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A word from the IFEH President

Bernard Forteath



Welcome to the latest edition of Environment and Health which has been produced to coincide with the 11th World Congress. I hope that you enjoy reading this edition and, as always, we welcome feedback. The Editor is always happy to receive articles and papers, so if you have done some research or are involved in a research programme why not let your colleagues around the world know about it?

This article will be the last from me as IFEH President before I hand over to Robert Bradbury at the 11th World Congress on Environmental Health to be held in Vancouver, Canada from the 5th to the 10th September 2010. Over the past two years I have had the pleasure of meeting many individuals from Member Organisations. At the end of May this year I was invited to take part in the 2nd All Africa Environmental Health Congress held in Lilongwe, Malawi.

Malawi is a small country surrounded by Zambia, Tanzania and Mozambique. The country has no ocean coastline but has, within its boundary, Lake Malawi, the third largest lake in Africa. The main river is called the Shire (pronounced 'Shir-ee') which flows out of the southern end of Lake Malawi eventually joining the Zambezi River in Mozambique. The capital, Lilongwe, was built in 1906 along the bank of the Lilongwe River and it is here that the parliament building and the main government departments are situated. The official language of the country is English although Chichewa is also widely spoken. Malawi is known as the 'warm heart of Africa' and for very good reasons. Malawians are friendly people and visitors are given a warm welcome. The Congress, which attracted delegates from all over Africa and beyond, lasted for four days, one of which was given over to technical visits. The Congress was officially opened by the Minister of Health, Professor Moses Chirambo, MP.

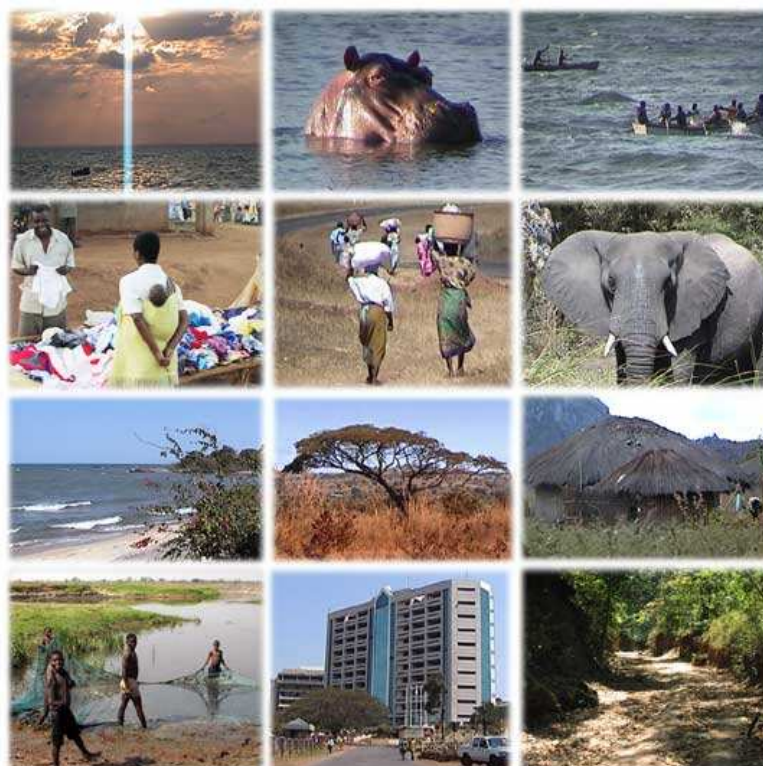
My duties involved giving a Keynote address on the first morning, chairing one of the parallel sessions, and officially closing the Congress on the last day. The Congress programme covered areas of particular importance to Malawi and Africa and was very much centred on Public Health issues including Diarrhoea Control and Treatment, Water and Sanitation, Drinking Water Safety Plans, Community Led Total Sanitation, Community Health, and Climate Change and Disaster Risk Management. During the Congress the Environmental Health Curriculum document, prepared by the African Academy for Environmental Health (AAEH), was handed over to the Director of the British Council in Malawi. The British Council provided financial assistance through a DelPHE grant to help develop the first ever generic curriculum in environmental health training for Africa. Africa is a unique continent with unique challenges and the development of a curriculum for a Bachelor

of Science in Environmental Health is a major step forward and will assist training institutions throughout Africa. The presentations on Day two of the Congress focussed on the implementation of community led sanitation and hygiene promotion programmes, and the presentations provided ideal preparation for the technical visits the next day to community sites in the Salima District situated in the Central Region of Malawi.

Visits were made to two villages and to Salima District Hospital; all have been working with a number of non-government organisations over the last decade to improve water, sanitation and hygiene. Community Led Total Sanitation (CLTS) is a grassroots approach to sanitation developed in Bangladesh which mobilises communities to completely eliminate open defecation. It is generally recognised that providing toilets does not necessarily mean that they will be used and that the cycle of faecal-oral contamination will come to an end. CLTS approach harnesses a community's desire for change and improvement leading to greater ownership and sustainability. In the villages we visited it was obvious that the villagers were totally committed and involved in improving living conditions within their own village. It was very important

for the elders of these communities to be able to show us around their village and to witness, at first hand, what can be done to improve public health. Unfortunately, the area we were visiting was suffering from a measles outbreak which originally started in South Africa and then spread to Zimbabwe, Mozambique and then to Malawi.

Living in the UK measles does not engender the same concerns as it does in Africa, for example, but measles is one of the leading causes of death among young children even though a safe and cost-effective vaccine is available. In 2008, there were 164,000 measles deaths globally – nearly 450 deaths every day or 18 deaths every hour - and more than 95% of measles deaths occur in low-income countries with weak health infrastructures. I must admit I felt very privileged meeting and seeing the work carried out by so many dedicated and enthusiastic environmental health professionals as they went about their work. On a daily basis the environmental health officers are at the forefront of continuous improvement in the living standards of the communities they serve and there can be no better testimony to the work of our profession than that.





www.ifeh.org

About IFEH

INTERNATIONAL FEDERATION OF ENVIRONMENTAL HEALTH

The Federation works to disseminate knowledge concerning environmental health and promote co-operation between countries where environmental health issues are trans-boundary. It promotes the interchange of people working in this sector and the exchange of Member's publications of a scientific and technical nature.

Amongst other things, the Federation seeks to provide means of exchanging information and experience on environmental health, to hold Congresses and meetings to discuss subjects relevant to environmental health science and administration, to represent the interests of environmental health to state agencies, national governments and international organisations and to promote field studies of environmental health control.

