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Whilst the United Nations Declaration on the Rights of Indigenous Peoples of 2007 assures individuals the right to health and social services, the rising burden of diabetes and related Non-Communicable Diseases (NCDs) poses a grave threat to the health and lives of the world’s estimated 370 million indigenous peoples (5% of the global population). Representing some of the poorest people in the world, indigenous peoples experience significant health disparities compared to their non-indigenous counterparts, including high morbidity and premature death rates from diabetes and NCDs. Underlying social, economic and historic factors, including extreme poverty, barriers to education and health care, and degradation of the ecosystem are fuelling the diabetes epidemic in indigenous communities and contributing to poor health outcomes. Indigenous women face particularly severe health problems and are often denied access to education and basic health care. In some indigenous communities the incidence of diabetes has reached epidemic proportions and places the very existence of these communities at risk.

In September 2011, NCDs finally secured international attention with the adoption of the UN Political Declaration on NCDs was also a historic step forward for indigenous peoples, as it recognises that indigenous peoples suffer from major health disparities due to the incidence of NCDs, and commits to implementing culturally sensitive policies and programmes for NCDs that fully engage indigenous peoples. It is high time that this serious threat to the health and lives of these peoples is addressed by the states in which they live and by the relevant UN agencies.

To build on this political momentum, an Expert Meeting on Indigenous Peoples, Diabetes and Development was organised by the World Diabetes Foundation and co-hosted by the International Diabetes Federation on 1-2 March 2012 in Copenhagen, Denmark. The main objective of the meeting was to build consensus around the burden of diabetes and related NCDs amongst indigenous peoples and to identify specific areas of intervention. Participants included a broad range of expert stakeholders including indigenous representatives from 15 countries, international health experts, renowned researchers, special rapporteurs on indigenous issues from the United Nations, representation from the United Nations Permanent Forum on Indigenous Issues, the Pan American Health Organization, the World Diabetes Foundation project partners and academics.
The Expert Meeting provided a platform for stakeholders to cross-fertilise knowledge and perceptions of indigenous health issues and discuss the importance of acknowledging and respecting what indigenous peoples offer to the world in terms of their generations of wisdom, about living on this planet, caring for Mother Earth and each other and about the right of indigenous peoples to define their own way forward and future as stipulated in the UN Declaration on the Rights of Indigenous Peoples.

More importantly, the experts and participants worked together to produce a joint Call to Action which presents a summary of recommendations and will serve as an advocacy tool going forward. The Call to Action will feed into two major upcoming events—the International Diabetes Federation’s World Diabetes Congress in Melbourne in 2013, which will feature a programme stream dedicated to indigenous peoples, and the forthcoming UN World Conference on Indigenous Peoples in 2014.

In 2006, collaboration with indigenous communities in the fight against diabetes entered a new phase, when the International Diabetes Federation established the first Task Force on Diabetes among Indigenous Peoples and indigenous groups were mobilised behind the International Diabetes Federation’s global campaign to secure the landmark UN Resolution on Diabetes 61/225.

The support for indigenous peoples has also been resonated by the World Diabetes Foundation by funding initiatives on the ground to improve access to diabetes prevention and care as highlighted by several projects during the Expert Meeting. In Guatemala, the World Diabetes Foundation has granted support to provide access to community diabetes care amongst the Kaqchikel-speaking populations (Maya descendants) and in Bolivia. In the African region, the World Diabetes Foundation is supporting projects in Uganda, Sudan, Cameroun and Mali which are reaching out to nomadic and other indigenous peoples. In the Pacific region, projects have been initiated to improve the quality, accessibility and effectiveness of diabetes care and thereby reduce the burden of diabetes complications in Fiji, Tonga, Nauru, and Vanuatu.

The World Diabetes Foundation and the International Diabetes Federation are truly proud to bring the issue of diabetes amongst indigenous peoples onto the global health agenda. The health of indigenous peoples is a fundamental human right and by joining forces, we are committing to bring social justice to the issue of indigenous health. Following this meeting, the World Diabetes Foundation and the International Diabetes Federation will continue to work in collaboration with indigenous peoples to raise awareness of the issue of diabetes and NCDs, with particular focus on the social determinants of health and improving access to care. The first step will be to discuss opportunities to address the agenda for indigenous health with the World Health Organization and the United Nations Permanent Forum on Indigenous Issues. Together, we will work with indigenous communities to create a collaborative policy framework and dedicated action plan to tackle the diabetes epidemic among indigenous peoples in the future.

We hope this report and the strategic recommendations from this Expert Meeting will serve as a useful compendium of the issues discussed and serve as a tool for advocacy which all stakeholders can use.

Professor Pierre Lefèbvre, 
Chairman 
World Diabetes Foundation

Ms Ida Nicolaisen, 
Board Member, 
World Diabetes Foundation & former 
Vice Chair of the United Nations Permanent Forum on Indigenous Issues

Professor Jean Claude Mbanya, 
President, 
International Diabetes Federation

Professor Paul Zimmet, 
Director Emeritus, 
Baker IDI Heart and Diabetes Institute
**OPENING CEREMONY**

Professor Pierre Lefèbvre (Chairman of the World Diabetes Foundation) welcomed delegates to the first Expert Meeting on Indigenous Peoples, Diabetes and Development hosted by the World Diabetes Foundation and the International Diabetes Federation (IDF) and introduced the first keynote welcome speaker, Ms Ida Nicolaisen (Former Vice Chair of the UN Permanent Forum on Indigenous Issues and Board Member of the World Diabetes Foundation).

“It is a great privilege and pleasure for me to be here today to welcome you to the first Expert Meeting on Indigenous Peoples, Diabetes and Development hosted by the World Diabetes Foundation and the International Diabetes Federation,” Ms Nicolaisen said. “Most of my life time, I have been privileged to work among and with indigenous peoples and also to listen to the wisdom which has been inherited by indigenous peoples for decades.”

“When the United Nations Conference on Human Settlements observed the International Decade of the World’s Indigenous Peoples, world leaders decried the damage to the environment and land of indigenous peoples. This was a prominent reminder to all of us, that it not only harms the peoples who have for centuries and millennia lived on those lands. The rest of the world suffers as well. When we marginalize indigenous peoples, we cut off a vast body of knowledge that is of great value to humanity. That is clear to those of us in the field of health, who depend on the wisdom passed down through the generations, of plants and herbs that have the power to heal.”

Ms Nicolaisen went on to explain that non-communicable diseases and diabetes pose a grave threat to the health and lives of the world’s estimated 370 million indigenous peoples which constitute some of the poorest people in the world. “Where segregated data are available, it reveals increasing rates of premature death from cancers, diabetes, heart and cardiovascular diseases and a health gap between indigenous and non-indigenous populations. Most troublesome, indigenous peoples are over-represented among the world’s poor and are less likely to live in safe or adequate housing, more likely to be denied access to safe water and sanitation, more likely to be malnourished, and more likely to lack access to appropriate, affordable, and culturally-sensitive health services. When we marginalize indigenous peoples, we cut off a vast body of knowledge that is of great value to humanity,” she said.

Ms Nicolaisen explained that maintenance of the culture and traditional lifestyles of indigenous peoples has been associated with a higher health status and decreased rates of infant mortality, low birth weight, cancer, high blood pressure, diabetes and other non-communicable diseases. “A small number of interventions funded by the World Diabetes Foundation have demonstrated that it is possible to apply holistic solutions to improve access to prevention and care, but also that indigenous peoples possess the knowledge and cultural base on which to build healthier societies. However, they cannot do so alone,” she highlighted.

“The UN International Decade for the World’s Indigenous Peoples, and the Declaration on the Rights of Indigenous Populations, sound the call to governments across the world that indigenous peoples have rights to survival, dignity and well-being that must be respected and promoted. Governments therefore have a responsibility and an obligation to do their part, but there are few examples where their actions have reduced the disparities between indigenous peoples’ health and that of other people within national boundaries. Partnerships between governments, researchers, civil society, health institutions and the indigenous peoples are therefore of paramount importance; indeed they are essential. Only through partnership can societal systems mutually reinforce each other.”

Ms Nicolaisen called on delegates to share opinions and examples of best practice with the aim of bringing forward key expert recommendations to the forthcoming World Conference on Indigenous Peoples, to be held in 2014. “The fundamental message we send is that non-communicable diseases in general and diabetes in particular continue to be neglected issues concerning the global health agenda amongst indigenous peoples. Both in health and economic terms, neglecting the health of indigenous peoples and non-communicable diseases such as diabetes will prove expensive as costs and productivity losses as a consequence of complications will undermine and stunt economic growth and negatively impact the achievement of the Millennium Development Goals”.
“The health of indigenous peoples is a fundamental human right. Investing wisely in indigenous health means caring for our natural environment and ensuring that we endow future generations with precious resources. And most importantly, recognising that indigenous peoples are included as part of the overall solution to improve access to universal health,” concluded Ms Nicolaisen.

Speaking on behalf of Dr Myrna Kain Cunningham, Chair of the United Nations Permanent Forum on Indigenous Issues, Ms Paimaneh Hasteh (Rapporteur of the UN Permanent Forum on Indigenous Issues), in her opening remarks to delegates stated that the United Nations Declaration on the Rights of Indigenous Peoples, adopted by the General Assembly on 13 September 2007, provides the framework for the UN’s work on indigenous peoples. Article 21 affirms that ‘Indigenous peoples have the right, without discrimination, to the improvement of their economic and social conditions, including, inter alia, in the areas of education, employment, vocational training and retraining, housing, sanitation, health and social security’, while Article 23 stresses that ‘indigenous peoples have the right to determine and develop priorities for exercising their right to development. In particular, they have the right to be actively involved in determining health, housing and other economic and social programmes affecting them’. “This includes the right to health and health services, including traditional medicines and health practices,” explained Ms Hasteh.

“For indigenous peoples, health encompasses the physical, social, mental, environmental and spiritual dimensions. Diabetes and other diseases should not be seen only from a biological, or a scientific, or a medical point of view. They have to be perceived from a broader perspective of how and why there is an ever increasing incidence of these hitherto rare diseases among indigenous communities. They are a result of the changes in the lifestyles of indigenous peoples who currently face new and devastating problems that make them more and more vulnerable,” said Ms Hasteh.

Indigenous peoples’ rights to land, food and health are key components of their survival and their wellbeing. “Indigenous traditional knowledge and beliefs about food systems are inextricably tied to their cultures and values,” explained Ms Hasteh. “The right to land and to a healthy environment is an indispensable part of indigenous peoples’ health and well-being and should be recognised. Therefore it is essential to take action at all levels to empower indigenous communities to take ownership and lead initiatives for their sustainability and for their self-determination”.

Ms Hasteh pointed out that the current Millennium Development Goals (MDGs) do not include issues related to indigenous health. “As stressed by the Permanent Forum on its Fourth session devoted to the MDGs in 2005: “…unless the particular situation and voices of indigenous peoples are taken into account, the MDG process may lead to accelerated loss of land and natural resources, and accelerated assimilation, thus prolonging and even worsening the marginalization, discrimination and further impoverishment of indigenous peoples’. The Forum also recommended to ‘rethink the concept of development, with the full participation of indigenous peoples in development processes, taking into account the rights of indigenous peoples and the practices of their traditional knowledge’. Now more than ever, indigenous peoples’ needs and views must be included in the post-2015 development agenda, where the MDGs will probably be redefined and adapted to a changing world. It is important that the follow up incorporates the specific health problems of indigenous peoples, with specific indicators developed with the involvement of indigenous peoples,” said Ms Hasteh.

However, while indigenous peoples are affected by all the goals related to hunger, education and ill health they are invisible in all the indicators currently proposed. “Therefore, a major effort must be made on improving data related to indigenous peoples’ health and living conditions, but this information can be obtained only with the full participation of indigenous peoples,” requested Ms Hasteh.

Access to comprehensive, community-based and culturally appropriate healthcare services, health education, adequate nutrition and housing should be ensured without discrimination, stressed Ms Hasteh. “I would like to emphasize the need for capacity building, research and cultural education for health professionals who work in and with indigenous communities, as well as the formation and inclusion in all public health policies and structures of an indigenous health workforce that has both professional and cultural competence”. 
“A genuine indigenous health perspective, that encompasses a holistic and spiritual dimension, should be incorporated in conventional health services, as well as in public health policies and constitutional or legislative reforms. Traditional knowledge regarding health practices must be recognized as essential to indigenous peoples, and also that they make important contributions to overall health. It should be valued as part of the heritage of the whole humankind and integrated in comprehensive primary health care plans, in collaboration with indigenous health practitioners,” concluded Ms Hasteh, who wished delegates fruitful discussions that would indicate a way to move forward in empowering and strengthening indigenous peoples’ rights.

The third and final speaker in the opening session, Professor Jean Claude Mbanya (President of the IDF) explained that diabetes is a health tsunami of the 21st Century. “The new figures from the fifth IDF Diabetes Atlas tell us that 366 million people today have diabetes worldwide and the number will rise to about half a billion people within the next generation. The human and economic cost of diabetes is staggering: 4.6 million deaths every year due to this disease. Put another way, one person dies from diabetes every 7 seconds. And the Atlas estimates 465 billion US dollars is spent on diabetes-related health each year,” he reported.

Previously considered a disease of the rich and elderly, diabetes is now impacting on the poorest and most vulnerable populations, so much so that four out of every five people with diabetes now live in low- and middle-income countries. “While the diabetes epidemic is truly global, indigenous populations are disproportionately shouldering the burden. The gap in health between indigenous and non-indigenous populations remains unacceptably wide,” said Professor Mbanya. “As quoted by the UN, 50% of indigenous adults over the age of 35 worldwide have type 2 diabetes and this number is predicted to rise. Diabetes has reached epidemic proportions in these communities and places the very existence of these communities at risk. Yet most indigenous peoples with diabetes around the world are never diagnosed; they never receive treatment for diabetes and die from the condition without knowing the reason for their suffering. Those that are diagnosed are diagnosed too late to prevent the development of life-threatening complications.”

