Group, Medtronics and CANSA. Given the fact that our current funding comes to an end in 2014, it has become critical to raise additional resources to ensure our sustainability. Unfortunately, a number of grant applications submitted during the past year were unsuccessful, but a further series of applications are being prepared for submission in 2014, including an application to the Discovery Fund to support the functioning of the directorate.

We would like to express our gratitude to the members of our governing board. Under the leadership of Professor Jimmy Volmink, Dean of the Faculty of Medicine and Health Science at Stellenbosch University, the board meetings have served to give overall guidance to CDIA. The management committee has continued to play an important role in providing regular oversight of the various projects and activities. We have also valued the input of members of the Scientific Advisory Panel, with regard to the overall direction of CDIA. On behalf of associate director, Krisela Steyn and myself, I would like to thank the staff in the directorate: Carmelita Sylvester, Susan Botha and Chantal Stuart for providing the excellent administrative support that enables us to manage CDIA.

Finally, we look forward to 2014, when planning for the next five years will begin in earnest. This will include finding additional resources to train more young researchers.

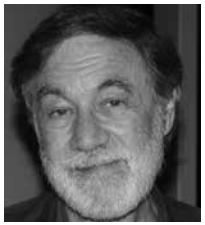
CDIA GOVERNING BOARD MEMBERS

Dr Niresh Bhangwandin
Medical Research Council (MRC)

Professor Jimmy Volmink
University of Stellenbosch (US)

Professor Melvyn Freeman
Department of Health (DOH)

Professor Tania Douglas
University of Cape Town (UCT)



Professor David Sanders
University of Western Cape (UWC)

PROJECTS CURRENTLY FUNDED FROM CDIA RESOURCES

Project 1:

Pragmatic cluster randomised controlled trial of a guideline-based intervention to improve the primary care of non-communicable disease in the Eden and Overberg districts of the Western Cape

Research team: Lara Fairall (Lung Institute, UCT), Naomi Levitt (UCT), Max Bachmann (University of East Anglia, UK), Thomas Gaziano (Division of Cardiovascular Medicine, Brigham and Women's Hospital, Harvard University), Eric Bateman (Lung Institute, UCT), Krisela Steyn (UCT), Carl Lombard (MRC), Merrick Zwarenstein (Department of Family Medicine, Western University, Canada), Beverly Draper, Ruth Cornick, Alan Bryer (UCT), Crick Lund (Deptartmentof Psychiatry & Mental Health, UCT) and Debbie Bradshaw (MRC)

PhD student: Naomi Folb (Lung Institute,UCT)

Background and objectives:

The quality of care for NCDs in public sector primary care clinics is poor. In these clinics, care is predominantly provided by

Eden Trial fieldworkers.

nurses who are often inadequately trained or empowered to manage the care of patients with NCDs. The objectives of this trial are to test the effectiveness of a guideline-based training programme for nurses on the processes and outcomes of NCD care across four priority conditions: hypertension, diabetes, chronic respiratory disease and depression.

Methods:

The trial was conducted in 39 primary care clinics in the Eden and Overberg districts of the Western Cape Province of South Africa. Clinics were randomised within six health sub-district strata to have either one more or one less intervention clinic than control clinics, (19 per group, 38 in total). The intervention, Primary Care 101, consisted of three elements: a 101-page evidence- and policy-based guideline covering all common symptoms and major conditions in adults, including communicable diseases, NCD, mental health, antenatal care and contraception; an educational outreach programme whereby department of health nurse trainers were equipped to deliver eight short (1.5 hours) interactive training sessions, using the guideline and case scenarios, to all staff at a facility over a period of several weeks; and expanded prescribing provisions for NCD for nurses. Four cohorts of patients – hypertension, diabetes, chronic respiratory disease and depression – who met the inclusion criteria, were recruited. Participants may have been included in more than one cohort. Baseline and follow-up (14 months) data were collected by questionnaire (demographic characteristics, medical history, smoking status, mental health, health-related quality of life, socio-economic factors). These were administered by trained fieldworkers, who also measured blood pressure and anthropometry; and collected prescription information from clinic records. The baseline fieldwork and initiation of the intervention took place in 2011 and 4 393 patients were enrolled in the trial. In 2012, 3 977 patients were re-interviewed approximately 14 months after their baseline interview, achieving a 90.5% follow-up rate for the questionnaire data and a 97.4% follow-up rate retrieving the

Eden Trial management meeting.

prescription pads in their clinic records in 2013 (n=4 280).

Initial analyses show high rates of baseline co-morbidity: 48% of hypertension patients had diabetes; 84% of diabetes patients had hypertension; and 22% of patients with hypertension or diabetes also had chronic respiratory disease. Approximately 50% of chronic disease patients had depressive symptoms. There was also under-treatment and under-diagnosis of chronic diseases at baseline: 59% of patients with hypertension were uncontrolled; 10% required urgent referral for very high blood pressure (≥ 180/110 mmHg); and 77% of diabetes patients with a measured glycated haemoglobin (HBA1C) were not controlled. 30% of patients without known hypertension had blood pressure recorded at 140/90 mmHg and 50% with chronic disease were at risk of depression.

A limited qualitative review indicated that the PC101 programme has been well-received. Some challenges were highlighted, such as having to manage the backlog of sub-optimally managed patients and the increased workload associated with this, but nurses were generally happy to increase their responsibilities for chronic disease care.

Progress in 2013:

Completing the extensive trial administrative activities, the preparation of the integrated data set and analysis of the data occupied most of 2013. The primary outcome measure for the trial was 'treatment intensification', a composite measure considering treatment intensification for each of the conditions studied. Treatment intensification rates were high among patients with hypertension and diabetes, but did not differ between intervention and control groups (hypertension: 44.1% intervention versus 40.3% control group, risk ratio [RR] 1.08 [95% CI: 0.94 to 1.24]; diabetes: 56.5% v 50.3%, RR 1.10 [0.97 to 1.24]).

Treatment intensification rates in participants with chronic respiratory disease were low in intervention and control groups (13.8% v 11.9%, RR 1.08 [0.75 to 1.55]). A pre-planned subgroup analysis of treatment intensification by level of control showed higher rates in moderately uncontrolled diabetes patients, (baseline HbA1c between 7% and 10%) in the intervention group (69.3% v 54.7%, RR 1.33 (1.19 to 1.50), was p = 0.001, but not in those with severely uncontrolled diabetes (HbA1c >10%). Case detection of depression did not differ between groups (17.9% v 23.9%, RR 0.76 [0.53 to 1.10]). Three manuscripts are being prepared on these findings.

The provincial and national departments of health, and some countries in sub-Saharan Afripa are expressing an interest in implementing Primary Care 101 in their countries.

Project 2:

Non-laboratory-based total cardiovascular risk assessment tools

Research team: Thomas Gaziano (Division of Cardiovascular Medicine, Brigham and Women's Hospital, Harvard University), Krisela Steyn (UCT), Debbie Bradshaw (MRC), Lara Fairall (Lung Institute, UCT) and Naomi Levitt (UCT)

PhD student: Ankur Pandya successfully defended his PhD dissertation in 2013

Background and objectives:

Screening of patients at high risk for cardiovascular disease (CVD) is an important public health prevention strategy to ensure that those patients who will benefit most from preventive and clinical care actually receive such care as soon as possible.

The overall objective of the study is to develop and validate new and cost-effective non-laboratory-based screening tools for cardiovascular risk prediction in low-resource settings, to obviate the high cost of blood assays associated with such screening. Three projects are being conducted to validate this non-laboratory total CVD risk score.

The first was to compare the ranking of the non-blood-based CVD risk tool with the ranking of blood-based CVD risk assessment tools in 12 cross-sectional community-based CVD risk factor surveys previously conducted in South Africa. This enabled the predictive performance and risk discrimination of the non-laboratory-based risk score to five commonly used laboratory-based scores to be examined in the South African setting.

Secondary data analyses were used to calculate and compare 10-year CVD (or coronary heart disease (CHD)) risk for 14 772 adults from 13 cross-sectional South African populations. Risk characterisation performance for the non-laboratory-based score was assessed by comparing rankings of risk with six laboratory-based scores (three versions of Framingham risk, SCORE for high- and low-risk countries, and CUORE) using Spearman rank correlation and percent of population equivalently characterised as high or low risk.

There was a high Spearman correlation coefficient for the non-laboratory-based score with the laboratory-based scores ranging from 0.88 to 0.986 in all the cohorts. Further, at a normal treatment threshold of 20% risk, there was 90% or more agreement in risk stratification.