IFEH	<i>Steve Cooper, Northern Ireland</i>
President: <i>Bernard Forteath, Scotland</i>	Webmaster: <i>Henning Hansen, Denmark</i>
President Elect: <i>Robert Bradbury, Canada</i>	Honorary Editor: <i>Hadrian Bonello</i>
Honorary Secretary: <i>Raymond Ellard, Ireland</i>	<i>16, Triq il-Lampara, Bahar ic-Caghaq NXR 5130 MALTA</i>
Honorary Treasurer:	<i>Email: hadrian.bonello@gov.mt</i>

Front and Back Cover: Vancouver is a coastal city located in the Lower Mainland of British Columbia, Canada. It is named for British Captain George Vancouver, who explored the area in the 1790s. The name Vancouver itself originates from the Dutch "van Coevorden", denoting somebody from a city in the Netherlands.

Vancouver has ranked highly in worldwide "livable city" rankings for more than a decade according to business magazine assessments.^[1]

has hosted many international conferences and events, including the 1964 British Empire and Commonwealth Games, the 1976 United Nations Conference on Human Settlements and the 1986 World Exposition on Transportation and Communication. The 2010 Winter Olympics and 2010 Winter Paralympics were held in Vancouver and nearby Whistler, a resort community 125 km (78 miles) north of the city.

The views expressed in this magazine are not necessarily the views of the International Federation of Environmental Health.

IFEH REGISTERED OFFICE, Chadwick Court, 15, Hatfields, London, UK SE1 8DJ

Editorial

Hadrian Bonello

The theme for the Vancouver IFEH Congress 2010 is 'Global Health Protection from Sea to Sky'. A perfect heading for a Congress in a world where this can only be achieved if all countries work together to tackle the challenges that this brings with it.

One of the thematic areas during the congress is 'Promotion of active living and healthy communities'. Coming from a small island right in the middle of the Mediterranean, Malta is reported to have one of the highest overweight problems in Europe. The Health Behaviour in School-Aged Children study found an alarmingly high proportion of Maltese children to be overweight. In fact around 15% of 13-year olds are above the 95th weight centile and hence obese. The European Health Interview survey reports 36.3 % of adults being overweight and a further 22.3% being obese.

Obesity in Malta is indeed a major public health challenge and the rates of obesity amongst both adults and children are a cause of grave concern. The trend for persons to be overweight and obese will seriously undermine all efforts in the past to overcome non-communicable diseases unless strong and concerted action is taken. On a positive note, obesity, in recent years, is being targeted as a priority action in Malta's Strategy for Sustainable Development .

Maintaining a healthy weight also needs the balance of physical activity whereby we encourage more physical activity in different settings including schools in collaboration with the education division and to encourage people (adults and children) to decrease the amount of free leisure time spent sitting down.

Thus we should provide capacity building for people to make the right choices for their own health.



We should raise awareness about obesity, provide people with the support to maintain a healthy weight and support those who need to lose weight. People should be encouraged to be involved in healthy food preparation, to choose healthy food, to eat healthy portions and to include physical activity in their daily routine.

Vancouver is a world-class, multicultural city situated between majestic coastal mountains and the Pacific Ocean. Rainforests, sparkling waterways and seasonal foliage have inspired others to confer accolades of "Most Liveable" and "Most Beautiful" city.

Unfortunately I cannot be there to share this experience with you but I sincerely wish you all a pleasant and memorable stay in Vancouver and look forward to the outcome of the Congress with positive exchanges of information and experiences.

Welcome to our North American Continent on the occasion of the Vancouver IFEH Congress

Nelson Fabian

NEHA Executive Director and CEO



720 South Colorado Blvd.
Suite 1000-N
Denver, Colorado 80246-1926
Phone (303) 756-9090
Fax (303) 691-9490
www.neha.org

On the occasion of the Vancouver IFEH Congress meeting, the National Environmental Health Association of the United States of America welcomes Congress participants to our North American continent. We anticipate that many NEHA members will be in attendance at this special event. We are excited and grateful for the opportunity to build relationships with environmental health colleagues from all over the world.

To provide a little more insight on our association, we have prepared a very brief overview of NEHA (below). NEHA wishes you a wonderful conference experience.

Our Mission

The mission of the National Environmental Health Association (NEHA) is “to advance the environmental health and protection professional for the purpose of providing a healthful environment for all.” Advancement has been defined by NEHA in terms of both education and motivation. The basis for the association’s activities is the belief that the environmental health professional that is educated and motivated is the professional who will make the greatest contribution to the healthful environmental goals, which we all seek.

Who We Are

NEHA was incorporated in 1937 as a 501(c)(3)

non-profit body to create a national professional society for environmental health practitioners. The organization stands as a strong professional society with 4,500 members in the public and private sectors as well as in universities and uniformed services across the country and around the world.

What We Do

NEHA's mission, "to advance the environmental health and protection professional for the purpose of providing a healthful environment for all" is represented in the services provided for the profession. NEHA serves as a constant resource for the environmental health professional by offering seven national credentials, producing the Annual Educational Conference & Exhibition, publishing the widely-respected and peer-reviewed Journal of Environmental Health, serving as a "one stop shop" for publications in virtually every area of the environmental health field through its online bookstore, providing networking and committee participation opportunities, and developing positions on timely and serious environmental health concerns.

For More Information

More information on NEHA can be obtained from our website at www.neha.org.

We invite You ALL to the XII World Congress on Environmental Health ‘New Technologies, Healthy Human Being and Environment’ in Vilnius 21-27th May 2012.

**Lithuanian Union of Hygienists and Epidemiologists (LUHE)
Andrius KAVALIUNAS**

E-mail: andrius.kavaliunas@sam.lt



About the Organization

Foundation of the organization was in the year 1885, when a sanitary section was established in Vilnius Medical Society and this mostly focused its work on disinfection, sterilization and vaccination while later on the main activity filed was promoting healthy lifestyle. LUHE was registered (re-founded) on 27th April 1995.

The main organizational goals are, namely: hygiene, epidemiology, public health care science popularization, analysis of practical activities,

publications, training, raising qualification, re-qualification, licensing of physicians - public health specialists and epidemiologists of Lithuania. At present the role of organization is increasing. We often communicate with the media, participating in discussions on draft legal acts and laws and take part in international activities.

One of the objectives of our organization is to seek higher authority and recognition of the Lithuanian Union of Hygienists and Epidemiologists and public health specialists among the public, following the principle “Strong public health institutions for a healthy and unified Lithuanian society”. Seeking higher and more positive influence of LUHE members on public health related decision and establishing of public institutions, our organization is looking for common understanding and mutually beneficiary contacts with national and international partners.

Information about LUHE is published in National Lithuania Encyclopaedia 2008, Volume 13.

Members and partners of LUHE

LUHE joints together over 300 members. These are practitioners and researchers from State Public Health Service and Regional Public Health Centres, Centre for Health Promotion and Disease Prevention, Centre of Communicable Disease Prevention and Control, Radiation Protection Centre, National Public Health Care Laboratory, Institute of Hygiene, Ministry of

Environmental Protection Inspection, Faculty of Medicine of Vilnius University, Public Health Faculty of Kaunas University of Medicine and others.