Indigenous peoples’ lack of access to health care is due to a range of geographical, economic and cultural factors and there is no ‘one-size-fits-all’ approach to prevention and treatment for diabetes, said Professor Mbanya. “In order to increase access and coverage of health care amongst indigenous peoples, it is critically dependent on the active participation of indigenous peoples themselves and culturally sensitive approaches”.

According to Professor Mbanya, there still remain deep-seated pockets of inequality. “But while the situation is undoubtedly alarming and seriously unjust, it is not hopeless. Just last year we went one step further. In September 2011, UN Member States convened in New York for the UN High-level Meeting on Non-Communicable Diseases and unanimously adopted the Political Declaration on NCD Prevention and Control. Significantly for the focus of this meeting, the Declaration recognises the threat posed by diabetes and NCDs to indigenous peoples and includes articles dedicated to the health of indigenous peoples”.

Following the UN Summit, the next major milestone in the IDF’s sights is the end date of the Millennium Development Goals (MDGs) in 2015. “We need to work together to ensure the next iteration of the MDGs fully reflects the true needs of low- and middle-income countries and gives priority attention to the situation of vulnerable populations such as indigenous peoples,” explained Professor Mbanya. “IDF has a roadmap of action for indigenous peoples over the coming years, culminating with our World Diabetes Congress in Melbourne in 2013 where for the first time we will have a dedicated programme stream on indigenous peoples,” Professor Mbanya continued. “In the lead up to Melbourne we will be convening an expert group to update an IDF position statement on this important issue, we will highlight the evidence on diabetes among indigenous populations by dedicating a chapter of the next edition of the Diabetes Atlas to indigenous peoples and we will release a special issue of Diabetes Voice focused on diabetes and indigenous peoples”.

“More than anything else, IDF’s work is driven by social injustice in the world and we advocate for those that are trying to achieve social justice. Until we see the health disparities between communities reduced and the rights of all people with diabetes respected we will not rest. This meeting is a catalyst for future action and the IDF looks forward to working with stakeholders on this issue,” he concluded.
The NCD & diabetes burden: addressing challenges and consequences amongst indigenous peoples & regional perspectives

In the first session of the meeting, the health and economic challenge posed by NCDs and diabetes and their associated co-morbidities was addressed by Professor Paul Zimmet (Baker IDI Heart & Diabetes Institute, Australia). Professor Zimmet explained that the meteoric rise in the prevalence of obesity, the “obesogenic environment of modern days”, is driving the increase in diabetes and NCDs and that this is “the biggest NCD epidemic in human history”.

Professor Zimmet’s study group is currently researching diabetes in Mauritius, which has a population consisting of Asian Indians, Creoles and Chinese. These three ethnic groups constitute 66% of the world’s population and so whatever happens in Mauritius has global implications. It is therefore alarming that Mauritius has experienced a 62% increase in diabetes between 1987 and 2009.

Diabetes is linked to many major complications and co-morbidities, but Professor Zimmet focused on the metabolic syndrome, which has been shown in a study by Gentles et al in 2007 to be 2-3 times increased in frequency in the Maori and Pacific communities, compared to the European community in New Zealand:

As an example Professor Zimmet referred to the Dutch winter famine at the end of World War Two, where women delivered small babies. As adults, these babies who had been exposed to famine in utero had a higher prevalence of type 2 diabetes, cardiovascular disease, hypertension, obesity and schizophrenia. Modern day equivalents can be found in Cambodia.

Concluding his presentation, Professor Zimmet said “Diabetes is a huge cost to society and while the US or UK can perhaps cope with these costs, in developing countries and indigenous communities this is a huge problem in relation to their resources. By 2020, diabetes and associated co-morbidities are set to bankrupt the economies of many nations unless action is taken”.

Ms Paimaneh Hasteh (Member and Rapporteur of the UN Permanent Forum on Indigenous Issues), provided delegates with an analysis of indigenous issues related to economic and social development. Indigenous peoples in Asia account for about 70% of the world’s indigenous populations. The development of indigenous peoples’ health is deeply linked to their wider social, cultural, economic and political development. Ms Hasteh explained that the way in which indigenous peoples measure the health and vitality of their community is different from the conventional concept of health. “For indigenous peoples, health is a holistic concept and is measured as a delicate balance between humans and Mother Earth. The degree of self-government, ability to participate in cultural practices and the extent of access to traditional lands may be considered of equal importance because they represent forms in which the connection with Mother Earth is maintained. Any threat to this balance has an impact on health,” she reported.

Alienation from natural resources along with environmental degradation, brought about by colonisation, political oppression, armed conflicts and industrial activities on indigenous land, have been identified as a major cause of diabetes and heart disease react to the environment. These changes can be inter-generational – in other words what your grandmother ate may in fact have a major effect on your risk of diabetes or heart disease. We need to get past the belief that being sedentary or lazy is the major cause of diabetes as there may be different perceptions of causation in the indigenous communities. Clearly for indigenous peoples this is fundamental in the approach to tackling this epidemic”.

Professor Zimet drew delegates’ attention to the concept of epigenetics. “What happens in early development in pregnancy can have a profound effect on the foetus and the risk of diabetes and heart disease in adult life,” he explained. “The mother’s nutrition and whether she smokes or drinks can affect how the baby’s genes for
of poor health. Millions of indigenous peoples now live in urban areas. “Urbanisation is often accompanied by increasing commercialism, acculturation, and rapidly changing lifestyles, which includes dietary changes in light of easy access to modern high-calorie, high-fat, high-salt, and low-fibre diets and changing infant feeding practices,” explained Ms Hasteh. “The loss of knowledge and practice of traditional food systems is not only a loss of food and the knowledge required to recognise, harvest, prepare and enjoy traditional indigenous food resources. It is also a loss to the universal heritage of human kind”.

“My central argument is that indigenous peoples are undergoing rapid lifestyle transition, including dietary change, which represents a major risk factor of indigenous peoples’ vulnerability to diabetes,” said Ms Hasteh. However, she pointed out that lack of disaggregated data severely undermines the possibility of drawing an exact picture of the incidence of diabetes in indigenous peoples.

In conclusion, Ms Hasteh recommended that “chronic diseases and their risk factors need to be countered by promotion of healthy lifestyles, change in food habits, encouragement of physical activity and by fostering of physical and emotional wellness. Health and nutrition can be improved using a multidisciplinary, holistic approach grounded in collaboration with community leaders and women, who are the custodians and users of local foods.”

Professor Pamela Orr (Medicine, Medical Microbiology and Community Health Sciences, Canada) spoke of the challenges posed by diabetes and social determinants of health in the Canadian Inuit community. A vast area of over 4 million square miles of Canadian Arctic is home to a very small population of approximately 40,000 Inuit people. Professor Orr explained that 20 years ago, the prevalence of diabetes in Canadians of First Nations (Oji-Cree) origins, was very high at about 40%, while the prevalence of diabetes in Inuit people was low at 1-5%.

“This was despite the Inuit population having genetic traits associated with diabetes, as do the Oji-Cree”.

“The difference in prevalence was attributable to the Inuit’s active lifestyle and diet which centred on hunting and fishing,” she said.

However, since then the prevalence of diabetes among the Inuit has increased to between 2-12% and the indicators for diabetes, including high body mass index, triglyceride and blood pressure levels, are present. “This reflects a devastating change in the cultural and social determinants of diabetes for the Inuit people,” said Professor Orr. “We are seeing lower life expectancy, low education levels, massive unemployment, low income and very crowded and poor housing in Inuit communities. There is a clash of cultures in an environment of relative poverty. An active lifestyle of hunting has changed in some communities and families into a sedentary lifestyle of watching TV and eating nutritious food, and there is an increased reliance on market-bought food.”

The Inuit community is also experiencing extensive food insecurity of around 51% compared with just 9% in the South of Canada. Professor Orr reported that prices of some nutritious foods are four times higher than in the South and fresh fruit and vegetables are often not available. “People are too poor to access their traditional foods. They can’t afford to support or buy a dog team, a snow machine, a gun, bullets, a sled, boat or equipment for hunting and fishing. Those who have a job can afford these things but they don’t have the time to hunt. In both cases the traditional knowledge that is required to hunt is lost leading to acculturation,” explained Professor Orr. In addition, climate change has made it increasingly difficult to go out on the land and sea ice and there are concerns about pollutants in traditional foods such as walrus, seal, fish, whale and caribou.

Furthermore, Professor Orr reported that there may be a different view of health and wellness in the Inuit community. “Some parents believe that when children are large – or in Southern parlance obese – they are actually protected from the cold and this is a desirable way to be. There may be a discrepancy in cross-cultural values that needs to be bridged”.

“The focus in Canada is on the biologic approach to diseases and not on the ecologic approach or social determinants. If poverty is the primary driver of inactivity, poor food use and access to nutritious food, then educational interventions won’t go far. I believe interventions at societal level, such as funding to support traditional hunting practices, would have a bigger impact. We need to go beyond education to achieve behavioural

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### Comparison of Canadian Oji-Cree (First Nation) and Inuit Population, 1990’s

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<th>Oji-Cree (n=728)</th>
<th>Inuit (n=434)</th>
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<tr>
<td>Prevalence of DM or Impaired Gl</td>
<td>40%</td>
<td>1-5%</td>
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<tr>
<td>Average BMI (kg/m²)</td>
<td>29</td>
<td>26</td>
</tr>
<tr>
<td>Prevalence of smoking</td>
<td>27%</td>
<td>82%</td>
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<tr>
<td>Activity Level</td>
<td>Sedentary</td>
<td>Active</td>
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<tr>
<td>Diet</td>
<td>Westernized</td>
<td>Traditional, high n3 fatty acids</td>
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**Figure. 2.** Comparison of the Canadian (First Nations) and Inuit population.
change,” concluded Professor Orr.

Addressing the barriers to improving diabetes care amongst the Inuit community in Greenland, Dr Michael Lynge Pedersen (Physician, Greenland), explained that health care in Greenland, which is free including medicine, is a challenge. The population is geographically widespread and health units are small with a lack of educated health care professionals, including specialists and sometimes even doctors or nurses, available at the clinics. Cultural disparities between the population and health care workers are a further barrier to health care.

“Parallel to Canada and maybe Alaska in the US, Greenland has experienced rapid social and cultural changes from a traditional hunting society to a modern, westernised society. These changes have been followed by a changing disease pattern,” reported Dr Pedersen. Diabetes prevalence in Greenland has historically been low, but a population survey around 2000 showed a high prevalence of 10%, with 70% previously undiagnosed. Obesity in children and adults is increasing; there is a high prevalence of smoking and increasing inequalities in income and education.

Dr Pedersen told delegates about a 3-year national diabetes project which was launched in 2008 to improve diabetes care including the detection of new cases and the prevention of type 2 diabetes. The project team consisted of a physician, nurse, dietician and chiropodist. National diabetes guidelines were developed, information about diabetes was made available for the general public in Greenlandic and performance reviews were given to clinics on a half yearly basis. Local health care professionals were trained to have responsibility for diabetes care. The project showed that the number of cases of diabetes between 2008 and 2010 increased by 19%.

A 3-year lifestyle project has now replaced the diabetes project, which aims to maintain the quality achieved in diabetes care, establish organisations for care of hypertension and chronic lung disease and develop health care events to aid awareness in the general prevention. In conclusion, Dr Pedersen said: “We are mainly focusing on lifestyle factors such as smoking, physical activity, blood pressure and weight and are using prescription of pedometers as one very important action in the lifestyle project”.

PLENARY PANEL – Q&A SESSION

A question and answer session followed the presentations, focusing on how to engage indigenous peoples regarding health issues when their cultural base has been lost. Dr Pamela Orr (Medicine, Medical Microbiology and Community Health Sciences, Canada) explained that behaviours of despair become prevalent in indigenous peoples when the ability to practice their cultural identity is lost and so it is therefore hard to remove these self-harming behaviours when the underlying problem remains. Professor Alex Brown (Executive Director, Baker IDI Heart and Diabetes Institute’s Centre for Indigenous Vascular and Diabetes Research, Alice Springs, Australia) agreed, discussing the critical need to understand the prevalence of unhealthy behaviours within the context of marginalisation and persistent disadvantage.

Dr Donald Warne (North Dakota State University and member of the Oglala Lakota tribe, US) suggested that physicians from indigenous populations are better placed - because of their own understanding of their culture as well as better acceptance by the community – in bringing modern medicine to the community. Ms Ida Nicolaisen (Former Vice Chair of the UN Permanent Forum on Indigenous Issues and Board Member of the World Diabetes Foundation) mentioned the clinics she had visited in Bhutan in connection with a World Diabetes Foundation project where one side of the building was devoted to modern medicine while the other side was focused on traditional medicine, but both sides collaborated. She concluded by agreeing that engaging indigenous peoples is a tremendous task, as there are over 5,000 cultures with different understandings of health, the body and spirituality.

Following the Q&A session, the presentations continued with Mr Terry Ehau (National Maori Organisation for Diabetes, Te Roopu Mate Huka O Aotearoa, New Zealand), who addressed delegates regarding leadership in improving Maori health and strengthening awareness about diabetes.

Twenty years ago Maori health organisations were in their infancy, today there are 240 such organisations and more than ten national Maori specialist groups including the group focusing on diabetes. Focusing on Maori relationships, Mr Ehau explained that an individual forms strong relationships with family, community, the environment and the universe.

“These relationships have deteriorated as tribes have moved to cities and are replaced with alternative relationships with fast food companies. Unfortunately one of the biggest relationships we have is with tobacco,” said Mr Ehau. “The global relationships we (Maori) are entering into require access to Maori knowledge which sits comfortably alongside other pools of scientific, business and environmental knowledge on a continuum”.