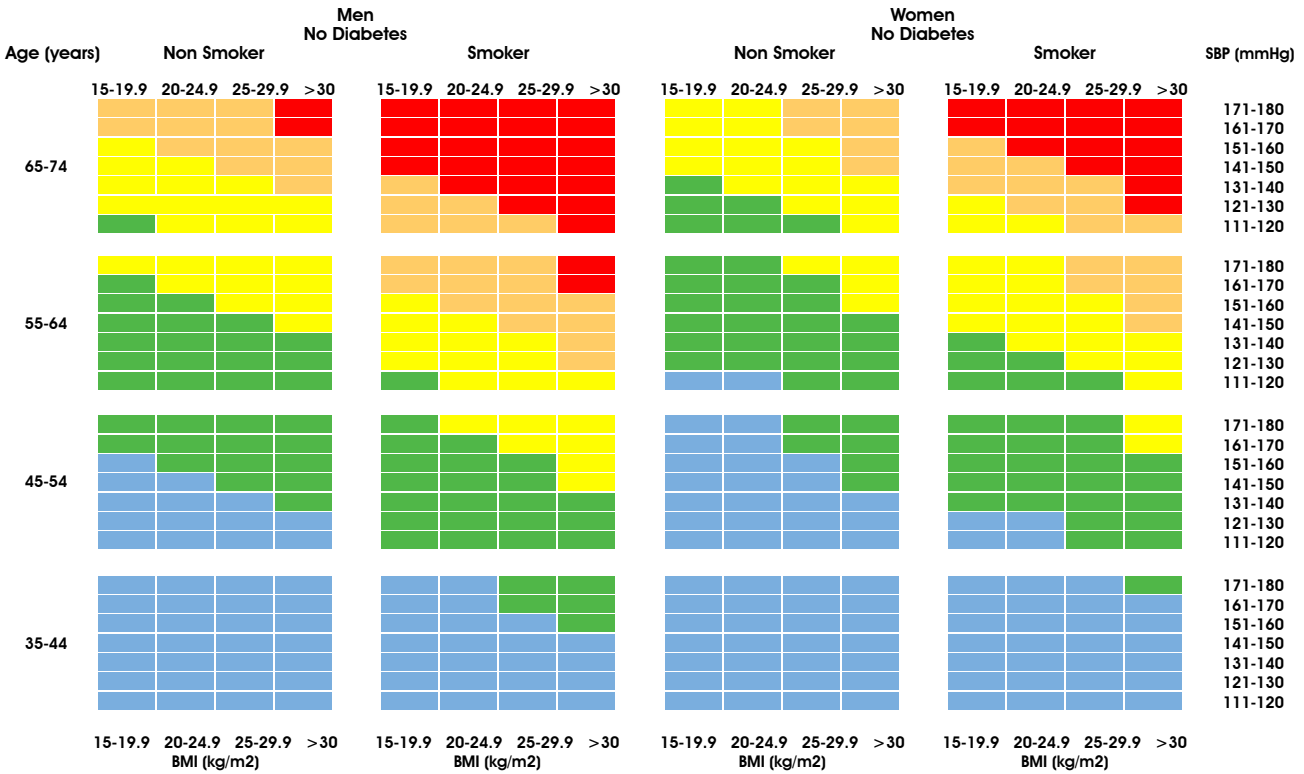
Total 10-year non-laboratory-based risk of CVD death was also calculated for a representative cross-section from the 1998 South African Demographic Health Survey (DHS, n=9 379) to estimate the national burden of CVD mortality risk. Approximately 18% of adults in the DHS population were characterised as high CVD risk (10-year CVD death risk >20%) using the non-laboratory-based score. This 10-year predicted non-laboratory-based risk of CVD will be compared to the actual CVD mortality recorded by Statistics South Africa 10 years later. The adjusted mortality data has not yet been released.

Thirdly, within the Eden Trial (see project 1) a prospective cohort of 2 272 subjects has been established and their total CVD risk prediction calculated. The subjects will be followed to assess the actual mortality recorded over the

following five-year period by linking mortality reports by means of identity numbers. This data will assist in calibrating the cardiovascular model inputs to predict outcomes that fit the observed mortality data in South Africa.

Progress in 2013:

The data for the first study was published in *BMC Medicine* in 2013. We are awaiting the mortality data from Statistics South Africa to complete the analyses of the second study. Data collection and cleaning for the cohort study imbedded in the PC 101 trial is complete and the analyses of the data are currently being written up. The collection of mortality statistics reported to the Province of the Western Cape for the districts involved in the intervention trial is underway.



5 year cardiovascular risk (fatal and non-fatal)

Low	Moderate		High	
<10%	10-20%	21-30%	31-40%	>40%

How to use the Chart

*Choose the section with the sex, diabetes and smoking status
*Find the cell that matches the patients risk factor profile using the age, BMI, and blood pressure
*Refer to physician those with excessive blood pressure (>180 mmHg)

Project 3:

Economic modelling of the impact of preventive and management interventions for chronic diseases

Research team: Thomas Gaziano (Division of Cardiovascular Medicine, Brigham and Women's Hospital, Harvard University), Debbie Bradshaw (MRC), James Irlam (UCT), Lara Fairall (Lung Institute, UCT) and Krisela Steyn (UCT)

PhD student: Ankur Pandya defended his PhD dissertation successfully in 2013

Background and objectives:

This research is being undertaken to assess the economic impact of prevention and management of interventions for chronic diseases. The aim is to develop a CVD prevention and management model that will allow the prediction of CVD events accurately and which could be used in cost-effectiveness analyses of screening and intervention strategies.

Methods:

State-transition simulation models, also called Markov models, have been developed to assess the cost-effectiveness of the integrated care guidelines for CVD in comparison with the base case. The effects measured are in the life years saved, QALYs (quality-adjusted life years) and DALYs (disability-adjusted life years). Incremental cost-effectiveness (C/E) ratios have been calculated for each of the three strategies compared to the base case under consideration. The US Panel on Cost-effectiveness in Health and Medicine's recommendations are utilised in this analysis.

Ankur Pandya.

We have been updating the parameters of a CVD policy model, as well as calculating country-specific costs for cardiovascular diseases. We completed the process of converting the Excel- and Tree Age-based model into a C++ model. In addition, model parameters are being updated with the current literature. CVD cost estimates using WHO CHOICE data and local cost data have been completed.

Progress in 2013:

We have completed the last updates of the mortality estimates from South Africa to calibrate the model and a manuscript describing the model is being prepared. To date, the model has been used to conduct three cost-effectiveness analyses.

Project 4:

Lifestyle intervention tools: ichange4health resource package

Research team: Katherine Everett-Murphy (UCT), Bob Mash (US) Krisela Steyn (UCT), Catherine Draper (MRC), Tracy Kolbe-Alexander (UCT), Vicki Lambert (UCT), Anniza de Villiers (MRC), Erika Ketterer (Heart & Stroke Foundation), Svenja Wolfromm University of Flemsberg, Germany), Clare Bartels (UCT), Deborah Jonathan (MRC) and Jillian Hill (MRC)

PhD student: Zelra Malan (Department of Family Medicine, US)

Background and objectives:

There is strong evidence to show that risk behaviours can be changed to produce meaningful clinical improvements through brief counselling assistance by healthcare providers (Whitlock, 2002).

Methods:

This project set out to produce and pilot a resource package for primary healthcare providers and community health workers to enable them to offer brief best practice behavioural change counselling on smoking, diet, weight management and physical activity. The package draws on the 5A Best Practice Clinical Guideline for brief behavioural change counselling (Fiore et al., 2008) and comprises educational or motivational resources for patients, a training course for healthcare providers and healthcare provider aids and guidelines on how to integrate brief behavioural change counselling into primary healthcare practice and support patients in setting lifestyle modification targets.

The best practice guidelines and rapid assessment tools were completed for smoking, diet and physical activity, in

collaboration with expert working groups. Similarly, patient education or motivational materials on the three risk factors were drafted using a testimonial approach – they include authentic interviews and photographs of members from the proposed target audience, who model successful behavioural change. This material was pre-tested in the target population.

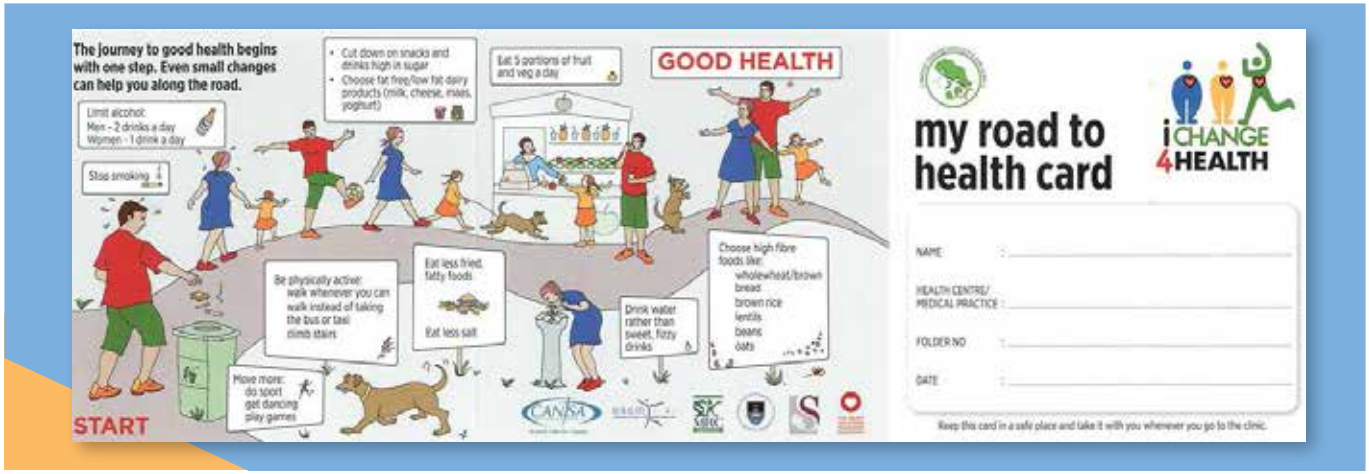
Regarding diet, a recipe book was developed targeting communities with low socio-economic status and therefore has a strong emphasis on how to eat healthily on a limited budget. The project was led by the Heart and Stroke Foundation, in collaboration with CDIA. The recipe book was called *Cooking from the Heart* and the project involved printing and distributing 200 000 recipe books, with a significant public relations campaign funded by Pharma Dynamics, during Heart Awareness Month in September 2012. The recipe book was widely welcomed, with a significant response from the public. It was even used in the kitchens of some hospitals in the country.

Furthermore, an adult *Road to Health* card that records and explains vital health indicators, and charts individual progress towards behavioural change goals was developed. This card aims to support the healthcare provider in introducing the importance of a healthy lifestyle and to discuss and negotiate behavioural change goals with the patient.

A three-day training module on brief behavioural change counselling for NCDs was developed and includes a DVD that demonstrates the requisite competencies. The module includes a presentation of the evidence base for brief behavioural change counselling; how to apply the 5A protocol to smoking, physical inactivity, alcohol misuse and an unhealthy diet; the main principles of the Motivational Interviewing counselling style and multiple opportunities for practicing skills. This has been formally registered as a short course for continuing professional development points for doctors and nurses.