LUHE has been a member of the International Federation of Environmental Health since 2000 is a member of Lithuanian Public Health Association and partner of Lithuanian National Tobacco and Alcohol Control Coalition. Vilnius College with its Faculty of Health Sciences, The Latvian Association of Preventive Medicine Functioners and The Royal Environmental Public Health Institute of Scotland are also partners of organization.

LUHE activities are organized by a national board and managed by chairperson, who is also a representative of the Union (currently chairperson of the organization is Viktorija Montviliene, elected recently for the 2010-2013 term, deputy chairman – prof Rimantas Stukas). The organization has five regional parts in the country in Vilnius, Kaunas, Klaipeda, Siauliai and Panevezys with their local boards and chairpersons – this helps to coordinate all actions nationwide and is useful for dissemination of information.

Relevant activities

The organization is mostly known for its contributions to improving the knowledge and skills of public health practitioners. Conferences have been organized on such topics as climate change, extreme situations for health care, urbanization in relevance with World Health days. Numerous seminars on children and youth health, health promotion, flu and other communicable diseases, were organized by the Vilnius regional board. A special report was presented by Lithuanian professor Vladas Kviklys, a teacher of many members of LUHE, to commemorate the 100 year jubilee . Also as with reforms in health care in Lithuania, resolutions concerning public health were carried and presented to the Parliament and Ministry of Health.

Important tasks in hand

The new board, elected in a general congress,

that was held on 7th of May, 2010, currently concentrates on such main tasks as:

- To continue and to develop collaboration with World Health Organization, International Federation of Environmental Health, Lithuanian Public Health Association, National Tobacco and Alcohol Control Coalition, Information and Support Centre for NGO's and other institutions and organizations, that care for public health and healthy lifestyle.
- Actively participate in the law-making process, when it comes to public health, give suggestions to state and municipal institutions, speak publicly and stand for public health in media and society
- Continue organizing training for and qualification of specialists
- Promote membership
- Promote public health as a speciality and profession
- Take part in the 11th World Congress on Environmental Health (Vancouver, Canada, 2010)
- Organize the 12th World Congress on Environmental Health "New Technologies, Healthy Human Being and Environment" in Vilnius, 2012
- Initiate and organize conferences and seminars on hot topics in public health, especially, children and violence at schools, climate change, occupational health, environmental risk factors (noise, air pollution, electromagnetic fields), communicable diseases, food safety, healthy lifestyle, etc.

In conclusion on behalf of our chairperson Viktorija Montviliene, I want to invite You ALL to the XII World Congress on Environmental Health „New Technologies, Healthy Human Being and Environment“ in Vilnius 21-27th May 2012. Waiting to see you here!

The 2nd All Africa Congress 'Environmental Health – The Key to a Better Life for All'

Tom Bell, Chief Executive

REHIS

Bernard Forteath and I (representing the International Federation of Environmental Health and The Royal Environmental Health Institute of Scotland respectively) attended the 2nd IFEH Africa Group All Africa Environmental Health Congress which was held at the Crossroads Hotel, Lilongwe, Malawi between 24 and 27 May. Our arrival at Lilongwe Airport after thirty hours travel and three flights was a joyful one as we were met by Young Samanyika (President of the Malawi Environmental Health Association), Dr Steve Taulo (Vice President of the Malawi Environmental Health Association), Kingsley Lungu (Head of Environmental Health at the University of Malawi Polytechnic), Dr Tracy Morse, Dr Tony Grimason and George Jabu (Senior Lecturer at the University of Malawi Polytechnic).

The Opening Ceremony of the Congress was a lively affair with Malawian primary school children entering the congress hall singing and carrying the flags of all the African nations. The children were followed by the Malawi National Dance Troupe who were accompanied by drums and whistles. Following the official welcome from Dr Grant Kululanga (Chairman of the Congress Organising Committee and Vice Principal of the University of Malawi Polytechnic) two Keynote Addresses were delivered by Bernard Forteath (President of the IFEH) and by Jerry Chaka (Chairman of the IFEH Africa Group). The official hand-

over of the Africa Academy for Environmental Health curriculum document to Julian Baker, Director of the British Council in Malawi took place. The development of the Africa Academy for Environmental Health curriculum document, a British Council sponsored project, was finalised during a workshop which was held in Johannesburg, South Africa in February 2010. (Please refer to pages 12 to 14 of the article 'A Generic Curriculum for Training Programmes in Environmental Health in Africa' in Volume 22, Number 1, Spring 2010 of *Environmental Health Scotland*). The curriculum document is the product of a series of workshops that took place over a period of two years with participation from Africa's main stakeholders. These workshops were facilitated by Jeannie Snyman, a curriculum development specialist, from the Tshwane University of Technology in Pretoria, South Africa. Ms Snyman presented a very interesting paper during the Congress in which she, with the active participation of delegates, considered the concept of constructive alignment using a number of examples from the curriculum document.

The handover was followed by the Malawi Environmental Health Association (MEHA) announcing its re-launch. To mark this occasion Malawi's Minister of Health, the Honourable Professor Moses Chirambo, MP presented certificates conferring Honorary Membership to six individuals who were deemed to have made



valuable contributions to MEHA and to Environmental Health in Malawi. Receiving these certificates were Dr Tony Grimason (formerly Head of Environmental Health at the University of Strathclyde, Glasgow), Professor Kafwe Tembo (Retired Head of Environmental Health at the University of Malawi Polytechnic), Mr Wilson Bomba (retired Malawian EHO and Member of the Health Service Commission for Malawi), Dr Anne Phoya (Sector Wide Approach Director at Malawi's Ministry of Health), Mrs Neema Kandoole (Deputy Director for Preventive Health) and myself. I have to say that I was greatly honoured to have my, relatively small, contribution recognised in this way.

At the end of the first day a Welcome Reception was held around the open air swimming pool at the heart of the hotel and delegates enjoyed generous hospitality while being entertained by the Ministry of Health's 'African Band'.

The four day Congress consisted of four plenary sessions with 12 presentations, 18 parallel sessions with 75 presentations, several poster sessions and field trips. Plenary and parallel sessions covered diarrhoea control and treatment, climate change and disaster risk management, training and professional development, water and sanitation, community health, curriculum development and quality assurance for the Africa Academy for Environmental Health, drinking water safety plans, primary school water sanitation and hygiene, community led total sanitation, food safety hygiene, waste management, policy development and decision-making, pollution control and occupational health and safety.