Mr Ehau reported on a community project in the Tairawhit region on the East Coast of New Zealand called Ngati & Healthy, which had two aims: to reduce incidence of insulin resistance in the short term and type 2 diabetes in the long term. Participants in the project were encouraged
to increase their consumption of fruit and vegetables and levels of exercise and decrease their smoking, consumption of fat and alcohol intake. "This wasn’t rocket science. These were things that the community could control themselves," explained Mr Ehau.

A second project is currently taking place in the Bay of Plenty to reduce high levels of inequalities in Maori health. It began when the Ministry of Health developed a fund to seed, share and spread innovation. To date the Ministry of Health has funded 34 individual diverse projects under this umbrella project, one of which is the Pouwhenua Clinic project which has four targets: to increase clinical access, to provide access to specialist health services, to provide workforce development and to provide access to culturally appropriate wrap around services. "How did we work out what the targets were? We went out into the communities and asked them what they required, rather than telling them what they needed," said Mr Ehau.

The project has highlighted many issues and challenges, which Mr Ehau termed ‘C-lutions’, which includes challenge, community, continuity, connectivity, culture, conscientisation, conflict/change, champions, competency and credibility. "The on-going challenge is taking the Maori from a state of dependence to a state of interdependence - by changing states of mind from being powerless to one where we share the power. We have to translate policy into something communities need. We must ensure effective transmission, receipt and internalisation of our knowledge so that we understand the past in developing our future. Our frameworks must be steeped in Maori knowledge and other knowledge pools can enhance our framework, not vice versa. Global knowledge is the balance between indigenous ideology and knowledge and other pools of ideology and knowledge. You must respect all. However, we need to conscientise ourselves – go back to thinking as Maori – and start engaging with the challenges and celebrating our successes," he concluded.

Understanding how lifestyle changes and diabetes affects the American Indian community was presented by Dr Donald Warne (North Dakota State University and member of the Oglala Lakota tribe, US). Indigenous populations in North America are very diverse. Dr Warne explained that historically there were thousands of distinct tribal groups, but today there are only about 560 federally recognised tribes in 35 out of 50 US states. "A few centuries ago the land was all American Indian country until we experienced colonisation. There was a vibrant indigenous population in the North East of America that has largely been wiped out due to disease and warfare. In the South the tribes were moved and split up which did a lot of damage. The West Coast tribes were also decimated," he said.

Historically, American Indians from the planes hunted buffalo which provided food, shelter, tools and clothing and gathered wild rice and naturally occurring vegetables and berries. This was a roaming community which moved to the mountains in the winter for protection from blizzards. "There was no word for ‘exercise’, as we didn’t need to find time to do this, it was just part of life as you had to be physically active just to survive," explained Dr Warne. But today the American Indians have experienced significant lifestyle changes, partly due to their inability to roam, and hunting, gathering and fishing has changed significantly from the past. "Many American Indians do not have access to food and some have actually starved. The commodity food programme for impoverished families has tried to address this, but due to limited resources it has introduced unhealthy food such as fried bread which is not a traditional food for American Indians. This is not good if you are trying to prevent diabetes," said Dr Warne.
Unlike the rest of the population, American Indians have legal rights to health care. The Indian Health Service (IHS) has the goal to assure that comprehensive, culturally acceptable personal and public health services are available and accessible to American Indian and Alaska Native people. However, Dr Warne reported that there is a large discrepancy in per capita spending on American Indians compared with other federally funded health care systems. For example, Medicare was USD 11,018 per beneficiary in 2008 compared with USD 2,696 for the IHS in 2009 (see figure above).

It is perhaps not surprising that there is a huge disparity in health, with a projected reduction in life expectancy for American Indians of 10 years and the median age of death is 58 years, compared with 81 years in the rest of the general population (see figure below). “This is worse than many third world nations or developing countries,” highlighted Dr Warne.

<table>
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<tr>
<th>Life Expectancy in Years:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
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<tr>
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<tr>
<td>U.S.</td>
</tr>
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<td>AAIHS</td>
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<table>
<thead>
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<th>Disparity:</th>
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<td>10.6</td>
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**AI Health Disparities**

**Median age at death in SD (2009):**

- **81 Years** in the General Population
- **58 Years** in the AI Population

According to the evaluation of patients enrolled in the Hypertension and Diabetes Program in 2010 there is a high prevalence of obesity, hypertension and diabetes in the population over 60 years of age. The prevalence of obesity is mainly seen in the Northern region of Mato Grosso do Sul (87% of cases) and it occurs predominantly among the Terena ethnicity, which represents 33.1% of the indigenous peoples in the entire region. However, more than 90% of cases of diabetes are found among the Terena. “We cannot ignore the possibility of genetic factors predominating in certain ethnic groups, such as the Terena, who appear to have a high tendency to develop diabetes,” reported Dr Trajber. In addition, there is a progression in the number of pregnant women from the indigenous populations who are overweight and obese.

“The problems that the multidisciplinary teams face consist of health education programmes including supervision for compliance to medical treatment, as well as changes in eating habits and the need for physical activities. These teams try to be the bridge between modern medicine and traditional medicine”, Dr Trajber concluded. “It is worth stressing that malnutrition, infant mortality, tuberculosis, high suicide rate, violence and high consumption of alcohol and drugs are of great concern for the medical teams treating the indigenous populations in our areas”.

**Dr Santau Migiro** (Ministry of Public Health and Sanitation and member of the Maasai community, Kenya) presented the African perspective: perceptions of access to health and diabetes care among the Maasai community. Of the 38 million inhabitants in Kenya, 1 million are from the Maasai and Samburu communities. The estimated national prevalence of diabetes is currently 3.3% but this is expected to increase due to changing lifestyles including poor diets. Epigenetic factors may also play a part in this increase. Dr Migiro explained that food is restricted during pregnancy to reduce the incidence of difficult deliveries as the vast majority of women give birth in their homes. This confinement of a large population in small areas often does not allow for growing small plantations for domestic needs,” he said.

Mato Grosso do Sul has the second largest indigenous population of Brazil which is confined to a very small area. It is the centre of the largest land conflict in the most fertile parts of the country and major violence against the indigenous populations. The area has just one reserve in Dourados and due to low resources people live on food baskets distributed by the State and Federal government which do not contain any proteins. “Many have to leave to find work in urban areas or on sugar cane crops, where their diets are modified. A more sedentary lifestyle has also become common, as the indigenous peoples of Brazil no longer walk their daily sacred Oguatá journey,” said Dr Trajber.
predisposes babies to a low birth weight which can put the babies at risk of developing diabetes later in life. “Also of concern are feeding practices in infants, who receive pre-lacteal feeds of homemade butter or ghee which continue throughout infancy, with the late introduction of complementary foods,” she said.

Health care infrastructure is an issue in Kenya with a disparity between geography and the number of hospitals. According to national figures there are about 17 doctors per 100,000 people, but this ratio is significantly reduced in the Maasai community, which has been driven to even more remote areas where it may take several days to get to the nearest hospital on foot. Traditional home remedies are common, with 73% using ethnic medicine. “Often the decision to use traditional healers is made out of necessity as clinics are few and far between. While modern medicine is commonly used, there is a belief that some illnesses can only be cured by traditional medicines,” Dr Migiro explained.

Other barriers to health care include sociocultural issues such as the low status of women and the low level of education, particularly for girls. While about 1.2 million people currently live with diabetes in Kenya, only about 29% of the general population has an understanding of the symptoms of this disease, and the most educated have the best knowledge. Indigenous communities have inadequate levels of literacy, with 15% of men and less than 5% of women able to read. “This is a problem as education is still the key to knowledge,” said Dr Migiro, concluding the first session of the meeting. “We need to increase access to education and empowerment, especially of women”.

**PLENARY PANEL – Q&A SESSION**

The question and answer session that followed these presentations circled the issue of governmental responsibility. Professor Pierre Lefèbvre (Chairman of the World Diabetes Foundation) pointed out that many studies involving American Indians in the last 40 years have produced very important knowledge regarding type 2 diabetes and complimented the researchers, and Dr Donald Warne (North Dakota State University and member of the Oglala Lakota tribe, US) remarked that ironically many of the new medicines that have been developed thanks to these studies are not available to this population. He again reiterated the need for an institute that could carry out collaborative research on the issues related to diabetes among the indigenous populations.

In response to comments from Dr Anil Kapur that the World Diabetes Foundation mandate does not permit the support of projects in the developed world even those directed at the indigenous populations, suggestions were made that in some countries, for example the US and Canada, the reserves of indigenous populations were in many respects sovereign nation states and one could establish a partnership with these local governments. Professor Alex Brown (Executive Director, Baker IDI Heart and Diabetes Institute’s Centre for Indigenous Vascular and Diabetes Research, Australia) and others said whilst funding was always an issue for local action in developed countries, providing a platform for advocacy and holding governments accountable for their actions was an essential role that the IDF could provide. This Expert Meeting was unique in that it placed interested people on a platform thereby providing an opportunity to share ideas and network.

Mr Terry Eau (National Maori Organisation for Diabetes, Te Roopu Mate Huka O Aotearoa, New Zealand) said it is very important to have conversations at the right level, for example with those that are writing policy. External agencies such as the World Diabetes Foundation can play an important role here. Professor Paul Zimmet (Baker IDI Heart & Diabetes Institute, Australia) asked who was monitoring human rights of indigenous peoples and Ms Ida Nicolaisen (Former Vice Chair of the UN Permanent Forum on Indigenous Issues and Board Member of the World Diabetes Foundation) responded that this was a difficult question and that we need to create a platform and space for these ethical and moral discussions to take place face-to-face at all levels. Professor Jean Claude Mbanya (President of the IDF) said in conclusion that one problem was that there was poor health data on many pockets of the population, so ways to address these disadvantaged populations must be found and the relevant governments held responsible.
Dr Treena Delormier (PhD in Nutrition, Kahnawake Diabetes School Project, Quebec, Canada) opened the second session of the meeting by addressing Aboriginal peoples’ perceptions of health, traditional food and the link to obesity, and a community approach to primary prevention and care. The Kahnawake Schools Diabetes Prevention Project is an 18-year, on-going community-directed intervention and research project in the Mohawk community of Kahnawake. The project aims to prevent type 2 diabetes in future generations by improving diet, increasing physical activity and promoting a positive attitude.

“The project is a community and university partnership,” explained Dr Delormier. “We have a strong code of research ethics that respects the self-determination of the Mohawk people of Kahnawake to make decisions about research, while they respect the academic researchers’ obligation to contribute to knowledge creation. Our research should support the empowerment of the Mohawk people to promote healthy lifestyles, wellness and self-esteem. We have rooted the principles of our partnership in our indigenous world view, yet at the same time we are respecting the obligations of the parties involved, including the Mohawk responsibility for caring for the ‘Seven Generations’ in the future – thinking about what we do today and the consequences this will have seven generations into the future”.

During the course of the project, the changing BMI’s of girls and boys have been monitored in Kahnawake. Looking at how to understand these statistics, Dr Delormier proposed that as determinants of individual behaviours are examined separately, their interactions are rarely studied and therefore current intervention theories are limited. In addition, there is little explanation of how certain behaviours of diet become patterned.

“We know that food is part of social relationships and that our food practices are socially structured beyond individual choices. I therefore started to look at food as more than a behaviour, but rather as a social practice. Choice is structured by the norms, meanings and resources of a family and these choices form patterns that endure. Changing food practices therefore involves changing the social structures that reinforce these patterns,” said Dr Delormier.

Resources such as money, time, transportation, decision-making power and food preparation skills, and rules such as the significance and enjoyment of the meal, all constrained and enabled family food choice practices. “We must regard family food choices as social processes integrated in the on-going nature of family life, not isolated from it,” concluded Dr Delormier. “It is by looking at these rules and resources in the Aboriginal communities that we will understand how food patterns are established.”

Gestational diabetes: new diagnostic criteria and the outcomes for indigenous peoples was the topic presented by Professor Jeremy Oats (Chair of the Victorian Consultative Council on Obstetric and Paediatric Mortality and Morbidity, Melbourne, Australia). “Gestational diabetes and type 2 diabetes in pregnancy by any criteria are under diagnosed,” said Professor Oats, who went on to explain that recent studies have shown that adverse pregnancy outcomes occur at lower levels of maternal glycaemia than previously acknowledged. In addition, gestational diabetes is one of the strongest predictors of later maternal type 2 diabetes and intrauterine exposure to hyperglycaemia is a significant risk factor for childhood diabetes and obesity. “Pregnancy, pre, during and post, provides an ideal opportunity for diabetes prevention and interventions to interrupt the diabetes begets diabetes cycle,” explained Professor Oats.
Survey data indicates that women from many indigenous communities have a greater prevalence of abnormal glucose tolerance including gestational diabetes, than the rest of the population. “Roughly this is at least double compared with the non-indigenous communities,” said Professor Oats. “But there is a paucity of data, with problems arising from different screening policies and diagnostic criteria”.

Reporting on the Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) study, which began in 1989 and was published in 2008, Professor Oats explained that with rising maternal glucose there is a linear relationship with macrosomia, caesarean section, clinical hypoglycaemia and cord C-peptide, or foetal hyperinsulinism (see figure below).

“When we are looking at determinants of maternal mortality, the important causes are hypertensive disorders, caesarean section, postpartum haemorrhage and macrosomia, so the impact of diabetes is not just the immediate outcome but also the secondary outcome relationships,” explained Professor Oats. The HAPO study findings are independent of ethnicity but diabetes prevalence will vary between ethnic communities, reflecting background rates of abnormalities of glucose tolerance.

