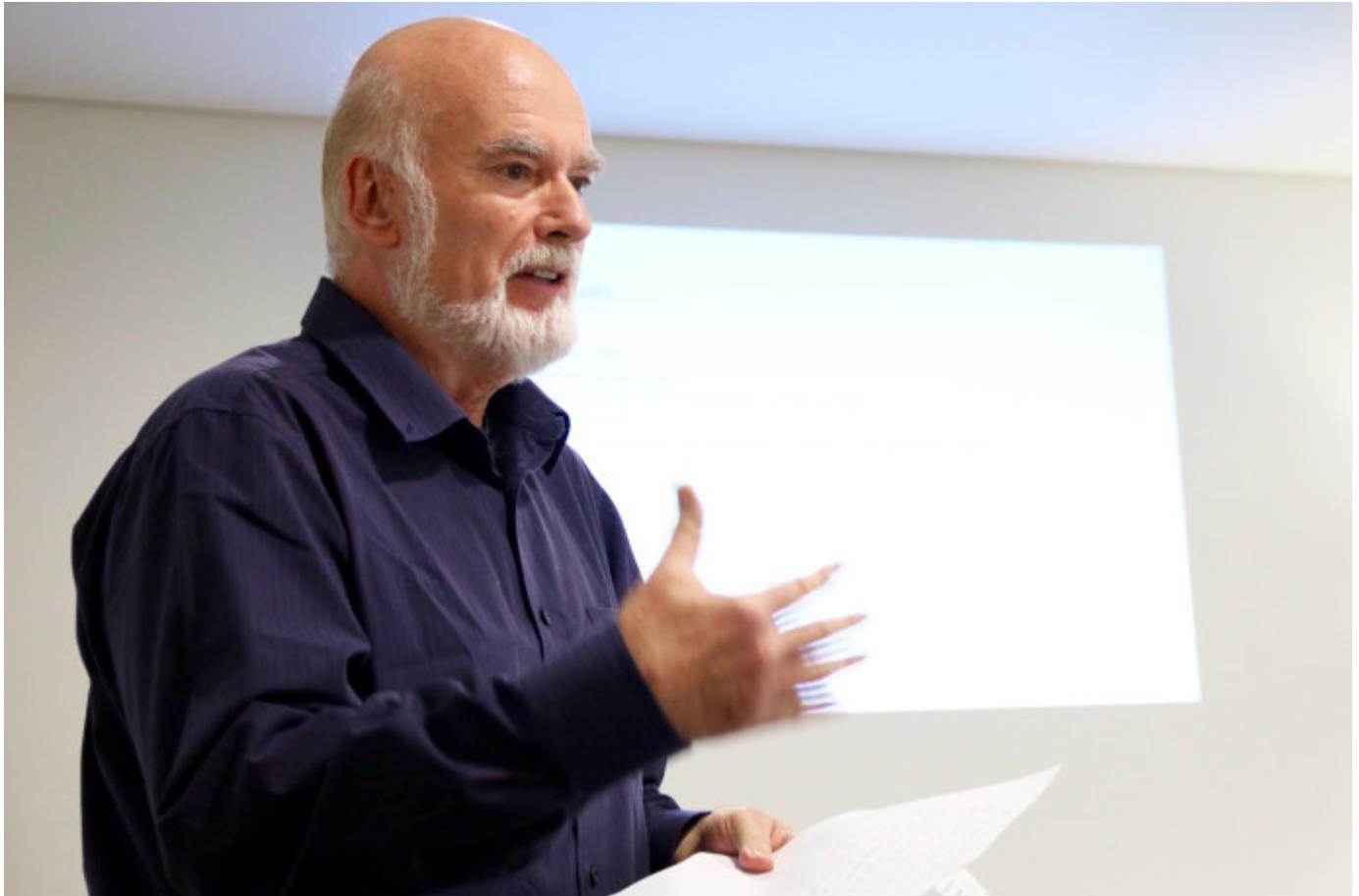


## **Healthy children to healthy adults: promoting brighter futures...**

**Professor Andrew Macnab**

“Promoting healthy behaviours in children is much more effective than trying to change unhealthy behaviours in adults,” said Prof. Andrew Macnab of the Department of Paediatrics at the University of British Columbia, STIAS fellow and member of the STIAS *Developmental Origins of Health and Disease (DOHaD)* group. Prof. Macnab was presenting a seminar on his work at STIAS.



**STIAS Fellow Andrew MacNab during his seminar on 6 October 2016**

“Fundamentally health promotion depends on individual behaviour change, coupled with appropriate technology and legislation,” he continued. “Prevention at a societal level relies on legislation and application of technology, but at individual level requires alterations in behaviour that are only achieved through education and attitudinal change.”

“Behaviour change usually only follows a life-changing insight, the equivalent of a light bulb coming on in the brain – it’s not the same for everyone – the trick is to find something that is relevant to and resonates with the population or group you are working with,” he said.

“Non-communicable diseases (NCDs) are a particular challenge in Africa,” he continued. “NCDs currently cause more than 60% of deaths worldwide and 80% in lower and middle-income countries (LMICs). And 44% of deaths from NCDs are preventable. The economic burden is very high – over the next 20 years NCDs will cost more than US \$30 trillion – 48% of global GDP.”

“And in Africa, poverty and malnutrition enhance the severity and cost of all disease conditions,” he said.

“So, we can’t wait to treat, we must prevent.”

Prof. Macnab emphasised that education is the best health promotion investment and that there are many examples from India, Sri Lanka and East Africa of successful health promotion interventions. He also emphasised the need to work with young people – currently one quarter of the world population is aged between 10 and 24. “Populations in Africa, in particular, are very young,” he said. “In Uganda, for example, 50% of the population are children 15 years or younger.”