Progress in 2013:

As part of the PhD project in January 2013, a group of family medicine registrars at the University of Stellenbosch was trained in brief behaviour change counselling methods and the use of the ichange4health resource package. The impact of



their training was evaluated by establishing their baseline competency before the training, assessing them immediately after the training (using the same measure) and then again six weeks later in their clinical practice setting. A group of 40 nurses who were enrolled in a primary care course at the University of Stellenbosch were also trained in behaviour change counselling methods and similarly evaluated.

The researchers collaborated with the pharmaceutical company PharmaDynamics in producing the package and distributing it to private general practitioners. It involved liaising with the designer appointed by PharmaDynamics to complete the patient resources and healthcare provider manual. The materials were also launched on web and mobi sites. The project was presented to PharmaDynamics sales representatives from around the country as they set about launching a national campaign for the package. This involved marketing the package through the sales representatives to their constituency of healthcare providers in the private sector, a number of PR events and press releases. The package was also presented to Melvyn Freeman, Director of Chronic Diseases, National Department of Health. PharmaDynamics sponsored a three-day 'Training of the Trainers' event at the Lanzerac Hotel in Stellenbosch, which involved two representatives from every university with a Family Medicine and Primary Care Department. The aim of the Train the Trainer event was to enhance the knowledge and skills of university staff in the area of behavioural change counselling for NCD risk factors and equip them with the resources to train others, including their health science students. This was followed by a number of further training courses in Port Elizabeth, East London, Pretoria, Bloemfontein, Cape Town, Nelspruit, Johannesburg and Durban, with groups of private general practitioners. The trainers were Professor Bob Mash, Dr Zelra Malan and Dr Katherine Everett-Murphy.

The employees of the Heart and Stroke Foundation's Health Line were also trained in behavioural change counselling and were assisted in adapting the manual to suit their particular needs. The research for this project was partly supported by the Cancer Association of South Africa (CANSA).

Project 5:

Community health workers' project

Research team: Thandi Puoane (UWC), Naomi Levitt (UCT), Krisela Steyn (UCT) and Helen Schneider (UWC)

PhD student: Lungiswa Tsolekile (UWC)

Background and objectives:

The national and provincial departments of health have strongly supported the inclusion of community health workers (CHWs) in the healthcare provider team. This project, in collaboration with the provincial Department of Health in the Western Cape, sets out to define the role of a CHW in caring for patients with chronic diseases. This is to be achieved through a process of consultation with the provincial department, conducting a situation analysis, reviewing existing training materials and, ultimately, drafting and evaluating a CHW chronic disease curriculum and training tools.

An observational study of CHWs was undertaken while they were conducting their daily activities in order to gain deeper insight into their tasks and to determine their current roles in prevention and control of chronic NCDs. It revealed the numerous NCD-related tasks that are conducted by CHWs and further revealed the challenges relating to training, supervision and referral patterns of clients.

A protocol to survey a larger sample of the estimated 1 431 CHWs in Khayelitsha, to assess their knowledge and practices in general and with respect to chronic diseases, was developed. The questionnaire was based on the findings of the observational study and uploaded on a mobile phone for data collection. The questionnaire assessed the following: induction of CHWs; training provided, including in-service training; support offered to CHWs and the referral system; supervision of the CHWs; and their knowledge of NCDs.

Progress in 2013:

The manuscript based on the data of the observational study has been submitted for publication.

A total of 150 CHWs were interviewed. Preliminary results of the second phase give weight to observations of the first study: that the training of CHWs, especially in NCDs, is fragmented. Training of CHWs is provided by numerous sources, which means that they receive varying messages from a variety of trainers. This, in turn, may influence the messages that the clients receive at community level.

Project 6:

A randomised controlled trial to evaluate the effectiveness of a group diabetic education programme using motivational interviewing in under-served communities in South Africa

Research team: Bob Mash (UCT), Naomi Levitt (UCT), Stephen Rollnick (Cochrane School of Primary Care & Public Health, Cardiff University, UK), Katherine Everett-Murphy (UCT), Krisela Steyn (UCT), Merrick Zwarenstein (Department of Family Medicine, Western University, Canada), Hilary Rhode (co-ordinator), Unita Van Vuuren (DOH, Western Cape) and Maureen Mc Rae (DOH, Western Cape)

Master's students: Buyelwa Majikela-Dlangamandla (UCT) and Roland Kroukamp (US)

Background and objectives:

Diabetes affects 11% of the adult population in Cape Town and is a major contributor to the burden of disease and mortality.

This pragmatic cluster randomised controlled trial aimed to evaluate the effectiveness of a group diabetes education programme, using a guiding style derived from Motivational Interviewing and delivered by health promoters in community health centres.

In 2010 and 2011, 1 570 people with type 2 diabetes attending 34 community health centres were enrolled in the study. The intervention group received a structured education programme of four sessions, delivered by health promoters to groups of 10 to 15 diabetic patients at a time. The control group received the usual care. Participants were measured at baseline and 12 months. Primary outcomes were: diabetes self-care activities, 5% weight loss and a HbA1c reduction of 1%. Secondary outcomes were: self-efficacy, locus of control, mean blood pressure, mean weight loss, mean waist circumference, mean HbA1c, mean total cholesterol and quality of life.

Altogether, 422 (59.4%) of the intervention group did not attend any education sessions. No significant improvement was found in any of the primary or secondary outcomes, apart from a significant reduction in mean systolic numbers (-4.65mmHg CI-9.18- -0.12, p=0.04) and diastolic blood pressure (-3.30mmHg CI-5.35 - -1.26, p=0.002). Process evaluation suggested that there were challenges with finding suitable space for group education in these under-resourced settings, patient attendance and full adoption of a guiding style by the health promoters.

Progress in 2013:

The incremental cost-effectiveness ratio (ICER) for the intervention, based on the assumption that the costs would recur every year and the effect could be maintained, was 1 862 $/QALY gained. An ICER of less than 10 000 $/QALY for medical intervention in South Africa is considered cost-effective. A structured group education programme performed by mid-level trained healthcare workers at community health centres, for the management of type 2 diabetes in the Western Cape, South Africa, is therefore cost-effective.

Two peer-reviewed indexed journals were published in 2013.

Since the trial, all health promoters in Cape Town have been trained and the model of group education is being rolled out in selected community health centres by District Health Services.

This project was supported by a BRIDGES grant from the International Diabetes Federation. BRIDGES, an International Diabetes Federation project, is supported by an educational grant from Lilly Diabetes (ST09-040).

Project 7:

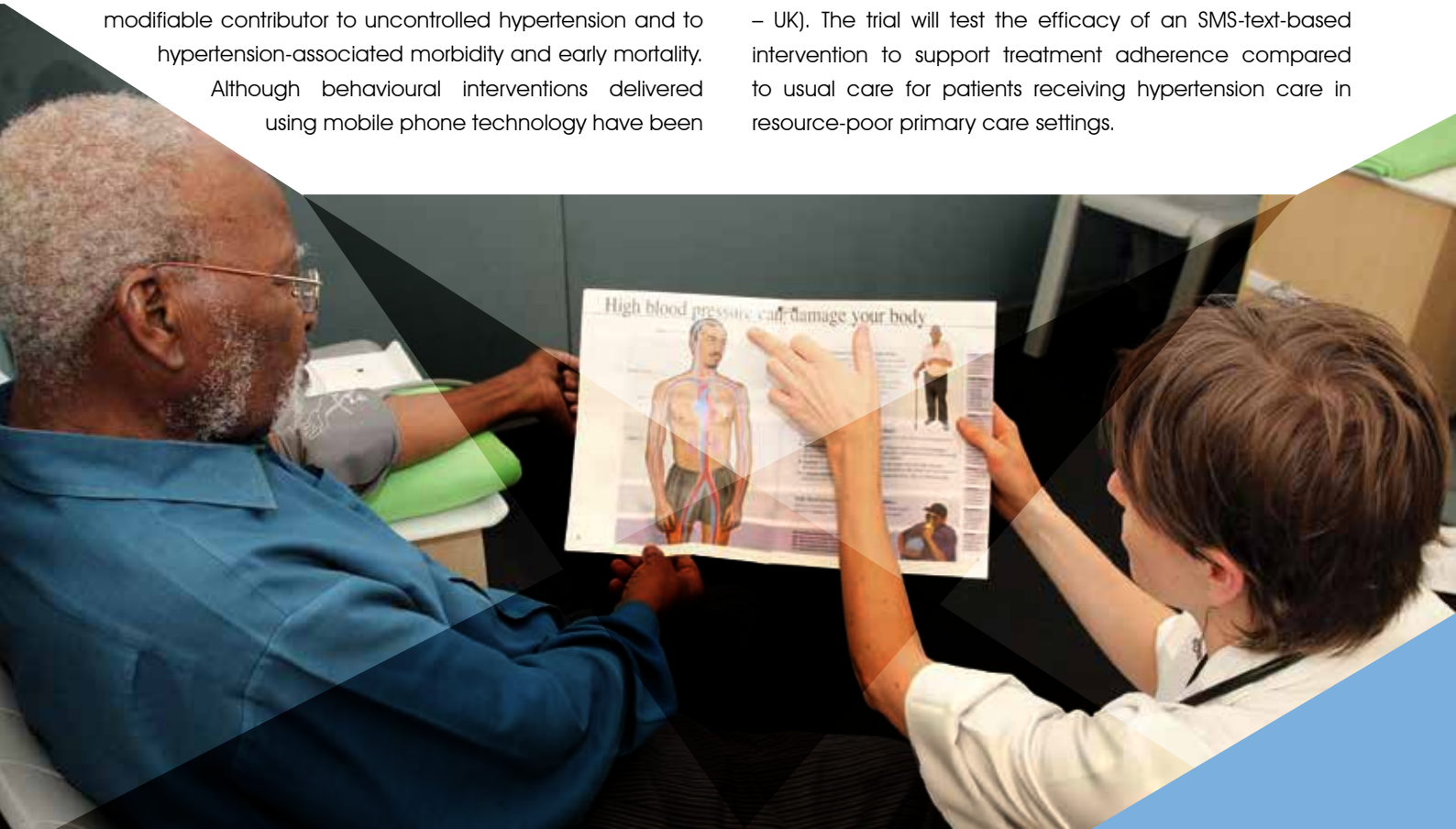
SMS-text adherence support study (StAR study)

Research Team: Kirsty Bobrow (University of Oxford/UCT), David Springer (University of Oxford), Thomas Brennan (University of Oxford), Lionel Tarassenko (University of Oxford), Andrew Farmer (University of Oxford), Naomi Levitt (UCT) and Krisela Steyn (UCT)

Background and objectives:

Poor treatment adherence (clinic attendance and medication adherence) is an important, potentially modifiable contributor to uncontrolled hypertension and to hypertension-associated morbidity and early mortality. Although behavioural interventions delivered using mobile phone technology have been shown to have clinically important outcomes for some diseases, results are not consistent.