“Using the HAPO data, for the first time we have agreed on an international criteria for gestational diabetes,” said Professor Oats. The International Association of Diabetes in Pregnancy Study Groups (IADPSG) published its recommendations on diagnosis and classification of hyperglycaemia in pregnancy in 2010, which were subsequently endorsed by the American Diabetes Association. At the time of this Expert Meeting, the World Health Organization was considering the recommendations.

Professor Oats reported that by applying the new IADPSG criteria to the HAPO cohort, overall 8.3% would be diagnosed using the fasting plasma glucose measurement compared with a further 6% and 2% using the 1 or 2 hour oral glucose measurements – but these proportions varied greatly between the different ethnic groups (see figure below).
for the first time” (see figure below). In 2010 the number of new cases of type 2 diabetes in Manitoba has by far the highest number of children with type 2 diabetes than any other province in Canada. In 2010 10% of the Manitoba population are of indigenous origin. 10% of the Manitoba population are of indigenous origin. The highest number of children with type 2 diabetes, “ reported Dr Sellers. “In Manitoba, 92% of the general Canadian population, compared with 23.2 cases/100,000/year in First Nation children in Canada. “While First Nation people represent 2.5% of the Canadian population, they represent 45% of the youth with new onset type 2 diabetes,” reported Dr Sellers. “In Manitoba, 92% of cases of type 2 diabetes are of self-declared First Nation heritage which is a gross overrepresentation as only 10% of the Manitoba population are of indigenous origin. Manitoba has by far the highest number of children with type 2 diabetes than any other province in Canada. In 2010 and 2011 the number of new cases of type 2 diabetes in children exceeded the cases of new onset type 1 diabetes for the first time” (see figure below).

Dr Elizabeth Sellers (Department of Paediatrics and Child Health, University of Manitoba, Canada), discussed type 2 diabetes in children and adolescents and early life determinants of diabetes: the implications for indigenous peoples. Indigenous populations have a higher prevalence of type 2 diabetes and of increasing concern is the growing prevalence in youth. New data presented by Dr Sellers showed 1.54 cases of youth onset type 2 diabetes per 100,000 in children between the ages of 0-18 years per year in the general Canadian population, compared with 23.2 cases/100,000/year in First Nation children in Canada. “While First Nation people represent 2.5% of the Canadian population, they represent 45% of the youth with new onset type 2 diabetes,” reported Dr Sellers. “In Manitoba, 92% of cases of type 2 diabetes are of self-declared First Nation heritage which is a gross overrepresentation as only 10% of the Manitoba population are of indigenous origin. Manitoba has by far the highest number of children with type 2 diabetes than any other province in Canada. In 2010 and 2011 the number of new cases of type 2 diabetes in children exceeded the cases of new onset type 1 diabetes for the first time” (see figure below).

Figure. 9. Describing the number of new cases of type 2 diabetes children representing First Nation heritage.

Looking at the early life determinants of diabetes, Dr Sellers discussed the risk of maternal pre-pregnancy obesity, which is associated with an increased risk of the offspring being obese and developing diabetes later in life. “The babies at greatest risk are those of women who were obese prior to their pregnancy and then had excessive weight gain during pregnancy,” said Dr Sellers. A study in Pima Indian women with pre-pregnancy type 2 diabetes has shown that this is the strongest single risk factor for their offspring developing type 2 diabetes, accounting for 40% of type 2 diabetes in youth in this population. These findings have been supported by the SEARCH study in the US, with maternal diabetes and obesity in pregnancy accounting for 47% of type 2 diabetes in the offspring. “In our Canadian First Nation population we have also demonstrated that maternal pre-pregnancy diabetes is the single most important risk factor for the development of youth onset diabetes, with an odds ratio of 14.4 compared with 4.4 for those exposed to gestational diabetes,” explained Dr Sellers. “I would argue strongly that making the correct diagnosis of pre-pregnancy versus gestational diabetes is of the utmost importance”.

Dr Sellers went on to present the Next Generation Cohort research which was established at the Winnipeg Children’s Hospital in June 2003. “In this research-based cohort we are following the offspring of children who graduated from our clinic – mothers and fathers who were diagnosed with youth onset type 2 diabetes before they started their families. Early data from the study show that the vast majority of their offspring are not only obese by the age of 2 but they are very obese. Looking at the overall cohort of 127 children, 10% have already developed diabetes and over the age of 10 more than a third have developed type 2 diabetes”. Other risk factors presented by Dr Sellers included in utero exposure to tobacco smoke, which has been associated with overweight and obesity in childhood. “We know that in utero and postnatal exposure to smoke is associated with insulin resistance in 10-year-old children, controlled for BMI. I’m only speculating but perhaps exposure to smoke may be one of the factors that are allowing expression of genes that are already there”.

Regarding the quality of maternal diet, Dr Sellers called attention to studies on under nutrition in utero and animal studies which have shown that high fat or poor protein diets have an impact on offspring including hyperinsulinaemia, obesity and beta cell number and function. “This suggests that the quality of the maternal diet may also be a very important player,” said Dr Sellers. “On a more positive note we know that postnatal exposure to breastfeeding is good. We have data in the Pima Indians of the south western US and in Canadian First Nation populations that show that prolonged breastfeeding for 6-12 months duration has a protective effect against youth onset type 2 diabetes”.

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Dr Sellers concluded her presentation and the second session of the meeting by highlighting concerns for the impact of youth onset type 2 diabetes in indigenous populations. “Long-term outcomes for these children are very poor which has an impact on the individual as well as the family and community around them. New data shows that 15 years post-diagnosis, a quarter of those diagnosed with youth onset type 2 diabetes have a major complication, which compares very unfavourably with those diagnosed with youth onset type 1 diabetes. From the same study, overall survival of those with youth onset diabetes was reduced by almost 10% at 10 years post-diagnosis and by 20 years there is an almost 25% mortality rate. The implications for the health of the community are therefore great”.

PLENARY PANEL – Q&A SESSION

The question and answer session that followed the presentations focused on maternal health and the risk of gestational diabetes. Dr Anil Kapur (Managing Director of the World Diabetes Foundation, Denmark) expressed concern for maternal nutrition in marginalised populations, where the diet has changed and diabetes and gestational diabetes is rapidly increasing. The importance of identifying those women at high risk of having pre-existing abnormal glucose tolerance as early as possible in pregnancy and instituting appropriate management was stressed by Professor Jeremy Oats (Chair of the Victorian Consultative Council on Obstetric and Paediatric Mortality and Morbidity, Melbourne, Australia). In addition he explained that maternal fasting blood glucose measurement is not sufficiently sensitive a measure to use for the diagnosis of gestational diabetes, which does require an oral glucose tolerance test.

The accelerated kidney disease seen in children and adults with diabetes in Canada and Australia and the impact of malnutrition in utero on this complication was raised by Dr Pamela Orr (Medicine, Medical Microbiology and Community Health Sciences, Canada). The immune response varies among and between indigenous and non-indigenous peoples, which may be a factor in cardiovascular disease rates. Professor Jean Claude Mbanya (President of the IDF) agreed that the drivers of diabetes complications in indigenous peoples should be examined further.

Dr Donald Warne (North Dakota State University and member of the Oglala Lakota tribe, US) mentioned that in the impoverished communities of the Pima Indians there was more formula feeding than breastfeeding of infants which may have an impact on this issue. Dr Elizabeth Sellers (Department of Paediatrics’ and Child Health, University of Manitoba, Canada) pointed out that in some indigenous communities the knowledge of how to breastfeed is not passed on from generation to generation and new mothers need help and support to breastfeed and breastfeeding intervention programmes could help with this.

Dr Florence Levy (Regional Advisor on Diversity and Health, Pan American Health Organization/World Health Organization, US) highlighted the importance of having a multi-sector approach to seek solutions, as this problem had many factors. Indigenous peoples should participate fully in the dialogue, exchanges and alliances, for example between researchers and politicians, as the approach to the solution may come from the indigenous community itself, she concluded.
Dr Anthony Hanley (Faculty of Medicine, University of Toronto, Canada) opened the session with a presentation on diabetes co-morbidities and the double disease burden amongst indigenous communities. There are three main groups of Aboriginal peoples in Canada, representing 4% of the total population. “But it is worth noting that there is an enormous heterogeneity across the country within each of these groups,” explained Dr Hanley. The Aboriginal population is a very young, increasingly urbanised community with about 50% under the age of 25. There are marked disparities in the social determinants of health including education, unemployment and income.

“Aboriginal peoples of Canada have undergone a massive epidemiological transition, with very limited chronic disease and a healthy population pre-contact, but in contrast infectious and chronic diseases increase from the 17th Century onwards,” said Dr Hanley. “While there has been a decline in infectious disease over the past half century, they have stabilised at a level still above that of the non-Aboriginal population. Tuberculosis has declined but has remained at a rate that is 10-fold higher than the general population, which does track with the social determinant of housing density or crowding” (see figure below).

This epidemiological transition has impacted mortality rates and age-standardised leading causes of death are higher in First Nations communities than in the general population (see figure below).

“In particular, acute myocardial infarction and stroke rates are significantly higher in First Nation communities than the general Canadian population,” remarked Dr Hanley.

Dr Hanley presented data from the Sandy Lake Health and Diabetes Project, which was initiated in 1991 and is a partnership between Sandy Lake First Nation and health researchers. The project showed high levels of type 2 diabetes and impaired glucose tolerance in the indigenous population. “The temptation is to paint in broad brush-strokes and that is very risky, but rates of complications of diabetes in indigenous populations around the world are very high. International comparisons are difficult, but what is apparent is that kidney complications are notably prevalent among indigenous peoples with type 2 diabetes”, reported Dr Hanley (see figure next page).
Studies have shown that rates of nephropathy are higher in indigenous peoples and the Aboriginal population is 16 times more likely to manifest end stage renal disease than the general population. A study in Alberta has shown a two-fold higher prevalence of severe chronic kidney disease in the First Nation community and an increased mortality risk. However, the same study shows lower transplantation rates in Aboriginal peoples compared with the general population which is not explained by remote location. Other complications are also evident and Dr Hanley noted “we are now also beginning to see increased rates of cardiovascular disease”.

“Clinical management of type 2 diabetes is clearly important. But we need to focus on primary prevention and turn the tap off at its source,” concluded Dr Hanley.

Reviewing the burden and determinants of diabetes and heart disease in indigenous Australians, Professor Alex Brown (Executive Director, Baker IDI Heart and Diabetes Institute’s Centre for Indigenous Vascular and Diabetes Research, Alice Springs, Australia) began by explaining that the heterogeneous Aboriginal community, which represents about 2.5% of the population of Australia, has a markedly different age distribution of deaths compared with the non-indigenous population.

“The vast majority of deaths in indigenous Australians occur before the age of 55 and as a consequence we have massive life-expectancy differentials. There is a life expectancy gap of about 17 years for indigenous males and 19 years for indigenous females, of which about 80% is attributable to non-communicable diseases, with cardiovascular disease accounting for 33% and diabetes 9% of this gap,” explained Professor Brown.

Looking at age specific mortality differentials, Professor Brown highlighted that diabetes has by far the biggest mortality rate ratio: “For people between the ages of 35-54, indigenous females are over 35 times more likely to die from diabetes than their non-indigenous counterparts and indigenous males almost 25 times. Looking at projections of chronic disease mortality, for indigenous Australians this gap will continue to widen in the next 20 years” (see figure below).

Professor Brown presented data from the Aboriginal community surveys within Central Australia, which showed “enormously high” rates of smoking, obesity, hypertension, diabetes, renal and cardiovascular disease in a cohort with a mean age of just 42 years of age. “Of the 209 patients undergoing renal dialysis at the Alice Springs clinic, 98% are indigenous and 65% of those have diabetes as their primary cause of end stage renal disease,” reported Professor Brown. “Indigenous people with diabetes are over eight times more likely to die from coronary heart disease. Diabetes is a driver of mortality, an important contributor to heart failure and a marker for people who have early cardiac damage”.

Professor Brown has conducted research focusing on the links between depression and heart disease in Aboriginal men. In the first interview for this study, Professor Brown was told it was an impossible task: “What scientists hold stock in is only what they can measure. But you can’t measure the mind or spirit. You can’t weigh it, you can’t deconstruct it. But only if we do will they see that Aboriginal people are spectators to the death of their culture, their lives… We watch as our culture dies. How are you going to measure that?”

The research showed that issues such as basic needs, racism, not being able to make life decisions and worry regarding the safety of family all had a major impact on stress. “I don’t want to give these Aboriginal men the label of depression, which is a western diagnostic classification, but depressive symptoms were extremely common in

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**Figure. 12. Showing Micro vascular complications amongst the indigenous peoples compared to the general population.**

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**Figure. 13. Age distribution of mortality amongst indigenous and non-indigenous Australians, Qld, WA, SA and NT, 2002-2006.**

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**Microvascular Complications: Nephropathy**

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**Age at Death – Indigenous Australians**

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* Represents only men

* Represents only men Naqshbandi, Harris et al 2008

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**Source:** AIHW 2009.
this group,” reported Professor Brown. “And those with elevated depressive symptoms were almost 10 times more likely to have heart disease, to smoke and drink alcohol to excess. Depression was also the strongest predictor of obesity”.

Andrew Tjapaljari Spencer, an Aboriginal man from the western desert of central Australia, painted a picture for Professor Brown showing how he perceives stress and worry leads to depression, causing a range of impacts on biological processes which can result in a heart attack. In the painting depression ultimately impacts the person’s spirit, which can be positively influenced by reconnecting to family, community, land and culture. “This painting shows the pathophysiological links between stress and chronic disease” said Professor Brown (see figure below).