In addition to the formal plenary and parallel sessions two field trips were organised for delegates. I chose 'The Role of Culture in Environmental Health Activities' which included a visit to the

Dedza Pottery on the border with Mozambique. Delegates received a guided tour of the pottery and the various processes were explained and the occupational health issues outlined. Delegates were then driven from the high peaks of Dedza, some of which reach to over 7,000 feet, down the African Rift Valley escarpment to the low levels of the lake shore via the picturesque Golomoti Road. Delegates were able to take in beautiful views of Lake Malawi, the low lying plains and the surrounding mountains. The next scheduled stop was at the Mua Mission and the Kungoni Cultural Centre. The Mua Mission was established in 1902 and in 1976 the Kungoni Centre was initiated. The centre has its own cultural dance troupe made up of people from the local villages who perform dances from all over Malawi. Each dance and song is interpreted to give their origins and meanings and their relevance to Malawians today, including the importance of health messages. As the result of me-

chanical breakdown on our return journey we had an unscheduled 90 minute stop by the roadside as darkness fell. Koos Engelbrecht's confident assertion that there were no large carnivores in this part of Malawi didn't stop us anxiously peering into the tall grass and thick shrubbery at the roadside as the gloom descended! Bernard Forteach, who was representing the IFEH at the Congress, chose the alternative field trip and travelled to Salima District and Lake Malawi where he witnessed the implementation of hygiene and sanitation programmes at district level. On our return to the hotel we enjoyed an excellent buffet at the Congress Dinner and were entertained by the Malawi National Dance Troupe which performed at the Opening Ceremony. Following the dinner Young Samanyika presented a number of us with beautifully carved wooden plaques depicting the MEHA crest.

During the Congress I presented a paper on the Education, Training, Qualifica-



tions and Continuing Professional Development of EHOs in Scotland at a parallel session and chaired and co-chaired two other parallel sessions. The delegates at all sessions I attended enthusiastically asked questions of the presenters and were happy to exchange views on all the topics covered.

Between two sessions Young Samanyika, Tony Grimason and I took the opportunity to finalise an application for funding from the British Council's International Health Links Funding Scheme. If successful, the funding will be used to improve the knowledge, attitude and practical skills of the environmental health workforce in Malawi through the development of MEHA. This application demonstrates the ongoing and developing relationship between MEHA and REHIS. I also met informally with senior office-bearers and committee members of MEHA at the end of the second day of the Congress to discuss how REHIS might further assist with the organisation and development of the Association. The enthusiasm and commitment shown by Young Samanyika, by the senior office-bearers and committee members of MEHA allied to the clear support offered by Humphreys Masuku, Chief EHO at the Ministry of Health, bodes well for the future of the Association and for the delivery of the environmental health in Malawi.

On the last afternoon of the Congress the Closing Ceremony was held and, on behalf of the members of REHIS, I presented two gifts to Young Samanyika to mark the re-launch of MEHA and the hugely successful delivery of the Congress. Presentations of stone sculptures to Koos Engelbrecht, Tony Grimason, Jerry Chaka and myself were made by

Professor Kafwe Tembo, the now retired former Head of Environmental Health at the University of Malawi Polytechnic. I first met Kafwe when I visited Malawi in 2000 and it was a delight to meet with him again. The announcement that South Africa will host the 3rd All Africa Environmental Health Congress in 2012 was met with enthusiastic applause from the delegates.

The role played by Dr Tracy Morse and the Congress Secretariat (Dr Steve Tauro, Kingsley Lungu and Dr Geoffrey Chavula) in organising the Congress cannot go unmentioned. Tracy, a Scottish EHO, has a long association with Malawi which started with her visit to 'The Warm Heart of Africa' as a postgraduate with the University of Strathclyde. Tracy completed her PhD studies in Malawi and has been Project Manager of the Scotland Chikwawa Health Initiative and a lecturer at the University of Malawi Polytechnic for a number of years. She and her husband Chad live with their two young daughters in Blantyre. Tracy's energy, enthusiasm and attention to detail along with the dedication of Dr Grant Kululanga and the Organising Committee ensured the successful planning, organisation and delivery of the Congress.

Finally, I take this opportunity to thank the Africa Academy for Environmental Health, WASHTED, MEHA, and the University of Malawi for making my trip to the Congress possible and for inviting me to be a delegate at this hugely successful event. The warmth of the welcome and the hospitality of everyone involved in the Congress more than compensated for the long outward and return trips from Edinburgh to Lilongwe.

What Holds the World Together in a Plague: A Parable from Environmental Health Science

Fred O'Brien, M.B.A., C.P.H.I.(C)

Honorary Vice President IFEH

You have probably heard the popular nursery rhyme, the original version of which is:

Ring a ring o' roses

A pocket full of posies

A-tishoo

A-tishoo

We all fall down

This song refers to the occurrence and consequence of the great plague of London of 1665 which spread via fleas from diseased rats to the human population resulting in great loss of life.

By the time the Plague reached epidemic proportions, the King and his court, as well as most clergy and physicians, had deserted London and left its poor to fend for themselves. Sir John Lawrence, Lord Mayor, remained to assume control of the city. Staying behind also were his friend and personal physician, Dr. Edward Harman; the Reverend Dr. Thomas Vincent, and a scientist named John Graunt, whose interest in statistics and trends helped to predict the spread of the disease. I was pleased to write about Graunt, a great hero of mine, in my paper: *Environmental Health Sustainability Indicators: A Lesson from History*, which you can check out on page 3 of the IFEH link: <http://>



www.ifeh.org/magazine/ifeh-magazine-2007_v9_n1.pdf

The aforementioned persons showed unfathomable courage in a time where the slightest human contact could lead to excruciating death.

In a wonderful play covering the epidemic, *The Living*, by Anthony Clarvoe, premiered in 1993, we have Graunt, the father of health statistics, recounting the story and reflecting, at its conclusion as follows:

We know so little. And we don't know much. So people ask me if we learned anything during the plague.

And I say we did. Newton did. He came up with something, just as I said, and he taught it to us. Those of us who lived. Plague spread to Cambridge, you see, and it closed for the duration, everyone scattered. Newton found himself on a lonely country estate. Nothing to do but take

walks and think. One day, he walked in an apple orchard, noticed an apple fall to the earth.

Have you heard the story?

Looked at that apple. Really looked at it, no one had before, not really. Wondered what it meant. Wondered if he could describe what had happened mathematically. Tried. Did. Learned that when we fall to the earth, the earth also falls, a little, towards us. So that in fact there is no falling, but a moving toward. Tremendous thing. What Newton found: that the world would fly to pieces, but for a great force, a power in every single body in the world, which pulls it ceaselessly towards every other body, which is pulled ceaselessly toward it in turn. No matter what.

We learned what holds the world together, in a plague.