Additionally, the efficacy of such interventions to support treatment adherence for hypertension and other chronic diseases in low-resource settings remains to be determined. The StAR trial is a collaboration between the University of Oxford and the CDIA, funded by Wellcome and the Engineering and Physical Sciences Research Council (EPSRC – UK). The trial will test the efficacy of an SMS-text-based intervention to support treatment adherence compared to usual care for patients receiving hypertension care in resource-poor primary care settings.



Methods:

The trial is a pragmatic individually randomised three-arm parallel group trial in adult patients being treated for hypertension at a single primary care centre in Cape Town, South Africa. The intervention is a structured programme of clinic appointment and medication collection reminders, medication adherence support and hypertension-related education, delivered remotely through informational or interactive SMS-text messages. The co-primary outcomes are the difference in mean measured blood pressure and measured treatment adherence (medication possession ratio) between the control and either intervention arm at 12-month follow-up.

The trial addresses the weakness of previous research by recruiting a large sample from a patient pool broadly representative of patients who receive care for hypertension in primary care in resource-poor settings. It defines a feasible theory-based intervention to support treatment adherence, using an automated system to deliver the intervention and management of participant interactions,and measuring clinically relevant outcomes. The results will inform practice and the design of a trial comparing different components of the intervention [*NCT02019823*, SANCTR DOH-27-1212-386].

Progress in 2013:

Clinical data collection has been completed and 87% follow-up of trial participants was achieved at 12 months. We are now in the process of cleaning the data and preparing the dataset for analysis. In addition, we successfully applied for funding from the Wellcome Trust through a Flexible Small Grant (University of Oxford) to undertake a qualitative evaluation of the StAR trial. We are in the process of collecting data for this follow-up project

Output to date includes publishing the trial protocol in an open-access journal (http://www.biomedcentral.com/1471-2458/14/28). In addition, we have presented interim findings at several international conferences.

Project 8:

An evaluation of community health workers' screening for CVD in the community in four developing countries using the non-laboratory total CVD risk factor score

Research Team in South Africa: Naomi Levitt (UCT), Thandi Puoane (UWC), Thomas Gaziano (Division of Cardiovascular Medicine, Brigham and Women's Hospital, Harvard University) and Jabulisiwe Zulu (UCT)

DrPH student: Shafika Abrahams-Gessel (Boston University)

Background and objectives:

This study proposes to train CHWs to use a non-laboratory-based risk assessment tool (described in project No 2) to identify persons at high risk for CVD in community settings in South Africa, Bangladesh, Guatemala and Mexico. The risk tool uses age, gender, body mass index (BMI), blood

Community health workers' graduation.

pressure, smoking status and history of diabetes mellitus (DM) to calculate an absolute risk score for developing CVD.

Methods:

The CHW-generated risk scores would be compared for agreement to risk scores generated by a trained health professional. Significant overlap in the percentage agreement between the two sets of scores, would demonstrate that low-level health workers such as CHWs could be adequately trained to screen for and identify those at high risk for CVD. The referral pattern for high-risk patients from CHWs to a trained health professional at a community health clinic would also be assessed. CHW knowledge levels and retention of knowledge about CVD and its risk factors would be evaluated, as would the costs of the programme.

Jabulisiwe Zulu.

At each of the four sites, between 10 and 15 CHWs were trained to obtain CVD risk factors on history, as well as blood pressure and anthropometric measurements; generate a CVD risk score using the risk prediction tool; and complete study forms.

Progress in 2013:

Across the four sites, 42 CHWs recruited 4 383 people and completed 4 049 screenings for CVD risk among community members who did not report a prior diagnosis of hypertension, diabetes mellitus or heart disease. Agreement in scores obtained by CHWs compared to health professionals ranged between 94% and 99%, demonstrating that nonprofessional health workers such as CHWs can be adequately trained to screen for and identify those at high risk for CVD, using this tool. Preliminary results of enrolment progress, demographics and risk factor distributions were presented by Diana Munguía in November 2013 in Hermosillo, Mexico. The first draft manuscript of the results has been submitted to a peer review journal. The referral pattern for high-risk patients from CHWs to a trained health professional at a community health clinic is currently being analysed, along with CHW pre- and post-training knowledge levels about CVD and retention of this knowledge post-fieldwork. Analysis of the costs of the programme is underway.

Focus groups with CHWs and in-depth key informant interviews to assess issues related to integrating CHWs, as community-based health workers, into involvement in screening efforts to prevent CVD and other NCDs have been completed, transcribed and translated at three sites (Guatemala, Mexico and South Africa).

An extension of this study involving the development of a mobile phone application for the total CVD risk assessment for use by community health workers was initiated by a master's student.

Project 9:

A qualitative study of the nutrition patterns of low-income South Africans

Research team: Anniza de Villiers (MRC), Katherine Everett-Murphy (UCT), Deborah Jonathan (MRC) and Jillian Hill (MRC)

Background and objectives:

The planning of a dietary intervention tool for the iChange4Health lifestyle modification package (described earlier) required an understanding of the commonly consumed foods, the food preferences and the inexpensive, healthy options available and acceptable to the lower socio-economic communities of diverse cultures in South Africa.

Methods:

Protocol development and ethical clearance was arranged in 2011. A total of 22 focus group discussions were conducted in Cape Town, Durban, Umtata, East London, Johannesburg and Pretoria. A brief questionnaire on demographics, dietary habits and the most commonly used cooking methods was administered prior to each focus group, which included 167 participants. Data was analysed using SPSS statistical package.

Progress in 2013:

Qualitative analysis of the data was completed and the manuscript is being prepared.

NEW CDIA PROJECTS INITIATED IN 2013

New Project 1:

What are the effects of blanket screening for hypertension and/or diabetes mellitus compared to other forms of screening or no screening in South Africa

Research Team: Solange Durao (MRC), Yemisi Ajumobi (MRC), Tamara Kredo (MRC), Celeste Naude (US), Naomi Levitt (UCT), Krisela Steyn (UCT) and Taryn Young (MRC).

Background:

A collaboration between CDIA and the Centre for Evidence-based Health Care and the South African Cochrane Centre has been established the (R^3 project), which involves the use of systematic reviews to inform CDIA's work.

Objectives:

To prepare an overview of systematic reviews to assess the effects of blanket screening for hypertension and diabetes compared to other forms of screening or no screening.

Methods:

This overview identified systematic reviews (Cochrane and non-Cochrane) of screening interventions for diabetes and hypertension among the general population,

without known diabetes or hypertension.
It compared population- and community-wide screening (also referred to as blanket screening or screening for all), specifically for diabetes and hypertension using any type of screening test or a combination of screening tests compared to other screening approaches (e.g. targeted screening and opportunistic screening) and no screening.

Comprehensive searches were conducted to identify systematic reviews. Two authors independently selected relevant reviews, assessed the quality of the reviews and extracted data, which was then synthesised.

Progress in 2013:

After clarification of the question, the protocol was developed and finalised. Comprehensive searches were conducted and we found two completed systematic reviews that addressed some aspects of our question regarding population versus targeted or no screening for DM and hypertension.

Krogsboll (2012) found that health checks for the general population did not reduce general and cardiovascular-related morbidity and mortality, and results were poorly reported for effect on new diagnoses and the impact on the health system. Ebrahim (1998) found increased coverage with intensive screening in areas with poor healthcare coverage. We also found an ongoing Cochrane review assessing the efficacy of screening for type 2 diabetes compared with regular care, in reducing morbidity and mortality related to the disease. Findings of the overview were presented at the annual CDIA meeting in 2013.

New Project 2:

Prospective urban rural epidemiological (PURE) study

Research team: Thandi Puoane (UWC), Ehimario Igumbor, (Centers for Disease Control & Prevention [CDC]), Gavin Reagon, Gail Hughes, David Sanders (UWC), Vicki Lambert (UCT), Naomi Levitt (UCT), Andre Kengne (MRC) and Bongani Mayosi (UCT)

PhD student: Kufre Joseph Okop (UWC)

Background and objectives:

The PURE study is a global prospective study that seeks to identify the population level factors that drive the development of known risk factors for NCDs, so that their distribution in the entire population can be shifted favourably by appropriate societal interventions (primordial prevention). The study is being conducted in 17 countries (including high-income, middle-income and low-income countries and from every major region of the world) and will involve investigations on 150 000 individuals. It also includes investigation of community-level factors (urban-rural differences; built environment; policy environment related to tobacco and food; and social factors), household level factors (family structure, income, housing, and so on) and individual level factors (lifestyle behaviours and attitudes, and genetic markers). From 2009, the University of the Western Cape School of Public Health has been leading research collaboration with researchers from the Medical Research Council, Human Sciences Research Council and the University of Cape Town in contributing to the PURE global study. A South African arm of the study was initiated and incorporates urban and rural communities within South Africa's Western Cape and Eastern Cape provinces into the global study. In 2013, the PURE study researchers chose to link the project to the CDIA network.