“One of the problems is that we are teaching children the wrong things,” he continued. “Knowledge is moving faster than our ability to teach facts. We should be teaching children about resilience and human relationships and how to find and synthesise relevant facts – real-time learning.”

“The World Health Organization’s (WHO) Health Promoting Schools model attempts to change the ethos in schools and the mindset of pupils towards health by increasing children’s knowledge and teaching healthy practices that promote autonomy, control over one’s life, and positively impact on the determinants of health.”

Health promotion in schools is all about learning how to make healthy decisions: and this includes aspects like male/female dialogue, social awareness, peace and violence, shelter, education, food (including growing food), a stable ecosystem, equity, social justice and sustainable development.

### **Middle-ground solutions**

Turning to specific outputs of his work at STIAS, Macnab pointed out that: “To improve health, we have to investigate middle-ground solutions when prevention is not possible and complete cure is prohibitively expensive.”

“For example, a child dies every 30 seconds from malaria,” he said. “It’s not just an African problem but a problem across the LMICs. However, in sub-Saharan Africa malaria is a principal cause of death in school-age children and the main reason a child misses school.”

“We know how to prevent and treat malaria but the solutions don’t trickle down to the grassroots level,” said Macnab. “In Uganda less than 50% of rural households own mosquito nets and 77% of rural children do not sleep under insecticide-treated nets.”

“And, although the WHO guideline call for diagnosis and treatment within 24 hours, very few children get to the clinic – which may be a long way away – for diagnosis and treatment in this time frame,” he continued. “In the group of school children we studied, only a quarter of those sick with fever were taken to a clinic, most were only given painkillers not malaria treatment.”

“Consequently, malaria has a huge impact on children’s health and affects their education due to absenteeism, with children typically spending 1.5 weeks away from school per episode. But, repeated malaria infections and inadequate treatment can also lead to permanent cognitive and perceptual damage to the brain, which have lifelong effects on the ability to learn.”

To address this, an innovative ‘middle-ground’ strategy was introduced into four rural schools in Uganda involving 2000 children. This intervention was conceived at STIAS at a 2011 workshop on Health Promoting Schools. The strategy involved training the teachers to administer a low-cost, rapid diagnostic test (RDT) with high sensitivity and specificity to children who became sick with fever at school and, if the test was positive, immediately administering a single-dose Artemisinin combination therapy (ACT) known to be effective for the type of malaria (i.e. caused by *Plasmodium Falciparum*) found in the area. The immediate benefits were very apparent, with many of the children well enough to return to classes within hours of ACT administration. And the duration of absence from malaria fell from 6.5 days in the pre-intervention year to 0.6 days.

But the impact on knowledge and behaviour is also important. “Before the intervention, only about 20% of the children knew that malaria was caused by mosquitos and could be prevented,” said Macnab. “By Year 2, 100% had comprehensive knowledge that also trickled down to families as behaviours changed in the communities.”

“Because both RDT and ACT are WHO-advocated measures to reduce malaria morbidity, this model – generated during my time at STIAS – is suitable to be scaled up by governments and non-governmental organisations worldwide,” said Macnab. “The innovation was to make them available ‘downstream’ in rural areas through a school-based intervention run by teachers.”

Macnab’s second example showed the impact of technological solutions to improve early diagnosis and allow access to treatment able to halt the progression of disease where neither prevention nor cure are feasible. “By 2018 1.1 billion men will have significant symptoms and loss of quality of life from a common bladder disease,” said Macnab. “Simple, inexpensive treatment is available but the problem currently in Africa is late diagnosis, with complications like infection developing that can result in renal failure and early death.”

Prof. Macnab’s group therefore adapted a novel optical technology developed in Canada for use by staff in rural African clinics as a screening test. This is as specific as the ‘gold standard’ bladder diagnostic test used in industrialised countries, but uses near infrared light to measure bladder blood flow non-invasively as the patient passes urine. The device, which is the size of a matchbox, is taped to the skin over the bladder. It sends information about the health of the bladder muscle wirelessly to a mobile phone or laptop where a diagnostic algorithm identifies if the patient has bladder disease requiring treatment or further investigation.

“Importantly, this work at STIAS has developed technology that is reliable, inexpensive, culturally acceptable and able to be used as a screening tool by rural health workers with minimal training,” continued Macnab.

“Both these examples show us how work at STIAS can translate good ideas into effective strategies and interventions applicable in Africa.” he continued. “The challenge then becomes how to use them to promote health further.”

### **Tailoring the message**

“In health promotion the ‘message’ you choose, the ‘voice’ you use and the ‘messengers’ you engage are all important.”

“To achieve more with youth we have to investigate new and novel options – like employing youth champions, promoting education for girls, involving celebrities, learning from advertising executives, and trying financial and other incentives. Also we need to learn more about the teenage mind – research tell us its structure and functions are still developing, and we all know it works differently! So engaging youth, listening, and working with them is critical if we are to find what works in what setting.”

“Young people may not have the mindset to be concerned about the NCDs that are consuming us,” he cautioned. “As these are things that are remote, because they only affect them and their offspring in the future, but we have to try.”

“We also have to achieve more with policy makers and governments. Convincing arguments are often financial in nature but we also need to be able to translate science into a manageable form and create messages that are readily understood and not able to be refuted,” he said.

“Individual choice is always important,” he concluded. “Consequently, the challenge is how can we, as a society, disseminate valid information widely and frame compelling arguments so as to engage and motivate individuals to improve their own health through changing their behaviours.”

(Presentation summarized by [Michelle Galloway](#) from SITAS Workshop. Oct 2016)