SOLID WASTE MANAGEMENT PROBLEMS IN SELECTED SCHOOLS IN IBADAN, NIGERIA

**G. R. E. E. Ana (Ph. D), E.O.Oloruntoba (Ph. D), M. K. C. Sridhar (Ph. D),
O.O Elemile(B.Eng) and O.R Benjamin(B.Sc)**

Division of Environmental Health Sciences,

Faculty of Public Health, College of Medicine,

University of Ibadan, Ibadan, Nigeria

ABSTRACT

Background

Inappropriate waste management procedures in schools in Nigeria particularly those in major urban communities constitutes one of the major factors leading to declining environmental health conditions in these schools. The objective of this study was to assess waste management problems and their associated effects in selected urban schools in Ibadan, South Western Nigeria.

Methodology

The study was a descriptive cross sectional survey. Eight Secondary schools with average population not less than 500 students per school were selected randomly for the study. The schools which are all located in Ibadan metropolis are Bishop Philips Academy (BPA),Ikoloba Grammar School (IGS), Bashorun Ojoo High School (BOHS), Oba Akinbiyi High School (OAHS), Mount Olivet Grammar School (MOGS), Loyola College (LC), Anglican Grammar School (AGS) and Aperin Boys, High School (ABHS). A total of 400 questionnaires (50 in each school) were administered to respondents drawn from all the participating schools. In addition observational checklist was also used. Data collected was analyzed using descriptive statistics.

Results

Results showed that Paper and Plastics are the most generated form of wastes according to 90%, 90%, 50%, 20%, 60%, 100%, 96%and 88% respondents from BPA, IGS, BOHS, OAHS, MOGS, LC, ACGS and ABHS respectively. The common methods of solid waste disposal are use of dustbins and open burning. The major problems associated with refuse disposal are odour, pest infestation and spillages. For instance at OAHS, 80% of the respondent reported odour as the major problem, 30% reported pest infestation and 20% reported spillages of the wastes in the school surrounding.

Conclusions

The study indicates that waste management facilities and practices in the schools were poor. The inadequacy of refuse bins may have contributed to waste spillages and the burning practices. The odours may have arisen from both the decay of over stored waste and emissions from the refuse burning. This scenario is certainly detrimental to the quality of the school environment.

Key Words: Waste management, Pest infestation, Urban schools, Ibadan, Nigeria

Introduction

Waste is an unavoidable by-product of human activities. Economic development, urbanization and improved living standards in cities increase the quantity and complexity of generated solid waste. If accumulated, it leads to degradation of

urban environment, stresses natural resources and leads to health problems (1). Cities in the world are facing a high level of pollution; the situation in developing countries are more acute, this is partly caused by inadequate provision of basic services like water supply, sanitation facilities, transport infrastructure and waste collection (2). Municipal corporations of the developing countries are not able to handle the increasing quantity of waste, which leads to uncollected waste on roads and other public places including schools.

Waste maybe regarded as “any unavoidable materials resulting from domestic activity and industrial operations for which there is no economic demand and which must be disposed of (3). Every school generates waste arising from routine activities. The types of solid waste found in various schools in communities of developing countries vary in type and in quantity.

The common types of solid wastes found in various schools in the communities include the following:(a) paper (b) grass (c) nylon (pure water bags, biscuits, lolly, ice-cream, and sweet wrappers) (d) sugar cane (e) maize cobs (f) groundnut shell (4). In addition to the above, some other wastes are found in school premises, which might not have been generated directly by pupils and teachers, such wastes include animal droppings from chickens, goats, sheep, dogs and lately cows.

Economic development, urbanization, improved living standards in cities and increase in enrolment of school children due to government policies increase the quantity and complexity of generated solid waste in schools. If accumulated, it leads to degradation of urban environment, stresses natural resources and leads to health problems (5). Public Schools in the world are facing a high level of pollution; the situation in developing countries is more acute, this is partly caused by inadequate provision of basic services like water supply, sanitation facilities, transport infrastructure and waste collection (6). Municipal corporations of the developing countries are not able to handle the increasing quantity of waste, which leads to uncollected waste on roads and other public places amongst

which are schools.

The problems associated with the disposal of wastes are many and include littering of food and other solid wastes in the school compounds. This can lead to the breeding of rats and other vectors which are of public health importance (7). Rats are also destructive which can destroy school materials such as paper and other important items. The U.S Public Health Service (USPHS) has published the results tracing the relationship of 22 human diseases to improper solid waste management (8).

This study is focusing on schools because after the home the next most important place of learning and where children spend most of time are the schools. If adequate waste management facilities are made available in the public schools, they can be a source of influence to the host communities and the teachers can also function as role models. Also a lot of public health problems can be adequately tackled.

Materials and Methods

The Study Area

Ibadan is the capital of Oyo State in Nigeria and the largest city in West Africa. An indigenous African town that lies between latitude 7° 0 and 90, 30' east of prime meridian (9). Ibadan covers a land area of 12 kilometers radius with Mapo hall as the centre. It has an altitude generally ranging from 152 to 213m with isolated ridges and peaks rising to 274m (10). The population of Ibadan was estimated as 100,000 in 1851, while the last official census conducted in 1963 gave an estimate of 627,739 (11). The present population of the city is more than 3 million. Ibadan presents a typical picture of many African cities each known for having the old town area (inner core), the transitional and peripheral areas. The majority of the people are Yorubas' while other ethnic groups constitute a smaller proportion of the population. Over fifty percent are Muslims while others are Christians and a small proportion are adherents of traditional African religions. Most of the people are engaged in petty trading and small-scale business, while others are civil/public servants. Ibadan has several public, private and social

amenities such as hospitals like the University Teaching Hospital (UCH), banks, industries, post office, higher institutions such as the University of Ibadan, research institutes such as the International Institute for Tropical Agriculture (IITA), water corporation and over 3000 schools made up of both public and private nursery, primary and secondary schools.

Study Design

The study was a descriptive cross sectional survey involving questionnaire administration and the use of structured observation checklist.

Study Population

A total of eight secondary schools with average population not less than 500 students were randomly selected for the study. The schools which are all located in Ibadan metropolis are Bishop Philips Academy (BPA), Ikolaba Grammar School (IGS), Bashorun Ojoo High School (BOHS), Oba Akinbiyi High School (OAHS), Mount Olivet Grammar School (MOGS), Loyola College (LC), Anglican Commercial Grammar School (ACGS) and Aperin Boys High School (ABHS).

Questionnaire Administration

A total of 400 questionnaires (50 in each school) were administered to respondents drawn from all the participating schools. The respondents were selected through stratified random sampling from a sampling frame of the number of classes available in the selected schools. Consent was sought and obtained from the school administration, all participating students and staff based on interest before the survey commenced. The questionnaire was divided into three sections vis Socio-demographic information, Environmental characteristics and Health conditions. Observation checklist comprised mainly environmental indicators expected in a school environment.

Statistical Analysis

Data on the completed questionnaires were analyzed using SPSS statistical package. Frequency distribution and other descriptive statistics such as percentages were used for data summary.