Thandi Puoane.

Methods:

During the first three years (2009 to 2011) of the PURE study, a total of 2 072 participants were recruited for both rural and urban sites, with the main research objective of this stage being "*to examine the relationship between societal influences and prevalence of risk factors and chronic non-communicable diseases*". Information collected through interviews and basic medical measures (such as weight, height, blood pressure) of participants and the environment address this objective. As the same individuals will be contacted every three years to be interviewed and have these medical measures repeated, the second objective of the PURE study, "*to examine the relationship between societal determinants and incidence of chronic non-communicable disease events and on changes in rates of selected risk factors*" will then be achieved.

Progress in 2013:

Of the 2 072 participants recruited at baseline, 1 970 (95%) were successfully contacted for a second year follow-up. This reduction in numbers includes 133 deaths reported from both sites. Recruitment of participants for a third-year follow-up and repeat of medical measurements is underway.

New Project 3:

Evaluation of point of care testing for HbA1c in primary care

Research team: Bob Mash (US), Rajiv Erasmus (US) and Megan Rensburg (US)

Master's students: Cobus Vos (Family Medicine & Primary Care, US) and Abigail Ugoagwu (Family Medicine & Primary Care, US)

Background and objectives:

The main aim of this study is to investigate if the placement of a point of care (POC) device for HbA1c measurement in community healthcare centres in Cape Town for the management and care of diabetic patients will lead to an improvement in patient education, management and control. Specific objectives are to evaluate:

- the technical quality of POC testing for HbA1c in primary care;
- the feasibility of introducing POC testing for HbA1c in primary care;
- the effect of POC testing for HbA1c on the percentage of patients receiving an annual HbA1c test;
- the effect of POC testing for HbA1c on treatment intensification and patient education;
- the effect of POC testing for HbA1c on glycaemic control as measured by HbA1c; and

Bob Mash.

- the cost implications of introducing POC testing for HbA1c in primary care.

Methods:

A quasi-experimental study is being implemented in health centres draining to the Helderberg District Hospital. Two health centres will implement POC testing for a period of one year, while two matched health centres will continue with care as usual.

The primary outcome of the study will be the difference in the percentage of patients who received an HbA1c test to accurately determine their glycaemic control in the last 12 months.

Secondary outcomes include differences in:

- The percentage of patients receiving more than one HbA1c test in the previous 12 months;
- Treatment intensification, as measured by the percentage of patients started on a new medication to lower glucose, blood pressure or cholesterol;
- Treatment intensification, as measured by the difference in the mean dose of metformin, glibenclamide, gliclazide or insulin;
- The percentage of patients referred for counselling (diabetes health education);
- The percentage of patients with counselling recorded in the consultation; and
- The mean HbA1c result.

A sample size calculation was extrapolated to account for the number of patients with baseline HbA1c results from usual care and concluded that 150 patients should be included from each health centre (300 in each arm).

Data will be collected from the patients' medical records. At the end of the 12-month period, a focus group interview will explore the health workers' experience of using the POC intervention.

Progress in 2013:

The protocols have been accepted by the Ethics Committee of the University of Stellenbosch and data collection has been initiated.

Other research projects by CDIA members

The CDIA network members are all involved in additional research activities which are not funded by CDIA. An overview of these activities is presented below:

Dr Debbie Bradshaw, the director of the Burden of Disease Research (BOD) Unit has been leading the second National Burden of Disease Study for South Africa. Mortality trends of NCDs from 1997 to 2010 have been estimated and are being interpreted.

The BOD Unit has also assisted the Western Cape Department of Health in developing a mortality surveillance system that provides local level statistics. Provincial reports for 2009 to 2011 highlight the variations between health districts. Mortality from non-communicable diseases features in all districts, with cardiovascular diseases, diabetes, cancers and chronic respiratory diseases contributing the most to mortality in the province.

The population-based cancer register in a rural setting in the Eastern Cape province, as part of the BOD Unit of the MRC, continues to collect data regularly from 19 participating hospitals. Data has been included in the IARC publication of *Cancer Incidence in Five Continents*.

The first large-scale analysis of mortality from smoking in any African country was published in a research article in *The Lancet*. Based on the analysis of South African death notifications, the study found the highest tobacco-related mortality was in the coloured population group. In this group, smoking causes one in four of all deaths in middle-aged men and one in six of all deaths in middle-aged women. South Africa modified its national death notification form in 1998 to ask a simple yes/no question about whether the dead person had been a smoker five years earlier. Together with an international team of researchers, the BOD Unit analysed the answers about smoking on the death notification forms of nearly half a million (481 640) adults in South Africa who died between 1999 and 2007.

Dr Thomas Gaziano leads projects to evaluate the costs of hypertension in South Africa and potential costs versus savings of efforts to reduce blood pressure through reductions in salt intake, increased fruit and vegetable consumption, and increased physical activity. Furthermore, Dr Gaziano is involved in a study with the HAALSI (South Africa site) project to assess the risks of cardiovascular disease and HIV for a cohort of older persons in South Africa. This project is undertaken in collaboration with the Demography and Population Studies Programme at the University of Witwatersrand and is funded by the National Institute on Aging, a division of the National Institutes of Health in the USA. Dr Gaziano is also the co-lead editor of Volume 5 (Cardio-metabolic and Respiratory Diseases) of the Disease Control Priorities Project 3 (DCP3).

Dr Tracy Kolbe-Alexander completed most of her formative work among nurses working in public hospitals

in the Cape metropole, which is part of her nurses' health and lifestyle research study. The provincial Department of Health has been an active collaborator on this study, with frequent input from Dr Tracey Naledi and Frederick Marais.

The main aim of the focus group discussions and key informant interviews, which were conducted with nurses and their managers, was to determine their perceptions of health, their main health concerns and current lifestyle behaviours. The key findings from this study were that nurses identified living with NCDs and weight gain, in addition to being exposed to tuberculosis, as some of their main health concerns. In addition, they expressed a desire for physical activity-based interventions in the workplace. Consequently, physical activity and sedentary behaviour was measured in both night- and day-shift nurses. Preliminary data analysis suggests that the night shift nurses were significantly more physically active during working hours than the day shift nurses. These findings, together with those from the qualitative research study, will be used to develop and implement a workplace intervention programme for nurses.

Dr Kolbe-Alexander is also part of the research team, together with Professor Vicki Lambert and Clare Bartels, who are adapting the Neighbourhood Environment Walkability Scale (NEWS) for an African setting. The NEWS instrument was developed in the Global North, and therefore needs to be adapted to reflect African settings. Data collection for this study is underway in both the Western Cape and North West provinces.

Professor Vicki Lambert is the outgoing chairperson of the African Physical Activity Network (AFPAN). She was instrumental in convening the first CDC/IUHPE International Course for Physical Activity and Health in the African region, which was held in Cape Town in 2007. The network now boasts over 200 members, representing more than eight countries, with a website and a quarterly newsletter, providing the impetus for regional research collaboration.

Members of AFPAN from seven countries are currently collaborating on a study, adapting measures of the walkability of the built environment in urban African settings, which is funded through the International Physical Activity and the Environment Network. She has served on the executive board of Agita Mundo.

Professor Naomi Levitt is a co-applicant on the Wellcome Trust-funded H3Africa grant titled *Burden, clinical spectrum and aetiology of diabetes in sub-Saharan Africa*. She and Dr Joel Dave are leading longitudinal and cross-sectional studies examining the metabolic consequences of antiretroviral therapy. She has been working with Dr Tollulah Oni and Professor Robert Wilkinson on a project titled *Epidemiology of Diabetes, Tuberculosis and HIV Interaction in a High-burden Setting*. She and Dr Oni were co-principal investigators on a grant from the Worldwide University Network on *Understanding non-communicable/ communicable disease syndemics in transitional societies*.

Professor Karen Sliwa is the head of The Hatter Institute for Cardiovascular Research in Africa, which is a dedicated unit focused on undertaking research into the pathogenesis, treatment and prevention of heart disease in Africa. Her particular research interest focuses on investigating cardiac disease linked with pregnancy and post-partum cases.

Some of the research has formed part of collaborative projects with the University of Hannover, in Germany, and the University

Diderot, Paris, France. Two specific studies that Professor Sliwa has been conducting are the THESUS Study on acute heart failure in more than 1 000 patients from Africa and the Cardiac Disease in Maternity Cohort Study. The main objective of the THESUS study was to describe the epidemiology, management and outcome among 1 000 patients presenting with acute heart failure from nine African countries including Mozambique, Sudan, Kenya and Nigeria. This information was crucial to the development of effective and resource-sensitive strategies to tackle acute heart failure in sub-Saharan Africa and the findings have been included in policy documents.

The Cardiac Disease in Maternity Cohort Study is aimed at studying the natural history of pregnant women with cardiovascular disease, pre- and post-partum, as well as identifying risk factors and the clinical predictors of outcomes, so that the risk of morbidity and mortality attributed to cardiovascular disease in pregnancy can be addressed. They have developed a multi-media resource that is envisioned to become a widely available tool for preventing and managing the causes and consequences of cardiovascular disease in pregnancy. This research is supported by CDIA.

Monitoring and evaluation of health services

The Integrated Audit Tool for Chronic Diseases is an internal audit tool administered annually within the Western Cape Department of Health. Its primary purpose is to measure clinical and managerial performance related to the management of chronic diseases; however, as it is undertaken annually, a broader purpose of improving clinical management of patients and ultimately optimising outcomes in patients has emerged. The audit first took place in 2009 and since then, the number of primary healthcare facilities that are audited annually has increased.

In 2013, all the districts in the Province of the Western Cape Province are represented with a total of 168 facilities participating in the audit. While the number of facilities in the City of Cape Town metro district has remained fairly constant since 2011, the number of participating facilities in the rural districts has increased significantly over the same period.