Professor Brown concluded by discussing the two non-converging views of diabetes. While the medical causation for diabetes focuses on unhealthy lifestyles, indigenous Australians believe diabetes is a consequence of a number of issues including socio-cultural change and disharmony. “If we look at the emerging literature across a whole range of paradigms, we see that the balance is shifting in favour of the way indigenous peoples understand the world. But we currently have a system that is fundamentally wrong when it comes to providing for individuals with chronic conditions. We have to focus on promoting wellness, being proactive not reactive and moving away from control through fear and risk. We need to develop functioning systems that rely on human capital and our relationships with patients. Until we can change this mind-set we are always going to be struggling”.

Dr Blanca Restrepo (University of Texas School of Public Health, US) presented the rising burden of diabetes: consequence for tuberculosis (TB) control. People with diabetes are more susceptible to lower respiratory tract infections, including TB, and diabetes is re-emerging as a significant contributor to developing TB. Among the 10 countries that had the highest number of diabetes cases worldwide in 2000, seven of these countries also had a high burden of TB as designated by the WHO. “When you compare American Indians with non-Hispanic whites as a reference, there is up to five times more diabetes and six times more TB among American Indians”, said Dr Restrepo.

As both TB and diabetes are studied separately, Dr Restrepo’s group has been studying diabetes and TB in the Hispanic population - which has much higher rates of TB and diabetes than the non-Hispanic white population - in clinics in South Texas on the Mexico border and in Northeast Mexico. “I’m a laboratory scientist and I see this location as like a test tube of these countries where you have high diabetes and TB at the same time,” explained Dr Restrepo. “The prospective study we conducted evaluated the impact of diabetes on TB control in this region and with this knowledge we looked at what we can do to improve TB and diabetes in this population”.

The study took patients who had confirmed TB and were over 20 years of age and classified them using hyperglycaemia or self-reported diabetes as either having diabetes or no diabetes. “These were mainly Hispanic whites with low socio-economic status. In Texas we found 42% of TB patients had diabetes and in Mexico 36%. This is one of the highest rates of diabetes among TB that I have seen in the literature, and significantly higher than the general population. This means that people with diabetes are three-fold more likely to develop TB,” reported Dr Restrepo. “Perhaps the most important finding was that the population attributable risk of TB due to diabetes is 28% in Texas. This means that one out of every three or four patients develop TB due to diabetes in our community” (see figure below).

The following table shows the population attributable risk of TB due to diabetes and HIV in Texas and Mexico:

<table>
<thead>
<tr>
<th>Population attributable risk of TB</th>
<th>Diabetes</th>
<th>HIV</th>
</tr>
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<tbody>
<tr>
<td>Texas</td>
<td>28%</td>
<td>6%</td>
</tr>
<tr>
<td>Mexico</td>
<td>24%</td>
<td>3%</td>
</tr>
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</table>

Drrestrepo et al., 2011

Figure. 14. Indigenous painting that shows the patho-physiological links between stress and chronic diseases.

Figure. 15. Comparison of the contribution of tuberculosis and diabetes and linkages to HIV.
Dr Restrepo explained that the other important finding was how aware patients were that they had diabetes prior to their TB diagnosis. While in Texas 96% of patients self-reported their diabetes, in Mexico only 79% did so. “Of those who were unaware they had diabetes, the majority were males. TB is more common in males and therefore TB drives men to the physician – so this is an opportunity to diagnose new diabetes cases in men,” said Dr Restrepo.

With regards to prevention, the study also looked at patients that had been exposed to TB and had diabetes. Dr Restrepo explained: “Diabetes compromises the immune response and detection of latent TB infection is based on having a competent immune system. We took our TB patients and compared people with diabetes and without diabetes and saw how they responded to tests that detect TB infection. We found that patients with diabetes, high HbA1c, high hyperglycaemia or a high body mass index were two- or even three-fold more likely to have a positive QuantiFERON-GOLD result which is great news as it helps us identify diabetics with latent TB infection”.

“The main message is that there should be synergy between the TB and diabetes programmes. Patients with diabetes have a poor prognosis with TB – they are more likely to relapse and die. It is therefore important to know if someone has diabetes when they have TB because we can manage their diabetes and TB at the same time. If someone has diabetes it would also reinforce the recommendation for preventive TB treatment for someone who has been in contact with TB,” concluded Dr Restrepo.

Traditional knowledge and practices of indigenous peoples in coping with diabetes was presented by Dr James Mbaria (Department of Public Health, Pharmacology & Toxicology, University of Nairobi, Kenya), who explained that indigenous peoples have unique and diverse practices for the treatment of diabetes including psychotherapy and spiritual psychotherapy. However the most important is phytotherapy: the use of medicinal plants. Dr Mbaria reported that over 70% of the Kenyan population rely on traditional remedies, yet the Ministry of Health does not recognise these as medicines – instead they are placed under the Ministry of Culture.

There are numerous anti-diabetic plants all over the world. They contain many active substances, called phytochemicals, including alkaloids and steroids, which are unequally distributed in a plant. “Indigenous peoples know the parts of the plant to harvest. They also have information on how to gather and preserve it. They have indigenous knowledge on factors that influence the efficacy and potency such as age of plant, climate and type of soil. Methods of preparation are diverse and include herbal teas, infusions, decoctions, extractions and fresh juice;” said Dr Mbaria.

According to Dr Mbaria, traditional healers including herbalists believe they receive their “power of knowledge” through magical contacts with dead ancestors, inspiration and dreams. This knowledge is then orally passed from generation to generation. “Other traditional healers say they learn from animal behaviour. An animal with diabetes will eat certain plants;”explained Dr Mbaria.

While African colonizers called the medicine of the native people “traditional” and the indigenous peoples call imported medicine “modern” or “conventional”, Dr Mbaria believes that these two types of medicine do not necessarily have to oppose each other. “It is important to remember that in both types of medicine, the active ingredient is a chemical substance. The difference is in conventional medicine the molecule is known while in traditional medicine the plant hasn’t been subjected to clinical studies to discover the actual pharmaceutical ingredient;” said Dr Mbaria.

But popularity of traditional herbal medicine has opened an era of international trade in alternative medicine, concluded Dr Mbaria: “Scientists have recognized the value of indigenous knowledge on diabetes and there is a surge in modernization of traditional/indigenous medicine in order to complement conventional medicine. Indigenous anti-diabetic plants are now being subjected to scientific studies for efficacy, safety and identification of active ingredients. An investigation is currently taking place in one of the communities in Kenya, where the Kamba indigenous people use single plants or in combination from 13 plant families to develop remedies that can treat diabetes. There is a lot of work to be done on indigenous medicine and a lot to learn from indigenous systems for the treatment of diabetes”.

PLENARY PANEL – Q&A SESSION

In the following question and answer session, Dr Michael Lynge Pedersen (Physician, Greenland) remarked that 60 years ago, TB rates were high in the indigenous populations in Greenland. Rates then fell, but are now rising again and he queried who with diabetes should be tested for TB. Dr Blanca Restrepo (University of Texas School of Public Health, US) responded that in order to prioritise resources, not every diabetes patient should be tested for latent TB infection. Emphasis can be placed on those with the highest risk of progression to TB, who are the contacts who have recently been infected with TB and have diabetes. If they have latent TB infection then they should be candidates to receive preventive TB treatment. She also highlighted that TB clinics provide a good opportunity for men to be tested for diabetes because men don’t usually go to the physician. Dr Anil Kapur (Managing Director of the World Diabetes Foundation, Denmark) further stressed the importance of screening all TB patients for diabetes as
so often this link is missed. Similarly people with diabetes should be screened clinically for TB.

On the subject of traditional medicines, Dr Treena Delormier (PhD in Nutrition, Kahnawake Diabetes School Project, Quebec, Canada) asked what can be done to protect the trust between researchers and indigenous peoples regarding what can be done with the knowledge shared about traditional medicines. Dr James Mbaria (Department of Public Health, Pharmacology & Toxicology, University of Nairobi, Kenya) responded that the communities need to have a clear understanding of what the knowledge is being used for. He expressed the importance of going through the community leaders initially and getting them to sign a document which states that the information belongs to the community. Ms Ida Nicolaisen (Former Vice Chair of the UN Permanent Forum on Indigenous Issues and Board Member of the World Diabetes Foundation) agreed that this was important and remarked that the issue of intellectual property rights has been taken up by the UN Permanent Forum on Indigenous Issues.

Regarding the lack of a word for diabetes in indigenous peoples’ languages, Professor Alex Brown (Executive Director, Baker IDI Heart and Diabetes Institute’s Centre for Indigenous Vascular and Diabetes Research, Alice Springs, Australia) explained that in central Australia there is no term for diabetes in the main language groups in this region. Diabetes is described as the white man’s disease which has been brought upon indigenous Australians. Dr Anthony Hanley (Faculty of Medicine, University of Toronto, Canada) explained that a word had been created for insulin with the elders in the Oji-Cree population which loosely translates as “watery-sugar-key” as diabetes – called “Sho-ga-wa-pin-ay”, meaning “sugar disease” – is a new disease in this population. Dr James Mbaria added that diabetes was a relatively new disease for indigenous communities in Kenya too and more education was needed.
The fourth session of the meeting began with a presentation by Dr Anil Kapur (Managing Director of the World Diabetes Foundation, Denmark) on building capacity and setting up clinics for diabetes prevention and care. The role of the World Diabetes Foundation is to fund projects and support existing systems to address the burden of diabetes for the poorest of the poor in developing countries. Acting as a catalyst, the Foundation enables others to create sustainable partnerships. Furthermore, the Foundation links people and resources to advocate globally and provide local, sustainable care.

“The World Diabetes Foundation has three key focus areas,” explained Dr Kapur. “Firstly, we aim to improve access to care, including building capacity. Even where facilities exist there are some areas of diabetes care that remain orphans, for example prevention of amputations and blindness. Our second focus area is primary prevention via maternal health initiatives, school health programmes and community awareness. The third focus area, advocacy, includes organising meetings to support global stakeholders such as this meeting. Over the last 10 years we have funded 279 partnership projects in 100 countries, totalling a project portfolio of USD 261.2 million, of which USD 86.9 million is donated by the Foundation.”

The World Diabetes Foundation’s funding has trained 37,675 doctors, 39,709 nurses and 65,199 paramedics in diabetes-related care and established 4,900 clinics and micro-clinics in developing countries, which provide care for over 1,369 million people. Over 8,000 health care professionals have been trained in foot care, enabling almost 371,000 people to be screened for diabetic foot.

Dr Kapur announced that the World Diabetes Foundation is also the largest funder in the developing world for diabetes and eye care programmes, with 49 projects in over 20 countries providing diabetes related eye care to over 400 million people. “More than 61,000 people have received sight saving laser therapy literally at their doorstep,” explained Dr Kapur. “But we found that even with a diagnosis people wouldn’t travel for the next round of laser therapy, so we put a laser unit in the van and local doctors have been trained to use the equipment so that people leave having received treatment”.

The Foundation has since included further equipment in such vans, so creating advanced mobile care units offering secondary-level care on the patients’ doorsteps. In other countries where qualified health care professionals are not available the World Diabetes Foundation has supported peer educators who are trained to encourage self-management and bring supplies to patients in the villages.

In conclusion Dr Kapur said: “My dream of how chronic care should be delivered is based on a primary care setting where services for diabetes, hypertension, maternal and child health, communicable and non-communicable diseases are integrated and provided. This primary health centre should be supported by advanced mobile units. Outreach services should be provided in schools and communities using a community health agent and involving the community, using the technology that is available such as mobile phones. This is the only way we can provide a solution for chronic care” (see figure below).
Professor Kerin O’Dea (Sansom Institute for Health Research, Australia), described going from policy plan to action – integrating National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan. The adverse health impacts of poor nutrition in indigenous Australians are today evident across the lifespan. “This is particularly serious in young women in the reproductive age group, who are gaining weight at the highest rate in these indigenous populations,” said Professor O’Dea.

Discussing diet, Professor O’Dea reported: “Indigenous communities have very high intakes of refined carbohydrates, soft drinks and low cost fatty meats and very low intakes of fresh fruits and vegetables. Why is this? Some think it is due to ignorance and it is a widely held assumption that Aboriginal people have conservative food preferences but our observations are very different. People do like high quality food, are keen to taste new dishes and they understand the qualities of healthy and unhealthy foods, so we need to look elsewhere for a cause”.

The economics of food choice plays an important role in diet. Maximising calories (the hunter/gatherer principle of eating as much as you can when food is available), reducing food spending by sacrificing quality before reducing quantity, and women restricting their own food intake to protect children yet gorging when they can, all lead to an unhealthy diet.

“Data from one of the communities we work in shows the actual true cost of foods and it is a very striking gradient,” said Professor O’Dea (see figure below).

Relative cost and energy density

“Fats and oils, sugar and flour are what people rely on – a low protein, filling, low cost diet. The other side of the graph is the foods that we educate people on – fresh fruit and vegetables, fish and lean meat. These are expensive particularly in remote communities”.

In Australia the National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan aims to address the issue of food and nutrition insecurity among indigenous peoples. “There are many players including NGOs who offer breakfast and lunch programmes, government agencies who offer meals to the elderly and dependent people, community groups and the private sector who provide food donations. But it is completely ad hoc and uncoordinated and we have no idea whether it’s effective. So we need system-level change,” reported Professor O’Dea.

Remote indigenous communities are particularly disadvantaged as they are often poor and rely on a single store where fresh food is very expensive, and many stores are poorly managed. In response to this, the Australian Government has funded outback stores to implement quality improvement in management practices and food supply. “We have an exciting opportunity to evaluate new approaches to enhancing the quality and affordability of healthy food in remote stores”, said Professor O’Dea who has recently been appointed to the board governing this initiative.