Results and Discussion

Student Distribution

Four hundred questionnaires were used to elicit information from the students. The students consisted of 213 (53%) females and 187 (47%) males (Fig1.0). This is at variance to earlier studies¹⁰ which recorded a higher male student enrollment in some schools in Ibadan. The respondents were in the age bracket 15-17 years consisting mainly of students in the senior class (S.S 1-S.S 3).

Waste Characteristics in Selected Schools

The Results of the survey showed that paper is the most generated form of solid waste (Table 1) followed by plastics in the school premises for all the schools. BOHS, OAHS and ABHS reported leaves as part of the waste generated in their schools. None of the schools reported wood as part of waste generated in the schools.

Solid Waste Disposal Practices

From the days of primitive society, humans and animals have used the resources of the earth to support and to dispose of wastes. In the early times the disposal of human and other wastes did not pose a significant problem, for the population was small and the land available for assimilation of waste was large (12). The problem has reached a great proportion in developing countries especially in public schools because of the lack of adequate solid waste disposal facilities.

Results of survey and observations using questionnaires showed that the use of dust bins and open burning were the major methods of solid waste disposal (Fig 2.0) in the school premises (BPA, IGS, BOHS, OAHS, MOGS, LC, ACGS, and ABHS). The waste disposal facilities were situated in the school premises. The result of direct observations using checklist showed that open burning was the major form of waste disposal in the school premises with the exception of BPA, which had an improvised incinerator. Majority (61.75%) of the respondents ie combining all the schools reported that the solid waste disposal facilities were situated at a distance

less than 10m within the school premises (Table 2)

Problems Associated with Solid Waste Management in Selected Schools

The major problems associated with Solid waste management in the schools are odour, pests and spills. (Fig 3) only BPA had no record of problems associated with refuse disposal. At IGS, 18% reported odour, another reported 32% for pest attraction, 10% reported spills and 18% reported no problems. At BOHS, 56% reported odour, another reported 20% for pest infestation while 5% reported spills and 14% reported other problems.

At OAHS, 80% reported odour, another 5% reported pest attraction while 2% reported spills and 8% reported other problems. At MOGS, 40% reported odour, another 30% reported pest attraction while 20% reported spills and 10% other problems. At LC, 28% reported odour, another 48% reported pest infestation while 20% reported spills and 2% reported other problems. At ABHS, 40% reported odour, another 10% reported pest infestation while 40% reported spills, 6% reported other problems while 4% reported no problems. For ACGS, 18% reported odour, another 16% reported pest attraction while 62% reported spills and 4% reported other problems.

The effects associated with these problems are of a great dimension and have grave consequences. Open dumping of solid wastes generates various environmental and health hazards. The decomposition of organic materials produces methane, which can cause fire and explosions, and contributes to global warming. The biological and chemical processes that occur in open dumps produce strong leachates, which pollute surface and groundwater. Fires periodically break out in open dumps, generating smoke and contributing to air pollution. In the Mexican city of Tampico, on the coast of the Gulf of Mexico, for instance, an inferno occurred for over six months at the local open dump. Fires at open dumps often start spontaneously by the methane and heat generated by biological decomposition (13). This situation is also very dangerous because most of the open

burning takes place near the classrooms (Table 2.)

Conclusions

The study indicates that waste management facilities are inadequate and poor and so their provision becomes very expedient in the affected schools.

Again waste sorting and segregation are not practiced thus making recycling and other proper disposal practices cumbersome.

Improved hygiene education and sanitation are important requirements which if well mainstreamed into the school system would reduce disease burden and hence enhance public health status of the school children.

A clean, safe, secure and enabling learning environment is an indispensable prerequisite that would ensure the optimization of a child's academic potential.

Government and other stakeholders should provide necessary support in terms of infrastructure and amenities to make the schools more conducive for learning.

Acknowledgements

Our sincere thanks go to the management of all the eight schools used in the study. We are indeed very grateful to our M.P.H students in Environmental Health who participated in the study as field assistants and facilitators of Environmental programmes in the schools.

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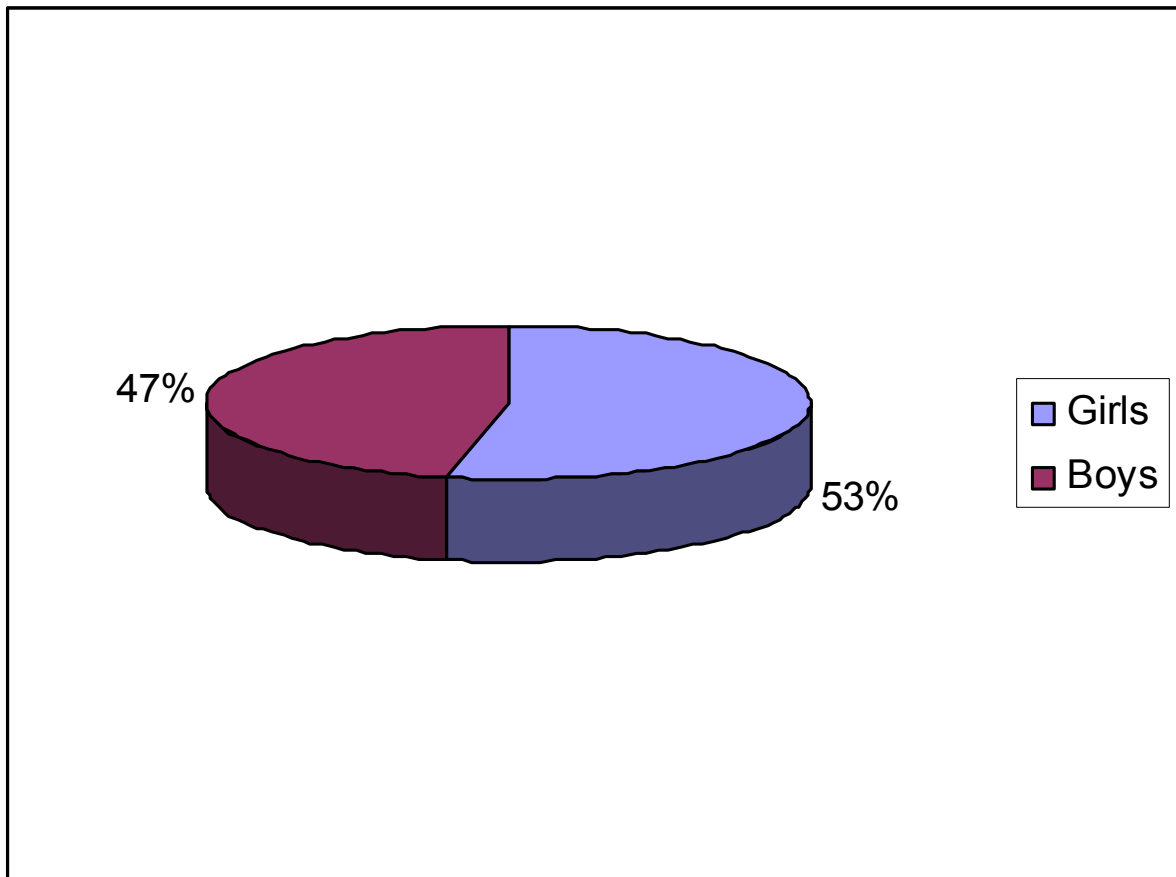