Results of 2013 audit: Availability of equipment in the preparation room has increased consistently since 2009. Consulting rooms are generally well-equipped, but not at 100% and hence, there is still room for improvement. The availability of obese BP cuffs should be increased, as it is only available in 53% of participating clinics' consulting rooms.

All chronic care processes showed an increase when compared to 2012. A central dispensing unit was used in 93% of facilities, while 78% had access to group education and community support groups, respectively.

Unita Van Vuuren, Deputy-Director for Chronic Diseases at the Department of Health, Western Cape.

Chronic care teams were present at 71% of the clinics, but they only held regular meetings at 41% of the participating clinics.

The proportion of diabetic and hypertensive patients who received annual investigation improved from 2012 to 2013. However, retinal assessment remains poor in diabetes monitoring and the proportion of diabetic and hypertensive patients with optimal cholesterol and creatinine levels decreased. In addition, the performance of audited facilities in the management of asthma and COPD was poor with risk factor assessment and optimal disease control deteriorating between 2012 and 2013. A greater focus on these conditions is therefore required to improve their management.

Counselling asthmatics for smoking and inhaler technique was 51 and 52%, respectively. Eighty eight percent of asthmatics were prescribed steroids and overall, only 31% of asthmatics were well-controlled. However, 46% of patients did not have their asthma control recorded.

Capacity development and research training

University of Cape Town

PhD student: Dr Naomi Folb (Lung Institute, UCT)

Thesis topic: Effectiveness of an integrated care guideline training programme on the processes and outcomes of chronic diseases in primary care in South Africa: A pragmatic cluster randomised controlled trial (see project 1)

Supervisor: Dr Lara Fairall (Lung Institute, UCT)

Co-supervisor: Professor Max Bachmann (Norwich Medical School, University of East Anglia)

Summary: The project is described in detail on page 6.

Progress in 2013: Dr Folb assisted in cleaning the data and preparing the final dataset for analysis. She assisted with the statistical analyses and reporting of the findings for publication. Two publications are currently being finalised for submission and a third paper is in progress.

The University of Cape Town (UCT).

Master of Science in Nursing (MSc) student:
Buyelwa Majikela-Dlangamandla (Diabetes Nurse Specialist, Division of Medicine, UCT)

Thesis topic: An evaluation of health promoters' adherence to a planned diabetes educational intervention that includes motivational interviewing at community health centres in Cape Town (see project 6)

Supervisor: Dr Una Kyriacos, PhD (Division of Nursing and Midwifery, UCT)

Co-supervisor: Professor Bob Mash MBChB MRCGP FCFP PhD (US)

Summary: The aim of this study was to evaluate the extent to which health promoters in public sector community health centres adhered to motivational interviewing principles in their delivery of a planned diabetes educational intervention, including adherence to the content and mode of delivery as they had been trained. The intervention was delivered in a group setting. Data was collected in 2011 by audiotape recording and structured observation of the educational sessions.

The audio tape of each educational session was analysed using the criteria specified in the Motivational Interviewing Integrity Code Version 3.1.1 (MITI), a validated tool for assessing Motivational Interviewing (MI) processes. The first of two sections generated measurable numerical data, as it involved global rating in relation to five key characteristics of MI on a five-point Likert scale (1-5). The second section counted each health promoter's (HP) behaviour during the entire recorded educational session.

Buyelwa Majikela-Dlangamandla.

The global rating scores and the summary scores obtained from the analysis of each session were collated into a spreadsheet. The average scores for specific sessions, specific HP, specific sites, and for all sessions were obtained. These average scores were interpreted according to the level of competence in the MITI.

Progress in 2013: On a scale of beginning-level proficiency to competency in Motivational Interviewing for group education sessions, health promoters' overall competence was below beginner proficiency (3.4, SD=0.5), although some individual HPs achieved beginner proficiency and/or competency. In overall guiding style, HPs scored higher in the first sessions than in later sessions and performed well in the use of open-ended questions. The extent to which the planned content was covered ranged between 75% and 89.5%. This study has shown that collectively, the 13 mid-level workers' ability to use Motivational Interviewing principles in group education sessions was below beginner proficiency level, but they appear to have the potential to improve their competence with additional training and practice.

The candidate has submitted her thesis for examination

MPhil student: Thandie Chuma (School of Public Health and Family Medicine, UCT – CDIA Health Promotion Fellow)

Thesis topic: A qualitative study of diabetic and hypertensive patients in Cape Town, their experiences of primary health care and their struggles with self-management

Supervisors: Dr Cathy Matthews (School of Public Health and Family Medicine, UCT) and Dr Katherine Murphy (UCT)

Summary: The aim of this study was to explore how low-income patients attending public sector primary health care services grapple with the reality of type 2 diabetes and/or hypertension and the need for lifestyle change to control the condition, using in-depth interviews. Participants were recruited from Gugulethu, Retreat and Lady Michaelis community health centres in Cape Town.

Progress 2013: The data analysis was completed and broad categories and themes were identified from the data. The write up of the thesis is underway.

The results of the study give insight into how health literacy, motivation and socio-ecological factors play a role in how patients respond to a diagnosis of diabetes or hypertension and affect their capacity for self-management. Factors such as family support, positive patient-doctor relationships and knowledge about the condition were identified as motivators for lifestyle modification and adherence to treatment.

Factors that emerged from the analysis as barriers to self-management included poor functional health literacy, lack of family support, lack of counselling from healthcare providers, fear of stigma associated with weight loss, financial constraints and side effects of medication. The findings of this study confirm that a patient-centred approach, which enhances motivation and competency for self-care, is particularly important for NCD patients.

Thandie Chuma.

4) MPH student (Health Economics): Dr Reneé de Waal MPH (CDIA Health Economics Fellowship, UCT)

Mini dissertation topic: Economic evaluation of provision of statins in primary health care in the Western Cape

Supervisor: Dr Susan Cleary (Health Economics Unit, UCT)

Summary: The aim of the project was to compare the costs and consequences of various models for providing statins for the primary prevention of cardiovascular disease, in order to inform clinical practice in the Western Cape. The interventions included prescribing different doses of statins at different levels of care (primary health care versus tertiary hospitals), and treating to a target cholesterol concentration versus treating patients with a standard dose, without monitoring cholesterol concentrations. The costs and consequences of the interventions were modelled, from a provider perspective, using published data as well as data collected locally. Efficacy and safety data (i.e. risks of various cardiovascular outcomes, complications and drug side effects) will be drawn from published studies, as no suitable local cohort data exists. Data regarding the costs of the interventions, and of treating

cardiovascular disease, complications and adverse drug reactions will be collected in the Western Cape.

Progress in 2013: Dr de Waal finalised the study protocol and began developing a Markov model to compare the costs and consequences of the proposed interventions. She reviewed relevant published efficacy data in order to inform the model assumptions. She met with a Western Cape Department of Health public health specialist and the pharmacist in charge of the electronic pharmacy database in the Western Cape, to discuss the feasibility and logistics of describing the current statin-prescribing practices and coverage in a sample of patients from Groote Schuur Hospital. She plans to obtain relevant ethics committee and provincial approval, and to complete her data collection and analysis in 2014.

5) PhD student: Dr Lindi van Niekerk (Graduate School of Business, UCT)

Thesis topic: Enhancing frontline social innovation capacity within community healthcare centres in Cape Town through positive organisational practices

Supervisors and co-supervisors: Dr Warren Nillson MBA, PhD (Graduate School of Business, UCT); Professor Lucy Gilson BA, MA, PhD (School of Public Health, UCT); Professor Anjali Sastry PhD (Sloan School of Management, Massachusetts Institute of Technology)

Summary: The aim of this study is to evaluate the role of positive organisational practices – as described in the literature of Positive Organisational Scholarship – in enhancing the social innovation capacity of frontline health workers employed within primary healthcare facilities. Enhanced social innovation capacity allows for the development of new programmes, products and processes that can improve health care from the ground-level up, as well as change the routines, beliefs and authority levels. This study invests in the frontline health workers' ability to develop solutions to challenges faced and seeks to develop the primary care organisation so that both the staff and patient's experience of care may be enhanced.

National Minister of Health, Dr Aaron Motsoaledi and Dr Lindi van Niekerk.

Progress in 2013: During the course of 2013, the research strategy was further developed. Time was spent as a visiting scholar at the Sloan School of Management, under the guidance of Professor Anjali Sastry. In August 2013, the first draft of the proposal was submitted to the UCT Graduate School of Business. A pilot research phase was conducted within one primary healthcare centre and preliminary data was collected. Dr van Niekerk concluded her time at the CDIA in December 2013 and is currently the Health Innovation Lead at the Bertha Centre for Social Innovation at the UCT Graduate School of Business and has continued as a part-time PhD student. Her data collection

was planned to occur in two primary healthcare clinics in Cape Town and one primary healthcare clinic in Lusaka, Zambia. Ethics approval was received in both countries.

She has been pivotal, in her role as Health Innovation Lead at the Bertha Centre, in organising the first Inclusive Healthcare Innovation Summit in South Africa, planned for early 2014.

6) PhD student: Dr Mahmoud Werfalli (Department of Medicine, CDIA, UCT)

Supervisor: Professor Naomi Levitt (Division of Diabetes and Endocrinology, Department of Medicine, CDIA, UCT)

Co-supervisor: Dr Sebastiana Z Kalula (Division of Geriatric Medicine, Department of Medicine, UCT)

Thesis topic: Development, implementation and evaluation of diabetes self-care management strategy targeted at older people with type 2 diabetes mellitus attending community health centres (CHCs)

Summary: Diabetes is becoming a significant problem in Africa, but little emphasis has been placed on research relating to the older person with diabetes on the continent. This research project is based on the theoretical framework of The Precede-Proceed model (PPM). It aims to develop a diabetes self-care management strategy targeted at both older patients and healthcare professionals with a view to limit the impact of the disease and improve health-related quality of life for this group. Phase 1 of the work is to conduct a systematic review to assess the prevalence of type 2 diabetes among older people in African countries. Phase 2 aims to conduct a systematic review to evaluate the effectiveness of the existing evidence on self-management interventions in diabetes, designed for older people in primary care settings. Phase 3 will be an explorative, descriptive and analytic study regarding older patients' needs, understanding and experience of diabetes self-care management provided by community health centres.