With regard to implementation of the Nutrition Action Plan, potential targeted programmes include a programme for women, infants and children with vouchers for healthy food and incentives for breastfeeding, which could be run through the primary care system, and school-based breakfast and lunch programmes guaranteeing quality meals. Potential programmes focusing on the food supply include a subsidy for a healthy food basket, which according to Professor O’Dea is very popular with Aboriginal peoples in remote communities, incentive payments for healthy food purchases, taxes on unhealthy products and the introduction of healthy takeaways. “Potential programmes for vulnerable groups must be done with full involvement of the communities,” added Professor O’Dea.

“International experience indicates that targeted national programmes can be very cost effective but there is little international experience yet to draw on for food subsidies and taxes. We will be interested to see the impact in terms of sales for foods in Denmark that have been targeted with taxes as they contain high fat, salt and sugar,” concluded Professor O’Dea.

Diabetes education and nutrition in Mali and improving care amongst the Tuareg population was presented by Mr Stéphane Besançon (Santé Diabète, Bamako, Mali). Mali is among the 10 poorest countries in the world, with very little human and financial resources devoted to health. The north of Mali consists of two thirds of the country and is mainly desert with a very low population density, consisting of five ethnic groups. The two main ethnicities in the desert area are the Moors and Tuareg communities.
In the north there are four regional hospitals covering this population “So for those living outside urbanised areas there is very small access to the health system,” reported Mr Besançon. “For the Touareg population there is very little access to health services even if they travel 200 km to one of the major towns. Public services are non-existent and epidemiological data is therefore very rare for these ethnic groups”.

Over the last 3 years the Government and NGOs, including Santé Diabète, have been working to improve access to health for these populations. A pilot programme was launched to provide mobile access to care. The nomadic health programme is conducted by a health team composed of one doctor and one obstetrician/nurse. The team tour for 3 weeks per month covering 100 km to monitor seven areas. “The nomad communities are grouped around the wells where there is water, so the mobile team has to move between these wells. These populations can live 3 or 4 km from the well so it is a question of running after the patients to give them care,” explained Mr Besançon.

The project undertook a study of the prevalence of diabetes, hypertension and obesity in the Tuareg and Moors populations. “It was necessary to screen around 335 families and in total 1009 people – 528 women and 481 men – were surveyed. We found 35.6% of women suffered with obesity compared with 4.2% of men. The overall prevalence of diabetes was 2.61% and overall prevalence of hypertension was 20.44%;” reported Mr Besançon.

Following the study the mobile health team received training on the prevention of risk factors for diabetes and hypertension, screening, the management of diabetes and hypertension without complications and giving simple patient education. The team also received equipment and medical supplies including scales, a small fridge, a blood glucose meter and insulin. Finally, prevention education tools were adapted to the local context. “The mobile health team can now screen for diabetes and hypertension, provide consultations and treatment for diabetes and hypertension, conduct prevention sessions on risk factors and symptoms and give basic education for patients,” said Mr Besançon, who went on to explain that in this small pilot project, the team supports over 20 people with diabetes and over 200 patients with hypertension. More complicated cases are referred to the regional hospital in Timbuktu.

There have been a number of cultural barriers regarding prevention, explained Mr Besançon: “There is a high rate of prestige attached to obesity. In order for the women to marry they need to be overweight so girls aged 11-13 have a specifically rich diet, taking on 20 kilos in the 6 months before they marry. These are matriarchal societies where the men do the work while the women are immobile. It is therefore necessary to work with community leaders to change attitudes. Mentalities are changing but we also need to help them to change eating habits which include very high consumption of red meat, milk, very sweetened tea, butter and salt”.

There are also a number of challenges to the project’s success. “It is difficult to keep the staff of the mobile team because of the harsh working condition involving tours lasting 3-4 weeks in the desert. We want to promote physical activity but the heat and culture are major barriers. Changing dietary habits is not easy in this environment as people do not have access to a varied diet. Also, there are problems with the management of complicated cases as the mobile team is not a mobile hospital – just a very basic clinic,” explained Mr Besançon.

However, there have been many successes. Patients now have access to screenings, basic treatment and adapted prevention and education tools and risk factors in the nomadic population have been identified. The government and NGOs had therefore planned to extend the project to other regions in the north but unfortunately 6 months ago the revival of the Tuareg rebellion and the presence of Al-Qaeda led to many difficulties in pursuing this project. “We must wait for stability to return to the area before planning future actions. Unfortunately it is the community paying the price for this political situation,” concluded Mr Besançon.
Professor Mohamed Eltom (Sudanese Diabetes Association and Sudanese Association of Physicians, Khartoum, Sudan) discussed diabetes community care in Sudan. On 9 July 2011, South Sudan gained independence from Sudan, resulting in diabetes prevalence increasing from 8% to 14% as diabetes in the south is very rare. “In Sudan only about 12% of patients have adequate glycaemic control so most patients have low quality of life and acute and long-term complications are very prevalent. There are high mortality rates among children as well,” reported Professor Eltom.

According to Professor Eltom, only about 4% of the national budget goes towards health care – resulting in an insufficient health care system including a reduced level of well organised diabetes care and a lack of health care professionals. “We have a good number of medical schools but doctors are poorly trained and when they are trained they migrate to countries with a better market,” he said.

Patients lack awareness, education and empowerment resulting in poor compliance. “Drugs are becoming more available but they are very expensive and health insurance only covers about 20% of the population. A child living with diabetes costs the family about USD 283 a year which is about a third of the family income. Glycaemic control for type 2 diabetes costs about USD 175 a year, which is about 90% of out-of-pocket expenses for that patient,” explained Professor Eltom (see figure above).

“But diabetes control is equally bad in high- or low-income groups. Cost is therefore not the most important part. Education, empowerment and care of the patients plays a role”.

In 2003, the World Diabetes Foundation supported its first project in Sudan, acting as a catalyst for further projects in the country focusing on access to care, advocacy and capacity building. “The most important aspect was strengthening the partnership between the government, NGOs, academics and community to improve care. Twelve diabetes associations have been established in 12 states and 100 diabetic community societies in the districts. These are important for advocacy, primary prevention and support of vulnerable groups in the communities. To have good community leaders we trained 72 people in the management and finance of civil societies. We established 12 laboratory facilities to provide diagnostic services in the area and to provide revenues for the diabetes associations. We have also established four referral clinics,” said Professor Eltom.

Other projects supported by the World Diabetes Foundation in Sudan focused on improving diabetes care and eye care for children, the management of gestational diabetes, prevention of major amputations and capacity building through training of health care professionals and the establishment of clinics and mobile units.
EXPLORING INTERVENTIONS AND BEST PRACTICES

Looking at indigenous peoples in Sudan, Professor Eltom explained that there is a high prevalence of diabetes in the internal displacement camps of Darfur, where nomadic people are now eating market-bought food. “The Danagla community in Sudan, as Nubians of South Egypt and north Sudan, has the highest prevalence of diabetes. They originate from the southern and western parts of Sudan. Recently they have migrated to all parts of the country and abroad. The total population is about 2 million but only about 300,000 are living in the North State of Sudan. These communities are heavily influenced by ancient and modern Egypt. The habit of smoking is a popular fashion imported from Egypt. Characteristically they are known to be very good at cooking exotic food, which may be related to higher rates of diabetes,” said Professor Eltom. “In the 15 years from 1995 to 2010, the prevalence of diabetes in the Danagla community in the North State has increased almost three times, from 8.3% to 21.3% (see figure below).

In conclusion, Professor Eltom said that the World Diabetes Foundation has created a solid platform for promoting diabetes care in Sudan. “I hope that the collaboration in these projects can bridge the gap between North and South Sudan in what we call health diplomacy,” he said.

PLENARY PANEL – Q&A SESSION

Dr Anil Kapur (Managing Director of the World Diabetes Foundation, Denmark) stressed in the following question and answer session the importance of providing basic services for people suffering with diabetes in addition to offering prevention programmes and that primary care should offer these services while also serving as a platform for outreach initiatives, raising awareness, advocacy and building initiatives for health promotion. Professor Pierre Lefèbvre (Chairman of the World Diabetes Foundation) commented on the health diplomacy occurring in countries such as Sudan and the importance of mobile clinics. An example of health diplomacy occurring in a very difficult part of the world can be seen in Palestine as in the West Bank there are many people with diabetes who need help but who cannot attend the Augusta Victoria hospital which is only a short distance away in Jerusalem. Mobile clinics in the West Bank are helping to solve this problem. Ms Ida Nicolaisen (Former Vice Chair of the UN Permanent Forum on Indigenous Issues and Board Member of the World Diabetes Foundation) agreed that mobile clinics should be used more to reach the indigenous populations who are often marginalised geographically.

Ms Nicolaisen went on to draw delegates attention to using this particular model as an inspiration for a more coherent programme for indigenous peoples, and why the cross-fertilisation of such ideas shared at this meeting was so important. She also added that networks should be developed in a more systematic way. Professor Alex Brown (Executive Director, Baker IDI Heart and Diabetes Institute’s Centre for Indigenous Vascular and Diabetes Research, Alice Springs, Australia) agreed that it is important to connect indigenous peoples around the world to develop a clinical, research and advocacy network. Mr Terry Ehau (National Maori Organisation for Diabetes, Te Roopu Mate Huka O Aotearoa, New Zealand) commented that in his experience policy is written prior to consultation, so relationships with ministries of health must be changed, and this is where the World Diabetes Foundation’s support would be invaluable. Professor Ib Bygbjerg (Board Member of the World Diabetes Foundation) agreed that the Foundation can help advocate for indigenous peoples and Mr Ehau added that sharing minds and ideas costs nothing and that the World Diabetes Foundation could be a champion for this cause.

Figure 19. Showing the prevalence of diabetes and IGT in the Danagla community in Northern part of Sudan.

The good news is that the rates of detection have increased, which indicates improving access to care as a result of stronger cooperation between the local communities and the diabetes associations”.

In conclusion, Professor Eltom said that the World Diabetes Foundation has created a solid platform for promoting diabetes care in Sudan. “I hope that the collaboration in these projects can bridge the gap between North and South Sudan in what we call health diplomacy,” he said.

Prevalence of Diabetes and Impaired Glucose tolerance (IGT) In Danagla Community, North State years 1995* and 2010

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number studied</td>
<td>724</td>
<td>1115</td>
</tr>
<tr>
<td>Males</td>
<td>242</td>
<td>376</td>
</tr>
<tr>
<td>Females</td>
<td>482</td>
<td>739</td>
</tr>
<tr>
<td>Prevalence of DM (%)</td>
<td>8.3</td>
<td>21.3</td>
</tr>
<tr>
<td>Known cases (%)</td>
<td>3.2</td>
<td>16.0</td>
</tr>
<tr>
<td>New cases (%)</td>
<td>5.6</td>
<td>5.3</td>
</tr>
<tr>
<td>Prevalence of IGT (%)</td>
<td>7.9</td>
<td>16.8</td>
</tr>
<tr>
<td>Prevalence of total glucose intolerance (%)</td>
<td>16.2</td>
<td>38.7</td>
</tr>
</tbody>
</table>

During the final session of the meeting delegates worked in groups to discuss how to leverage the learnings from sustainable and scalable interventions and how to take an integrated approach for improving prevention and care for indigenous peoples. Measures were suggested to define affective basic partnerships and models to support NCDs and diabetes care, based on projects and lectures presented during the meeting. Delegates subsequently came together to discuss and agree upon a Call to Action.

**CONCLUDING REMARKS**

At the close of the meeting, the Chairman of the World Diabetes Foundation, President of the IDF and representative of the UN Permanent Forum on Indigenous Issues thanked participants for their energy, enthusiasm and contributions during the 2-day meeting. “This has been a stimulating meeting,” said Professor Mbanya (President of the IDF). “We have been able to cross-fertilise our ideas which I hope will help build a stronger future for indigenous peoples around the world. I can assure you that the IDF will work tirelessly to give the Call to Action as much publicity as possible”.

Regarding the next steps, Ms Nicolaisen (Former Vice Chair of the UN Permanent Forum on Indigenous Issues and Board Member of the World Diabetes Foundation) said: “If we can unite as we have done here over these last 2 days and feed in the Call to Action strategically from the top of the UN, to the IDF Associations, researchers, collaborative partners, indigenous organisations and institutions, then we can really make a difference soon – something that people can feel on the ground”.

Ms Hasteh (Member and Rapporteur of the UN Permanent Forum on Indigenous Issues) explained that she had already been discussing the outcome of the meeting with the Chair of the Forum. The key messages from the meeting and the Call to Action will be conveyed by Ms Hasteh to the Forum at their annual session in May 2012 to ensure enough attention is given to the issue of diabetes. “I hope that the Permanent Forum will work closely with the World Diabetes Foundation and the IDF in order to elevate the status of health of the indigenous peoples around the world,” added Ms Hasteh.

Closing the meeting, Professor Lefèbvre (Chairman of the World Diabetes Foundation) thanked the expert delegates once again for their valuable support which has strengthened the World Diabetes Foundation in its resolve to work towards bringing the issue of indigenous health onto the global health agenda.
The Expert Meeting on Indigenous Peoples, Diabetes and Development was organized through a collaborative effort by the World Diabetes Foundation and the International Diabetes Federation.

The Expert Meeting was attended by a broad range of stakeholders including; indigenous representatives from 15 countries, international health experts, researchers, special rapporteurs on indigenous issues from the United Nations, representatives from the United Nations Permanent Forum on Indigenous Issues, the Pan American Health Organization, the World Diabetes Foundation project partners and academics.

The meeting was addressed by Ms Paimanéh Hasteh, Rapporteur of the United Nations Permanent Forum on Indigenous Issues on behalf of Dr Myrna Kain Cunningham, Chair of the United Nations Permanent Forum on Indigenous Issues, who could not attend due to other pressing engagements; Professor Jean Claude Mbanya, President of the International Diabetes Federation; Professor Pierre Lefèbvre, Chairman of the World Diabetes Foundation, Ms Ida Nicolaisen, Former Vice Chair of the United Nations Permanent Forum on Indigenous Issues and Board Member of the World Diabetes Foundation.