Fig 1.0: Distribution of student's population in Ibadan

Components of Solid Wastes	Name of Schools								Total responses
	BPA	1GS	BOHS	OAHS	MOGS	LC	ACGS	ABHS	
Paper	45 (90%)	45 (90%)	25 (50%)	10 (20%)	30 (60%)	50 (100%)	48 (96%)	44 (88%)	297 (74.25%)
Plastic	5(10%)	5 (10%)	2(4%)	1(2%)	20 (40%)	-	2(4%)	3(6%)	38(9.5%)
Glass	-	-	-	5 (10%)	-	-	-	2(4%)	7(1.75%)
Leaves	-	-	15 (30%)	34 (68%)	-	-	-	1(2%)	50 (12.5%)
Cans			2(4%)						2(0.5%)
Nylon			6 (12%)						6(1.5%)
Total	50 (100%)	50 (100%)	50 (100%)	50 (100%)	50 (100%)	50 (100%)	50 (100%)	50 (100%)	400 (100.0%)

Table 1: Responses about components of Solid Wastes Generated in Selected Schools in

Access to Disposal Facility (m)	Name of Schools								Total responses
	BPA	1GS	BOHS	OAHS	MOGS	LC	ACGS	ABHS	
< 10m	27 (54%)	22 (44%)	30 (60%)	8 (12%)	30 (60%)	19 (38%)	37 (74%)	193 (38%)	247 (61.75%)
10m	15(30%)	16 (32%)	10 (20%)	30 (60%)	20 (40%)	7 (14%)	9 (18%)	24 (48%)	132(33%)
> 10m	8(16%)	12 (24%)	10 (20%)	12 (24%)	-	24 (48%)	4(8%)	7 (14%)	13 (3.25%)
Total	50 (100%)	50 (100%)	50 (100%)	50 (100%)	50 (100%)	50 (100%)	50 (100%)	50 (100%)	400 (100.0%)

Table 2: Responses about Access to Refuse disposal facilities in Selected Schools in Ibadan