Mohammed Werfalli.

Progress in 2013: A systemic review of the literature on the prevalence of type 2 diabetes in Africa between 2000 and 2013 was performed. In total, 36 studies met the inclusion criteria and were included in the review; 22 studies were from peer-reviewed journal articles and 14 studies were WHO STEPS studies published in the WHO INFO database. These studies involved 105 667 subjects and were conducted in 27 African countries namely, Algeria, Angola, Benin, Botswana, Egypt, Gabon, Cameroon, Canary Islands, the Democratic Republic of

the Congo, Ethiopia, Guinea, Kenya, La Reunion, Libya, Mayotte, Malawi, Mauritania, Mauritius, Mozambique, Niger, Nigeria, Seychelles, South Africa, Togo, Tunisia, Sudan, Uganda, and Zimbabwe. Analysis of the data has commenced.

University of Western Cape

7) PhD student: Lungiswa Tsolekile (School of Public Health, UWC)

Thesis topic: The use of community health workers to improve chronic disease care (see project 5)

Supervisors: Thani Puoane (UWC) and Professor Debbie Bradshaw (MRC)

Summary: The details of the project are described on page 16.

Progress in 2013: A paper titled *A day in the life of a community health worker: Exploring the roles of community health workers working on non–communicable diseases in an urban township* has been submitted for publication. Data collection on the second project has been completed and the data is currently being analysed.

8) PhD student: Beatrice Nojilana (School of Public Health, UWC)

Thesis topic: Policy approaches on tobacco use and diet for prevention of chronic non-communicable diseases: The role of population-based data

Supervisors: Professor Thandi Puoane (University of the Western Cape) and Professor Debbie Bradshaw (Medical Research Council)

Summary: The study aims to explore the role of population-based data in supporting environmental and policy approaches to prevent chronic non-communicable diseases. It will involve a situational analysis of population-wide interventions; an assessment of the impact of tobacco control on the prevalence of smoking and tobacco-related mortality; and a comparison of environmental aspects and behaviours around smoking and diet in an urban and rural setting, to assess the potential for population-wide prevention of chronic NCDs.

In 2011, a situational analysis was conducted and included developing a more detailed proposal to interview people involved in the development or implementation of population-wide approaches to explore barriers and experiences. Trends in tobacco-related mortality have been explored.

Progress in 2013: The student has completed a postgraduate course in qualitative methods at Stellenbosch University and has conducted qualitative interviews with policymakers and NCD programme managers in two provinces. Two interviews were done in the Western Cape and four interviews in the Eastern Cape. Data was coded and prepared for analysis.

9) PhD student: Kufre Joseph Okop (School of Public Health, UWC)

Supervisor: Professor Thandi Puoane (School of Public Health, UWC)

University of the Western Cape (UWC).

Co-supervisor: Professor Naomi Levitt (Division of Diabetes and Endocrinology, Department of Medicine, CDIA, UCT)

Thesis Topic: Exploration of the association between body image, body fat, and total cardiovascular risk among adults in a rural and an urban community of South Africa

Summary: Excessive body fat or obesity, highly prevalent in the developing world and in many countries under transition, is known to be associated with increasing cardiovascular disease (CVD) risk and related health complications. The aim of this study is to explore the association between body fat percent, body image, and total cardiovascular risk using blood-and non-blood based risk scores among adults in rural and urban communities of South Africa. The study, which is guided by a social ecological model and social cognitive theory, is implemented in three phases, namely: 1) analysis of PURE-Cape Town baseline data; 2) a cross-sectional survey for measurements of body image and body fat; and, 3) exploratory interviews on body image and overweight/obesity at year 4 follow up. This study is an ancillary study nested within a multi-country population-based prospective urban and rural epidemiology (PURE) study.

Kufre Joseph Okop.

Progress in 2013: A research protocol was developed and approved by the UWC Research and Ethics Committee. Literature review and analysis of phase 1 data was undertaken. Also, data collection for phases 2 and 3 were kick-started. A draft manuscript on predictors of obesity in the men and women was developed with my supervisors. I have rewarding interactions with my supervisors and many academics in UWC, UCT, ITM Antwerp, among others. In the period under review, the findings of my work (phase 1) were also presented during Public Health South Africa (PHASA) conference and during two other symposia in Cape Town.

University of Stellenbosch

10) PhD student: Zelra Malan (Department of Family Medicine, US)

Thesis topic: The development, implementation and evaluation of a training intervention for primary healthcare providers on brief behaviour change counselling (BBCC) and assessment of the provider's competency in delivering this counselling intervention (see project 4)

Supervisors: Professor Bob Mash (Department of Family Medicine and Primary Care, US) and Dr Katherine Everett-Murphy (UCT)

Summary: This study aims to determine whether training health care providers in brief behaviour change

University of Stellenbosch (US).

CDIA directors and students.

counselling for NCDS can impact on clinical practice.

A training manual and course on brief behaviour change counselling for NCD risk factors were developed and a situational analysis of the current training curricula of healthcare workers in SA was conducted. A tool to assess competency of the healthcare workers in delivering the BBCC was developed and validated. Training was delivered to a group of family medicine registrars and nurses. The impact of the training intervention on the counselling behaviour of these healthcare providers was evaluated immediately after training and again six weeks later.

Progress in 2013: The first of four papers for the PhD has been submitted for publication. The additional papers are being developed and involve the design, development and implementation of the training interventions; the

data on the measurement of the efficacy of the intervention and the evaluation of the degree to which the training was implemented in the trainee's actual clinical practice; and the attitudes of the trainees towards the training after the intervention was completed. The training course, eight hours in duration, has been registered as a short course at the University of Stellenbosch and will be offered to students in the future.

11) MMed (Fam Med) student: Dr Roland Kroukamp (US)

Thesis topic: Determination of the cost of a group diabetes education programme delivered by health promoters trained in motivational interviewing (see project 3 and 6)

Supervisor: Professor Robert Mash (Department of Family Medicine and Primary Care, US)

Summary: In collaboration with Dr Thomas Gaziano (Division of Cardiovascular Medicine, Brigham and Women's Hospital, Harvard University), the model of economic impact developed by Dr Gaziano was used to evaluate the incremental cost-effectiveness ratio (ICER) for the intervention. As previously illustrated (project 3), a structured group education programme performed by mid-level trained healthcare workers at community health centres, for the management of type 2 diabetes in the Western Cape, South Africa, is highly cost-effective.

Progress in 2013: Dr Kroukamp completed his coursework in 2013 and has submitted his mini-thesis.

University of Boston

12) DrPH student: Shafika Abrahams-Gessel (Boston University) (see project 1)

Thesis topic: Determining the impact of training on the beliefs about the risk factors for non-communicable diseases (NCDs) or chronic diseases (CDs) and the longer-term impact of the training experience itself on community health workers (CHWs), who were trained to screen for individuals at high risk in a population-based setting in the township of Khayelitsha, Cape Town, South Africa (see project 8)

Supervision: Professor Deborah Bowen (Chair of the Department of Community Health Sciences/Boston University School of Public Health); Dr Thomas Gaziano (Division of Cardiovascular Medicine, Brigham and Women's Hospital, Harvard University); Dr Matthew Fox (Department of International Health/Boston University School of Public Health); Dr Judith Bernstein (Community Health Sciences Department/Boston University School of Public Health)

Summary: This study aims to assess the training and experiences of community health workers (CHWs) in the use of a non-invasive risk screening tool for cardiovascular disease (CVD) in the community setting as described in project 1. The study is being conducted in four countries – South Africa, Bangladesh, Guatemala and on the American/Mexican border. The impact of the cultural norms related to weight, perceptions of the roles of CHWs in the community and healthcare settings, the training materials, and challenges along with opportunities for scaling up the training and use of this tool; as well as its impact on policy related to integrating prevention of CVD programmes into the primary care setting, will be assessed. In 2011, the Doctoral Committee accepted the protocol and the student registered. The training manuals were developed thereafter.

Progress in 2013: The data collection for her dissertation was completed. Qualitative analyses of CHW focus groups and key informant interviews are complete. These analyses investigate the CHWs' experience of the training, fieldwork and interactions with study and clinic staff. Additionally, assessments were made of the field supervisors' experiences working with the CHWs in the trial and the issues related to 1) integrating CHWs into primary care settings and, 2) scaling up this kind of CHW-led intervention. The qualitative assessments were conducted in South Africa, Mexico and Guatemala.

The student has already obtained approval from her programme committee for her dissertation.

Shafika Abrahams-Gessel, Jabulisiwe Zulu and Thandi Puoane with community health workers.

University of Flensburg, Germany

13) MA Student (Disease Prevention and Health Promotion): Svenja Wolfromm (University of Flensburg, Germany)

Thesis topic: Pre-testing health education materials on chronic disease of lifestyle

Svenja Wolfromm.

Supervisors: Dr Katherine Everett-Murphy (UCT) and Dr Petra Wihofszky (University of Flensburg, Germany)

Summary: The purpose of the study was to investigate how the low literacy target group valued and perceived the newly developed health education material to prevent chronic diseases of lifestyle (see project 4). The material was developed to cover three main topics: smoking cessation, healthy diet and how to integrate physical activity into the daily life routine. The data collection was realised using qualitative focus group interviews and the data analysis was completed using the qualitative content analysis by Phillip Mayring. The overall purpose of the study was to provide primary healthcare professionals with a resource package, which can be used in brief counselling interventions, in order to improve the care and management of patients with chronic diseases within primary healthcare facilities. The results of this qualitative study show that the health education material was understood – with some literacy difficulties – and well accepted by the low literacy target group. Furthermore, some participants reported increased motivation to

change as a result of exposure to the draft materials. Some participants said that the gender aspect was of importance when providing behaviour change information concerning physical activity. The candidate graduated in 2013.