The experts recall:

- The United Nations Declaration on the Rights of Indigenous Peoples of 13 September 2007 which addresses their individual and collective rights.

- Other relevant resolutions of the General Assembly, the Human Rights Council and the Economic and Social Council relating to the rights of indigenous peoples.


- UN Resolution 61/225 on Diabetes, 2006

- Human Rights Council resolution 15/14 of 30 September 2010, by which the Council decided to extend the mandate of the Special Rapporteur on the rights of indigenous peoples, and resolution 15/7 of 30 September 2010, on human rights and indigenous peoples.

The experts take note of and acknowledge:

- The Political Declaration of the UN High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases adopted on 19 September 2011; recognizing in particular the call to encourage the involvement of indigenous peoples and communities in the development, implementation, and evaluation of non-communicable disease prevention and control policies, plans and programmes.

- The leading role of the WHO as the primary specialized agency for health and coordination role in promoting and monitoring global action against non-communicable diseases amongst indigenous peoples in collaboration with the UN Permanent Forum on Indigenous Issues.

The experts recognize that:

- The estimated number of adults living with diabetes has soared to 366 million, representing 8.3% of the global adult population. This number is projected to increase to 552 million by 2030, if no urgent action is taken. This equates to approximately three new cases every 10 seconds or almost 10 million per year.

- Where disaggregated data are available, many of the world’s 370 million indigenous peoples experience high
rates of disease and premature death from type 2 diabetes, cardiovascular diseases, cancer, malnutrition, infant and maternal mortality. Furthermore there exists unacceptable disparity in health outcomes between indigenous and non-indigenous populations.

- Poverty is both a cause and consequence of non-communicable diseases. Whilst poverty contributes to rising rates of non-communicable disease, it also worsens poverty amongst indigenous populations, posing a direct threat to health, economic and social development, each of which will negatively impact the attainment of the Millennium Development Goals.

- If appropriate public health action is not initiated, disability and deaths from diabetes, heart disease, cancer, kidney failure, and chronic respiratory diseases will continue to grow. This growth in non-communicable diseases will be disproportionately borne by indigenous peoples, who because of poverty, poor access to services and political and social marginalisation, will be less able to deal with the rising burden of illness.

- The existing health care capacity is inadequate to meet the health related needs of many of the world’s indigenous peoples. Where health services exist, they are all too frequently inaccessible, inappropriate or unaffordable for indigenous communities and families and do not take into account the holistic indigenous concepts of health, their culture, and traditional knowledge systems.

- Many of the world’s indigenous women bear a disproportionate share of the non-communicable disease burden, yet are often unable to access education and basic health care due to cultural differences, perceptions of health, social processes, and the experience of violence, prejudice and discrimination.

- Maternal and child health issues amongst indigenous peoples are inextricably linked with the development of non-communicable diseases and their risk factors, specifically as perinatal malnutrition and low birth weight (intrauterine growth restriction), creating a predisposition to obesity, high blood pressure, heart disease and diabetes later in life; and maternal obesity and diabetes during pregnancy (gestational and pre-existing diabetes) contribute to immediate and long term health risks for both the mother and her offspring.

- High rates of undiagnosed and poorly controlled diabetes in communities of indigenous peoples experiencing high incidence of infectious diseases such as tuberculosis, may limit and reverse improvements in infectious disease control if adequate diabetes control measures are not immediately put in place.

**The experts affirm that:**

- **Engagement and self-determination:** Indigenous peoples must be fully engaged in and supported to define, implement and evaluate policies and programmes aimed at preventing and controlling diabetes and other non-communicable diseases.

- **Family-centred policy:** Indigenous families and communities are essential to the creation and maintenance of health and wellbeing and as such, should be the primary target for health education, prevention activities, and clinical care of diabetes and other non-communicable diseases.

- **Holistic approaches to health:** The development and perseverance of indigenous peoples’ social, physical, spiritual and emotional well-being is central to health and should remain the primary focus of all health and social programmes that seek to reduce the burden of diabetes and other non-communicable diseases.

- **Indigenous lands and territories:** The health of the environment and enduring relationship between indigenous peoples and their traditional lands, territories and waterways are essential to the preservation of cultural practice, biodiversity, food security, intergenerational learning and survival of indigenous peoples and is critical to the prevention and control of diabetes and other non-communicable diseases.
The experts recommend urgent action to address and mitigate these threats through the following mechanisms and actions:

Social and cultural determinants of health

- Recognition of and improvement in the social, economic and cultural determinants of health amongst indigenous peoples is critical for the prevention and control of non-communicable diseases. Overcoming poverty is central to preventing and mitigating the epidemic of non-communicable diseases.

- Human-rights based approaches to health issues, including non-communicable diseases, are key to effectively tackling the root causes of diseases and to tailoring programmes and projects which take into account the needs, rights and world views of indigenous peoples.

- In particular, indigenous peoples' land rights, right to food and food security must be recognized.

- Indigenous peoples traditional medicines, including the conservation of vital medicinal plants, ecosystems, animals and minerals should be respected, preserved and promoted to improve health.

Programme development

- The participation of indigenous peoples and local communities in the development, implementation, and evaluation of non-communicable disease prevention and control policies, plans, programmes and priority settings should be ensured and supported. Furthermore ensure these mechanisms are in compliance with the principle of free prior and informed consent, and respect the individual and collective rights to the highest attainable standards of health and health services, as set in the United Nations Declaration on the Rights of Indigenous Peoples.

- Programmes and models of health care delivery for indigenous peoples should take into account indigenous concepts of health, encompassing their physical, social, mental, environmental and spiritual dimensions of well-being.

- The development of programmes that reduce shared non-communicable disease risk factors is essential and should focus on healthy lifestyles, diet, smoking cessation, the avoidance of harmful use of alcohol and the reduction of psychosocial stressors in indigenous peoples' lives.

Processes

- Health care systems should be strengthened, adjusted and integrated to address the prevention and care of non-communicable diseases among indigenous peoples, especially at the primary health care level.

- Health care capacities amongst indigenous peoples should be developed and encouraged at all levels of the health care system with a particular focus on the expansion of the numbers of indigenous peoples engaged in the health workforce.

- Where ever possible and appropriate, modern “western” medicine and traditional indigenous medicine and healing practices should be harmonised to improve the delivery, appropriateness, acceptability, accessibility and effectiveness of health and well-being services.

- Indigenous peoples should be actively engaged in defining the success of health care and community approach programmes and evaluating their impact on indigenous health outcomes.
• Community based programmes that empower and educate indigenous women are essential to prevent and overcome non-communicable diseases.

• Close collaboration between non-communicable disease control programmes and infectious disease control programmes, for example diabetes and tuberculosis management, are essential to halt and prevent diabetes and non-communicable diseases.

Advocacy

• Governments, UN agencies and international human rights monitoring bodies should be urged to give greater priority to strengthening surveillance systems that detect, track and monitor the health of indigenous peoples.

• Networks for research, advocacy and health system development among indigenous peoples should be established and strengthened to define and coordinate advocacy efforts for improving health care capacity, community outreach programmes, the sharing of best practices and establishing an international evidence base on non-communicable disease control.

• Governments should be urged to respond to the immediate challenge of non-communicable diseases through the development and implementation of culturally sensitive health promotion programmes for education and awareness of the common risk factors for non-communicable diseases.

• A special session at the forthcoming World Conference on Indigenous Peoples, to be held in 2014, should be convened to discuss issues related to indigenous health and formulate an action plan with particular focus on improving access to the prevention and care of diabetes and non-communicable diseases.
**SPEAKER PROFILES**

**Mr Stéphane Besançon**

Mr Stéphane Besançon is a biologist and nutritionist with specialised degrees in nutritional physiopathology and international development. He founded the international NGO Santé Diabète and became the Programme Director 2003. ONG Santé Diabète has set up numerous pilot projects for the prevention and management of diabetes in Africa. Mr Besançon’s work on health systems, chronic diseases, nutrition and diabetes in Africa has featured in many publications. He has recently published a book entitled “Diabetes Africa” – devoted to the challenges in improving access to diabetes care in Africa in collaboration with the International Diabetes Federation, African Region. He has also been associated with a large number of reports for governments and international organisations in his expert capacity as Programme Director.

**Professor Alex Brown**

Prof Alex Brown (BMed, MPH, FCSANZ, FRACP (Hon. PhD) is an Aboriginal Australian doctor and the Executive Director of the Baker IDI Heart and Diabetes Institute Central Australia, based in Alice Springs. For the last 12 years Prof Brown has been working in Aboriginal health from a public health perspective, specifically focused on policy development, communicable disease control, health service development and delivery, epidemiology and research. His research interests focus on chronic disease disparity, particularly cardiovascular disease, diabetes and its determinants, clinical and epidemiological cardiovascular research, chronic disease policy development, health services research, indigenous male health, and unpacking the psychosocial determinants of indigenous health.

**Dr Treena Delormier**

Dr Treena Delormier completed her Doctorate in Public Health (Health Promotion) at the University of Montreal. She holds a Bachelor and Master’s degrees in nutrition from the McGill University and is a professional dietician. Dr Treena is from the Mohawk Territory of Kahnawake, where she is actively involved with the Kahnawake Schools Diabetes Prevention Project (KSDPP) since 1994 where she has been in multiple academic and community roles. It was within this community-university research environment that she explored family feeding practices to better understand how social context shapes family food choice patterns for her doctoral research. Dr Treena’s research practice emphasizes on community-based research with Aboriginal communities and participatory research approaches. Her research interests encompass numerous elements including nutrition and health and social perspectives of food. In addition, she has researched in the area of diabetes prevention and obesity and Aboriginal conceptions of health. Dr Treena is currently a post-doctoral fellow at the Queens University.
Mr Terence (Terry) Hugh Ehau
Mr Terry Ehau has recently spent 7 years as a Health Manager at the Ngati Porou Hauora (NPH), a Maori Health Provider located on the Eastern Coast of the North Island of New Zealand. His roles with NPH included primary health issues and research. He has also been responsible for the Ngati and Healthy Project which addressed insulin resistance in a rural Maori community and as a Project Manager at various times during his tenure. Mr Ehau spent 2 years as the North Island Maori facilitator for sharing of best practices in New Zealand. He has worked with more than 30 Primary Health Care Organisations and their response to Maori health challenges. Most recently Mr Ehau has been working as a Health Consultant while working on his PhD. His area of research consists of Leadership in Maori Health. Currently, Mr Ehau is evaluating the Pouwhenua Project for the Poutiri Trust which is addressing access to care for Maori families, who suffer from chronic conditions, to clinical services at community level. Mr Ehau is also the current Executive Member of Te Roopu Mate Huka organisation and represents the Maori community on the National Diabetes Services Improvement Group.

Professor Mohamed Ali Eltom
Prof Mohamed Eltom is a graduate from the University of Khartou and has conducted his clinical practice in Sudan and Britain. Later on he received his doctorate degree and training in Medicine and Endocrinology at the Uppsala University in Sweden. Prof Eltom has published 38 papers in original journals. He also serves as the President of the Diabetes Programmes Promotion Organization, the Diabetes Care Organization and the Sudanese-Swedish Friendship Association. His is the Secretary General of the Sudanese Association of Physicians and the Sudan Diabetes Association. Prof Eltom is the former Ambassador of Sudan to Norway, Denmark, Finland and Iceland with resident in Oslo. He has actively been involved in diplomatic relations and has previously served as adviser to the Ministry of Foreign Affairs on Nordic countries.

Dr Anthony Hanley
Dr Anthony Hanley received his PhD in epidemiology from the University of Toronto in 2000 and was subsequently a post-doctoral fellow in the Division of Clinical Epidemiology, University of Texas Health Sciences Centre at San Antonio. Since 2005, he has been a faculty member of the Department of Nutritional Sciences, University of Toronto, where he teaches and conducts research and supervises graduate students. Dr Hanley is currently an Associate Professor and his research interests include the metabolic and nutritional epidemiology of obesity, insulin resistance and type 2 diabetes, with a particular focus on diabetes in Aboriginal Canadian communities and other high-risk populations. For over 18 years he has worked with community partners in Sandy Lake First Nation on the Sandy Lake Health and Diabetes Project, which involves epidemiological research as well as intervention development and evaluations.
Ms Paimaneh Hasteh
Ms Paimaneh Hasteh is a Member and Rapporteur for the United Nations Permanent Forum on indigenous Issues and carries the responsibility of providing expert advice and recommendations on Indigenous issues to the ECOSOC Council, as well as to programmes, funds and agencies of the United Nations, through the Council. She has served within the United Nations for more than 12 years representing senior positions including the UNFPA, Asia-Pacific Division and disseminated global information on indigenous issues related to economic and social development, culture, the environment, education, health and human rights. Before joining the United Nations, Ms Hasteh served as Director for the Ministry of Foreign Affairs in Tehran within the Department of Human Rights and Women’s Affairs and managed expert diplomatic relations. Ms Hasteh is Adjunct Professor of Environmental Studies at the Azad University in Tehran and has obtained a Master of Science Degree in Occupational and Environmental Health at the Wayne State University in Detroit.

Dr Anil Kapur
Dr Anil Kapur is a medical doctor and the Managing Director of the World Diabetes Foundation. He has been associated with the Foundation since its inception, previously serving on its Board as the Vice Chairman. He has previously worked in several capacities for Novo Nordisk A/S. Dr Kapur initially worked as the Managing Director of Novo Nordisk India, and later as Vice President of Novo Nordisk Regional Office India and Vice President of Novo Nordisk Corporate Stakeholder Relations – Asia. He also set-up and served as Managing Trustee of the Novo Nordisk Education Foundation in India. Dr Kapur has specialised in internal medicine. He has written books on diabetes, both for medical professionals and lay people and published more than 60 papers in Indian and international journals in the areas of internal medicine, clinical pharmacology and diabetes. Dr Kapur has co-ordinated several large studies – DiabCare Asia India study, Cost of Diabetes Care in India and the National Urban Diabetes Survey – and has developed a nutritional software package called NINA. He has given numerous lectures on diabetes, both in India and abroad as an invited speaker.