University of Queensland, Australia

14) Master's student: Dr Sam Surka (University of Queensland, Brisbane, Australia/CDIA, UCT)

Thesis topic: Evaluating the use of mobile phone technology to enhance cardiovascular disease screening by community health workers (see project 8)

Supervisor: Dr Sisira Edirippulige (Centre for Online Health, University of Queensland, Brisbane, Australia)

Co-supervisors: Professor Naomi Levitt (UCT), Professor Krisela Steyn (UCT), Dr Thomas Gaziano (Division of Cardiovascular Medicine, Brigham and Women's Hospital, Harvard University

Summary: The aim of this study is to develop a mobile phone application capable of calculating a total cardiovascular disease risk (CVD) score, based on the non-laboratory CVD risk assessment model developed by Dr Thomas Gaziano. The mHealth tool will be evaluated in order to assess how it impacts on the screening for CVD in the community by community healthcare workers (CHWs). A qualitative evaluation of CHWs' experiences will also be undertaken.

Progress in 2013: A feature phone application was developed using the open source online platform, CommCare©. CHWs (n=24) were trained to use both paper-based and mobile phone CVD risk assessment tools. Each CHW screened 10 to 15 community members using each tool.

Analysis demonstrated that the CHW training time was 12.3 hours for the paper-based chart tool and three hours for the mobile phone application. 537 people were screened, with a mean screening time of 36 minutes (M=35.4, SD=12.6) using the paper-based chart tool and 21 minutes (M=21.0, SD=8.7), using the mobile phone application, $p = <0.0001$. Incorrect calculations (4.3 % of average systolic blood pressure measurements, 10.4 % of body mass index and 3.8% of CVD risk score) were found when using the paper-based chart tool, while all the mobile phone calculations were correct. Qualitative findings from the focus group discussion corresponded with the findings of the pilot study.

The reduction in CHW training time, CVD risk screening time, lack of errors in calculation of a CVD risk score and end-user satisfaction when using a mobile phone application, have positive implications in terms of adoption and sustainability of this primary prevention strategy to identify people with high CVD risk who can be referred for appropriate diagnoses and treatment.

Dr Surka was awarded an Academic Fellowship Award from the Discovery Foundation, South Africa and a Trainee Seed Grant, from the National Heart, Lung and Blood Institute, Washington, USA. His poster, presented at the Successes and Failures in Telehealth Conference in Brisbane, Australia, was awarded a best poster prize, and his presentation at the Medical Research Council meeting on Innovation and Health was awarded an innovation launch first prize.

Dr Sam Surka training a community health worker.

Dr Surka graduated with a Master's in eHealthcare in November 2013 and was awarded the Dean's Commendation for High Achievement.

Other capacity development activities in 2013

The School of Public Health at the University of Cape Town once again ran the Chronic Disease Module in their Masters' in Public Health (MPH) course in 2013 over a six-month period. This is an elective module in the school's MPH programme. Five CDIA members participated in teaching on the course.

At the **University of Stellenbosch** (US), **Professor Bob Mash** of the Division of Family Medicine continues to teach postgraduate students in family medicine about chronic diseases and health systems. He is supervising one PhD student and five master's students on chronic disease research projects.

Professors Naomi Levitt and **Krisela Steyn** and other CDIA members met regularly with postgraduate students who are interested in exploring chronic disease projects for their research projects.

CDIA Network members' participation in policy development and interaction with non-governmental organisations and the community

Professor Debbie Bradshaw is a member of the Health Data Advisory and Co-ordination Committee that is advising the national Minister of Health on improving the national health information system and monitoring progress on the Negotiated Service Delivery Agreement undertaken by the minister. High level health indicators have been defined and are being tracked. She is also a member of the Western Cape Health Research Committee and has advised the provincial Department of Health on facilitating research and translation of research. She also

Doctor Max Price, Dr Tollulah Oni, Naomi Levitt and Helen Zille at the Worldwide Universities Network (WUN) 2014 conference held at UCT.

advises the national Department of Health on surveillance of non-communicable disease.

Professor Bob Mash visited the University of Pretoria's Department of Family Medicine with Karen Barnard and had an exploratory discussion on collaboration with CDIA with regard to ward-based outreach teams and NCDs. They subsequently commented on some of the tools they were planning to use with the CHWs for assessing households.

Dr Katherine Everett-Murphy participated in a WHO meeting as a member of the World Health Organisation Guideline Development Group for Smoking during Pregnancy. The task of the group was to develop best practice guidelines for tobacco cessation among pregnant women. She was also invited to serve as a member of another WHO guideline development working group that developed guidelines for substance use among pregnant women. This involved attending a meeting from 9 to 13 September 2013 in Geneva, as well as a number of teleconferences. These guidelines are distributed by WHO to governments around the world to guide policy development and clinical practice. She also worked with Richard van Zyl Smith and others on developing Smoking Cessation Guidelines for SA, which were published in the SAMJ in September 2013.

Professor Krisela Steyn served on the working committee that advised the national Department of Health on formulation of the draft regulations to reduce salt in South African food that most contribute to high sodium intake. The regulations were signed into law by the Minister of Health in March 2013 as amendments to the to the Foodstuffs, Cosmetics and Disinfectants Act of 1972 (act 54 of 1972). She has also collaborated with other colleagues on the planning for the public health campaign to reduce the use of salt by South Africans in food preparation and at the table.

Professor Thandi Puoane is a member of the National Department of Health's task force on obesity.

Professors Eric Bateman, Naomi Levitt, Krisela Steyn and B**ongani Mayosi** were all awarded centenary awards as part of the Department of Medicine of the Faculty of Health Sciences at the University of Cape Town's centenary celebrations, in recognition of the number of scientific publications that have reached the status of citation classics.

Professor Naomi Levitt is the president of Diabetes South Africa. **Professor Krisela Steyn, Professor Alan Bryer** and **Dr Tracy Kolbe-Alexander** are members of the South African Heart and Stroke Foundation's Advisory Panel and Professor Steyn was also appointed as vice chairperson of the foundation's governing board. **Professor Karen Sliwa** is a founding member and past president of the Heart Failure Society of South Africa and part of the European Society of Cardiology's peripartum cardiomyopathy working group.

Dr Kolbe-Alexander is a member of the International Society of Physical Activity and Health's (ISPAH's) education committee, the SA Heart and Stoke Foundation's Scientific Advisory Board, and provides input from Africa for the GlobalPAnet website.

Professor Vicki Lambert serves on the Obesity Task Force for the Department of Health and has been asked to advise on ongoing surveillance concerning physical activity for NCD prevention.

CDIA funders in 2013

We would like to acknowledge our funders. Without their support, NCDs would still constitute the neglected area of health research.

United Health Company, USA

- Total funding amounts to US$1 million over five years.
- Funding cycle: From Sept 2009 to August 2013.

National Heart, Lung and Blood Institute of the NIH, USA

- Total funding amounts to US$2 million over five years.
- Funding cycle: From 8 June 2009 to 7 June 2014.
- Supplementary funding of $498 916 shared with Guatemala, Mexican American Borders and Bangladesh Centres of Excellence.
- Funding cycle: July 2011 to June 2014.

Cancer Association of South Africa

- Total funding amounts to R480 000 over three years.
- Funding cycle: From 1 June 2010 to 30 May 2013.

Medtronics Foundation

- Total funding amounts to US$300 000 over two years.
- Funding cycle: From March 2011 to February 2013, extended until May 2014.

Global Evidence Synthesis Initiative (GESI)

- Total Funding amounts to 59 800 GBP over two years for C3 project of University of Stellenbosch and Medical Research Council with CDIA.
- Funding cycle: From July 2013 to June 2014.

Department of Medicine and Faculty of Health Sciences, University of Cape Town

- Research facilities and accommodation for CDIA Directorate office.

Publications of network members related to chronic diseases and CDIA activities

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Book Chapters

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Income and expenditure statement for 12-month period (January to December 2013) unaudited

	NOTE	2013	2012
Income		**9 194 838.75**	**9 999 806.63**
Grants – Restricted	2	9 028 293.83	6 734 072.52
Grants – Unrestricted	2	-	3 085 556.32
Net Financing Income	3	166 544.92	180 177.79
Expenditure		**9 965 695.76**	**9 392 326.78**
Personnel		4 652 634.15	3 910 415.62
Travel		376 544.85	4 96 524.37
Operating costs and supplies		995 996.43	1 963 810.72
Bursaries		558 072.00	398 747.80
Subcontracts		3 382 448.33	2 622 828.27
Lung Institute		948 241.45	969 434.48
Brigham Women's Hospital		1 863 756.67	1 371 511.64
CHW Projects		570 450.22	281 882.15
Surplus (Overspent)		**(770 857.01)**	**607 479.85**
Capital invested	**4**	**2 928 806.24**	**1 909 010.03**
Closing balances		**2 157 949.23**	**2 516 489.88**

Notes

1. Basis of Accounting

The income and expenditure statement was drawn up based on the cash basis of accounting.

1.2 Exchange Rate

The exchange rate used to convert foreign currencies to South African rands is the average weighted exchange.

2. Grants Restricted/Unrestricted

Grants restricted represent expenditure incurred on projects for which there are commitments from funders, including funding not yet received by year end. Grants unrestricted represents funding received in advance of expenditure for operational costs and bursaries.

3. Net Financing Income

Interest received from investments.

4. Investment

Unrestricted funding invested through UCT, receiving a market-related interest rate.

CONTACT

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Sue Botha Administrator

http://www.health.uct.ac.za/fhs/research/groupings/cdia/about

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