Dr Florence Levy
Dr Florence Levy is a medical doctor, with a Master’s degree in Public Health for Developing Countries (LSHTM) and with 20 years of professional experience. Her work has been associated with the Ministries of Health at national level and international agencies including the World Bank, the European Commission and international NGOs (Health Poverty Action) within the health sector. She has governed several managerial positions, with a strong personal interest in development of intercultural health systems, public policies, woman and youth, sexual and reproductive health, especially of people with marginalised or ethnic backgrounds. Dr Levy is a Member of the Peoples Health Movement and Lecturer at URACCAN University and the Universidad Intercultural-Fondo Indígena. Since November 2011, Dr Levy has worked at the Pan American Organization/WHO as the Regional Advisor on Cultural Diversity and Gender Issues.
Professor Pierre Lefèbvre
Prof Pierre Lefèbvre is the Chairman of the Board of Directors of the World Diabetes Foundation. He was President of the International Diabetes Federation during the period 2003–2006. He is also Emeritus (active) Professor of Medicine at the University of Liège, Belgium, where he has been Chairman of Medicine and Head of the Division of Diabetes, Nutrition and Metabolic Disorders. He has performed numerous studies on the physiology and pathophysiology of metabolic regulations in type 2 diabetes and obesity with emphasis on insulin, glucagon and physical exercise. Prof Lefèbvre is a member and former President of the Royal Academy of Medicine in Belgium, a member of the National Academy of Medicine in France and of the Academia Europaea. He is also a Fellow of the Royal College of Physicians. He has received numerous international awards including the Claude Bernard award of the EASD, the Paul Langerhans award in Germany and the Mizuno award in Japan. Prof Lefèbvre is Doctor Honoris Causa of seven universities in Europe and North America.

Dr P. Santau Migiro
Dr P. Santau Migiro is the Head of Division of Child and Adolescent Health at the Ministry of Public Health and Sanitation in Kenya where she has been employed the past years. Dr Migiro is a trained paediatrician and received her undergraduate and postgraduate qualifications from the University of Nairobi. Previously, Dr Migiro has worked in various capacities for the ministry of health for the past 12 years before joining the private health care sector and is an active Member of the Indigenous Maasai Community in Kenya.

Professor Jean Claude Mbanya
Prof Jean Claude Mbanya is from Cameroon and is the President of the International Diabetes Federation (IDF) for the period 2009-2012. Prof Mbanya is Professor of Endocrinology at the University of Yaounde in Cameroon and Chief of the Endocrinology and Metabolic Diseases Unit at the Hospital Central in Yaounde. His role was instrumental in the IDF-led ‘Unite for Diabetes’ campaign, which led to passage of the United Nations Resolution on Diabetes in December 2006 and the NCD Resolution in 2011. He now steers the strategic direction of IDF to encourage governments to implement policies for the treatment, care and prevention of diabetes. Prof Mbanya’s research mainly focuses on cultural diabetes-related factors, which are often unique to the African countries and communities he studies. His practice and research have largely contributed to increase the world’s awareness on diabetes in Africa, a continent where non-contagious diseases such as diabetes are too often overlooked. Cameroon has now become an important centre of research, acclaimed by the medical community. Prof Mbanya has been actively involved with IDF for many years, notably as President-Elect (2006-2009), Chair of the IDF African Region (1994-2000), Vice-President of IDF (2000-2006), member of the Board of Management and Executive Board (1994-present) and Chair of the IDF Task Force on Insulin, Test Strips and Other Diabetes Supplies (1997-2006). Prof Mbanya also serves on several WHO advisory groups: the WHO African Advisory Committee on Health Research and Development, the WHO Expert Advisory Panel on Chronic Degenerative Diseases Diabetes and the WHO Committee on Classification and Diagnosis of Diabetes.
Dr James Mbaria
Dr James Mbaria is from Kenya and is currently a senior lecturer, researcher and consultant in pharmacology and toxicology at the University of Nairobi. He was awarded a Doctor of Philosophy degree in pharmacology in 1999 after studying at the University of Nairobi and University of Ulm in Germany. He has 23 years of professional experience and has specialized in the pharmacology and toxicology of medicinal plants used in indigenous traditional medicine systems. Dr Mbaria has worked extensively with traditional healers in indigenous communities in Kenya and Uganda and undertaken a short course in Traditional Chinese Medicine. His on-going research activities include study of anti-diabetic efficacy of medicinal plants and traditional knowledge of indigenous peoples. Dr Mbaria teaches undergraduate and postgraduate courses in medical and biomedical sciences and has supervised 17 masters and two PhD students to completion. He has published 44 scientific papers in peer reviewed journals, books and conference proceedings.

Ms Ida Nicolaisen
Ms Ida Nicolaisen is the former Vice Chair of the United Nations Permanent Forum on Indigenous Issues, and editor-in-chief of the Carlsberg Foundation Nomad Research Project which is publishing a series of 16 scholarly books on Pastoral Peoples in Africa, the Middle East and Asia. She has been Associate Professor of cultural sociology and anthropology at the Copenhagen University and is currently a senior Research Fellow at the Nordic Institute of Asian Studies. Ms Nicolaisen has carried out extensive research among indigenous peoples in West Africa and central Borneo. She is a member of the American Philosophical Society, the American Academy of Arts and Sciences and The Royal Danish Academy of Science and Letters. Ms Nicolaisen sits on various boards including the Soeren Kierkegaard Research Center, the World Diabetes Foundation, the International Human Rights Network of Academies and the Scholarly Societies, the Standing Committee on Ethics – a subcommittee of All European Academies (ALLEA), the Israeli-Palestinian Science Foundation and the Royal Danish Geographical Society. She has received several awards and the Order of Dannebrog.

Professor Pamela Orr
Prof Pamela Orr is a Professor of Medicine, Medical Microbiology and Community Health Sciences, and a consultant with the J. A. Hildes Northern Medical Unit at the University of Manitoba in Winnipeg, Canada. Prof Orr is engaged in clinical care, education and research, with a particular interest in the biologic and social determinants of health and illness in indigenous peoples in the Northern Peninsula. She is a Scientific Editor of the International Journal for Circumpolar Health and a member of the International Association of Circumpolar Health Publishers and the International Network for Circumpolar Health Research. Prof Orr is President-Elect of the North American Region of the International Union Against Tuberculosis and Lung Disease and a member of the Global Indigenous Stop TB Initiative and the International Circumpolar Surveillance Group for TB. Prof. Orr is the past president of the International Union for Circumpolar Health and the Canadian Society for Circumpolar Health.

Professor Jeremy J. N. Oats
Prof Jeremy J. N. Oats is the current Chair of the Victorian Consultative Council on Obstetric and Paediatric Mortality and Morbidity. Other appointments include Senior Obstetrician & Diabetes Services at the Royal Woman’s Hospital in Melbourne and Professorial Fellow at the Department of Obstetrics and Gynaecology, University of Melbourne. In addition, Prof Oats is the current Secretary General at the International Association of Diabetes and Pregnancy Study Group. He is also a Member of the Steering Committee of the Hyperglycaemia and Adverse Pregnancy Outcome (HAPO) study which is one of the most comprehensive studies performed in response to the need for internationally agreed diagnostic criteria for gestational diabetes.
**Professor Kerin O’Dea**  
Prof Kerin O’Dea (PhD) is the Director of the Sansom Institute for Health Research at the University of South Australia and is a Nutrition Scientist and public health researcher examining diet and lifestyle in the prevention and treatment of non-communicable diseases (obesity, type 2 diabetes and cardiovascular diseases). She has a particular interest in the therapeutic potential of traditional diets – especially Aboriginal hunter-gatherer and Mediterranean diets – and is committed to a research approach that spans the spectrum from the basic biomedical to the population. She has held numerous senior academic and research leadership positions over the past 20 years, including Director of the Menzies Institute of Health Research in Darwin (2000-2005) and has been active on numerous national committees advising government on health and medical research, indigenous health, nutrition, and diabetes. She is a member of Australia’s National Health and Medical Research Council and Chairs its Prevention and Community Health Committee.

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**Dr Michael Lynge Pedersen**  
Dr Michael Lynge Pedersen is a Danish national and graduated with a Medical Degree from the University of Aarhus in 1997. He later specialised in general medicine in 2002 and completed his PhD in Public Health from the University of Aarhus in 2011. Dr Pedersen has been working as a Physician in Greenland and in Denmark since 1997. Between 2008-2011 he was responsible for leading a national diabetes project concerning primary diabetes care in Greenland amongst indigenous peoples. He has been involved in different health and research related activities in Greenland since 1995 including mercury exposure, blood pressure, hormones, diabetes, health care delivery performance and presently innovating a national lifestyle project.

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**Dr Blanca Restrepo**  
Dr Blanca Restrepo is originally from Colombia. She has a BSc in Medical Technology and PhD in Microbiology. She currently resides and conducts research in a Texas community that is adjacent to the Mexican border. This border population is predominantly Hispanic, has low socio-economic status and one of the highest diabetes prevalence rates in the world. Her team has shown that in this population nearly 40% of the TB patients have diabetes co-morbidity with an estimated 24% attributable risk of TB due to diabetes. Dr Restrepo’s team has also shown alterations in the immune response of TB patients with diabetes. Current efforts are aimed at identify strategies for prevention of TB among diabetes patients by complementing the basic science and epidemiological studies. Her findings provide support for integration of the existing TB resources to improve early diabetes detection.

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**Dr Elizabeth Sellers**  
Dr Elizabeth Sellers undertook her undergraduate medical training at the University of Western Ontario in London. Her paediatric residency is at the Children’s Hospital of Eastern Ontario in Ottawa and paediatric endocrine training at the McGill University in Montreal. She completed the research component of her endocrine training in Manitoba, undertaking a Master’s of Science in Community Health Sciences. Her thesis work revolved around the evolving epidemic of type 2 diabetes in children and youth with an emphasis on First Nations populations. She is currently an Associate Professor at the Department of Paediatrics and Child Health, University of Manitoba. As a Clinician and clinical researcher, her primary focus has been the epidemiology, pathophysiology, complications, treatment and support of youth with type 2 diabetes with a particular interest in indigenous peoples. Dr Sellers is privileged to be part of the inter-professional team in the Section of Paediatric Endocrinology and Metabolism at the Winnipeg Children’s Hospital.
Dr Zelik Trajber
Dr Zelik Trajber is a Pediatrician and graduated from Cuba and consequently renewed his degree at the University of São Paulo in Brazil. During the past 11 years he has worked for the Special Secretary of Indigenous Health at the Ministry of Health in Brazil and the Sanitary District of Mato Grosso do Sul. Dr Trajber is also a Member of the Social Control of Indigenous Health Group (CONDISI) and co-responsible at the Medical Anthropology course at the University of São Paulo USP.

Dr Donald Warne
Dr Donald Warne, MD, MPH is the Director of the Master of Public Health Programme at North Dakota State University, and he serves as the Senior Policy Advisor to the Great Plains Tribal Chairmen’s Health Board. In addition, he is an adjunct Clinical Professor at the Arizona State University Sandra Day O’Connor College of Law where he teaches American Indian Health Policy. Dr Warne is a member of the Oglala Lakota tribe from Pine Ridge, South Dakota and comes from a long line of traditional healers and medicine men. He received his MD from Stanford University in 1995 and his Master of Public Health from Harvard University as a Commonwealth Fund/Harvard University Fellow in Minority Health Policy in 2002. Dr Warne is a Certified Diabetes Educator (CDE) and is a Diplomat of both the American Board of Family Practice and the American Board of Medical Acupuncture. In addition to Minority Health Policy, he completed a Fellowship in Alternative Medicine from the Arizona Center for Health and Medicine. Dr Warne’s work experience includes several years as a primary care and integrative medicine physician with the Gila River Health Care Corporation in Sacaton and 3 years as a Staff Clinician with the National Institutes of Health in Phoenix where he conducted diabetes research and developed diabetes education and prevention programmes in partnership with tribes.

Professor Paul Zimmet
Prof Paul Zimmet is Director Emeritus at the Baker IDI Heart and Diabetes Institute and Adjunct Professor at the Monash University. He co-chairs the IDF Task Force on Epidemiology and Prevention and is an Honorary President of the International Diabetes Federation (IDF). He has an outstanding international record in diabetes and obesity research. Prof Zimmet is widely recognised for his studies in Mauritius and in the Pacific Ocean populations and is involved in indigenous diabetes activities in Central Australia. His research was a major trigger in predicting the evolving type 2 diabetes epidemic globally. Prof Zimmet established and co-directs AusDiab – the first national diabetes and obesity study. He has been awarded many honours including the Kelly West and Harold Rifkin Medals from the American Diabetes Association, the IDF Lilly Award, the Banting Award (Diabetes UK) and the Charles Best Oration (Canada). In 2010, Prof Zimmet received the Grand Hamdan International Prize for Medical Sciences. Prof Zimmet is an Officer of the Order of Australia for distinguished services to medicine, nutrition and the biotechnology industry.
The World Diabetes Foundation
is dedicated to supporting the
prevention and treatment of diabetes
in the developing world

The World Diabetes Foundation
creates partnerships and acts as a
catalyst to help others do more

The World Diabetes Foundation
strives to educate and advocate
globally in an effort to create
awareness, care and relief to those
impacted by the disease