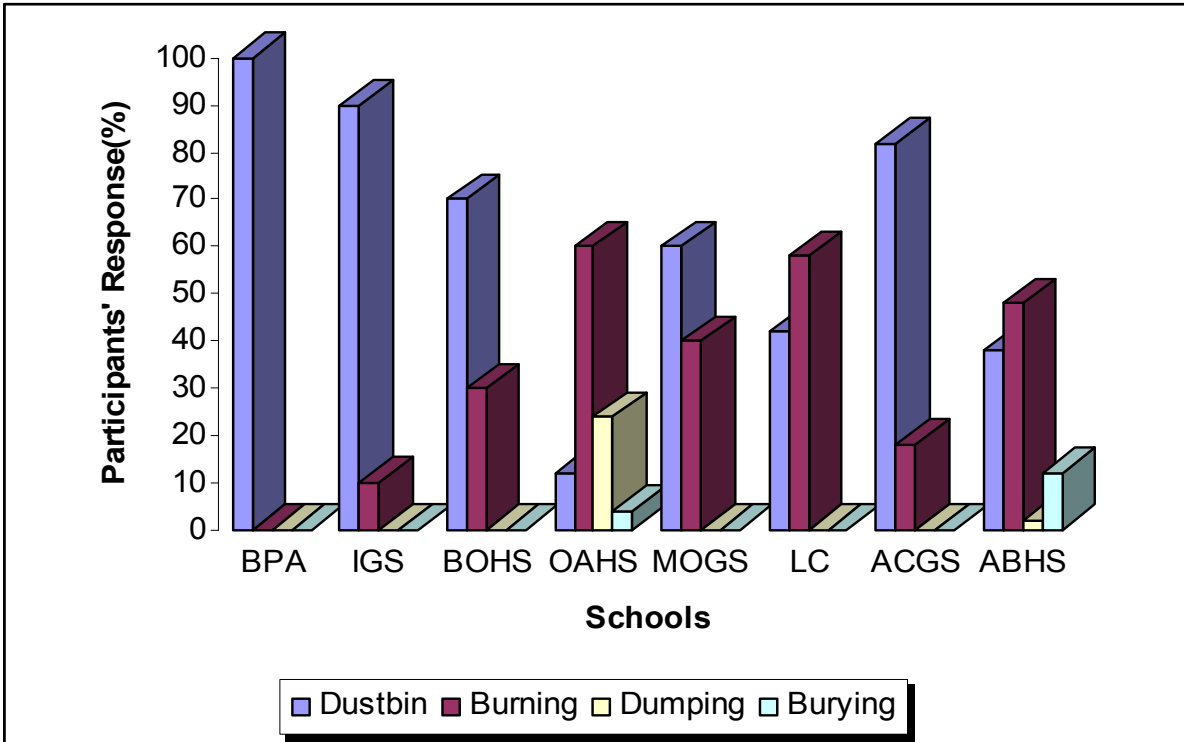


Figure 2: Refuse Disposal Practices in Selected Schools

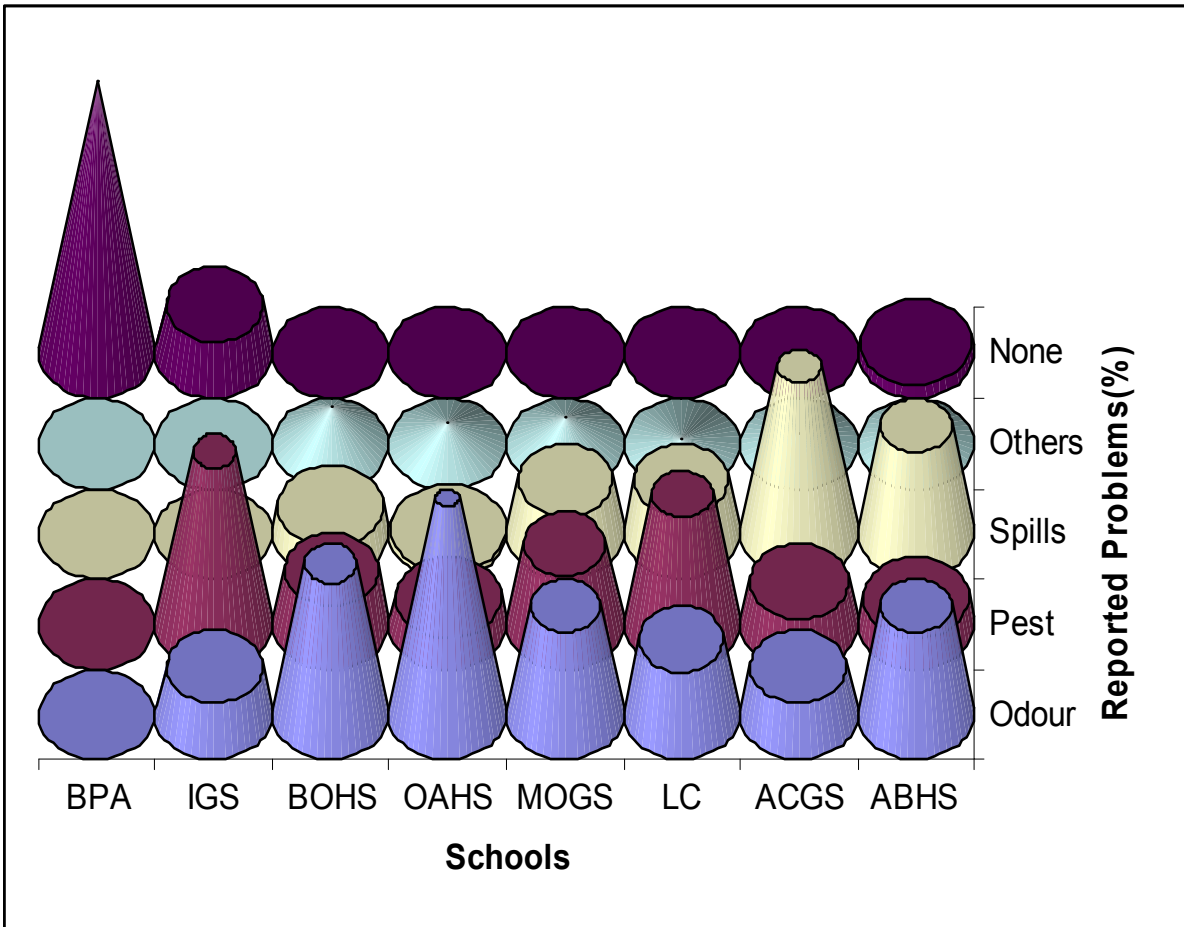


Fig 3.0: Reported Problems associated with Waste Disposal Practices

Assessment of insecticide treated bednets distribution coverage and acceptance by women in Lubombo Region, Swaziland

Joseph S. Mtshali MSc. BSc (Hons), Stanley J. Nkambule MSc. BSc (Hons), and Sabelo Dlamini PhD, Jamson Siphepho PhD, Jerry Nxumalo⁵ MSc BSc (Hons), Thabsile Nkambule BSS, BSc

Departments of Environmental Health and Community Nursing Faculty of Health Sciences, University of Swaziland.

Abstract

In 2003, Swaziland, through Malaria Control Unit, introduced the Insecticide Treated Bednets (ITNs) concept to the Swazi community by distributing ITNs to pregnant women and mothers of under five children in the Lubombo region as a pilot project. A team of researchers undertook a cross-sectional study in the malarial, lowveld of Swaziland to determine the ITNs distribution coverage and community acceptance, as demonstrated by community willingness to pay for ITNs. It was felt by Swaziland Government that these variables were important as they hold the key to full-scale implementation of the ITNs distribution project in Swaziland, a country that had no history of bednets use. The study was based on both quantitative and qualitative design. Pregnant women and mothers of children under 5 yrs residing in the Lubombo Region were targeted and data saturation per Inkhundla (constituencies) determined the minimum study sample size for the Inkhundla. A probability, simple random sampling was used to select five Tinkhundla centres from eleven in the region. A purposive, convenient sampling was used in selecting the study respondents from each selected Inkhundla. A total of 425 respondents formed the study sample. The results revealed that 40% distribution coverage of ITNs was achieved by the Malaria Control Unit. The study also revealed that 86% of the respondents protect themselves and under five children from mosquito bite by sleeping under the ITNs. Of the respondents that used ITNs, 92% liked them and 85% expressed willingness to purchase them if available for sale and that was a sign of acceptance. It was recommended that the ITNs should be distributed at full-scale to every body in the malaria affected areas of Swaziland, seeing that the communities accepted and were willing

to pay for them. The distribution points were to be increased to cover areas previously not covered in the malarial zone. Distribution points such as Tinkhundla, schools and shops were to be used to increase the coverage. It was recommended that a subsidy of 50% for an ITN be effected to make the price of ITN affordable to many and that families who can not afford be identified and ITNs issued free to them.

Key words: ITNs distribution coverage, acceptance and willingness to pay; Pregnant women; under 5 years children and Inkhudla

INTRODUCTION

An estimated 500 million cases of malaria and about a million malaria related deaths are recorded worldwide annually (USAID, 2004, Trust, 2008). The World Health Organization (WHO) and United Nation Children's Fund (UNICEF) equate malaria disease to HIV and AIDS as a major killer disease of mankind (WHO, 2001). Malaria retards development and economic growth as a result of absenteeism from work of workers and deaths (WHO, 2000, Malaria Control Unit, 2001). In African schools attendance is affected by malaria disease and this has impacted negatively on children's performance during examinations (WHO, 2003). Pregnant women and children under five (5) years are the most vulnerable (Singh and Shuckla, 2001, Nafu-Traore, 2003, WHO, 2003, Erasmus, 2008). According to WHO (2003) malaria parasites may cause placental parasitemia to pregnant women, which can contribute to maternal anaemia and impaired fetal growth; low birth weight; poor survival of the new-born and growth retardation. Malaria disease kills a child every 30 seconds in Africa ((Snow et al, 1999, Smith, 2003, Erasmus, 2008). There has been an

international and domestic effort to fight the disease through in-country malaria control programmes (WHO, 2008).

According to Erusmus, (2008) major malaria control interventions includes; measures designed to prevent mosquitoes from feeding on human's blood and measures designed to kill adult mosquitoes, both these interventions are intended to reduce the population of mosquitoes which transmit the malaria disease. The prevention of human bite by mosquitoes will also prevent the transfer of malaria parasite from mosquitoes to man and vice versa (Fuerst, 1983, Biuker et al, 2000). The transfer of parasites between man and mosquito is the important factor in the spread of malaria without which there will be no malaria disease (Manzava et al., 2000). The major contemporary method advocated by WHO and other international organizations, which can protect human against mosquito bite is the insecticides treated bed nets (ITNs) (WHO 2008, CDC 2008). According to Carroll (1997) and WHO (2003) ITNs had been put through series of tests in various countries in Africa and beyond with great success. Smith (2003) is in agreement with WHO (2003) that ITNs are effective in reducing morbidity and mortality caused by malaria as mosquitoes mostly bite people when they are asleep. ITNs can only protect mankind against malaria if people sleep under the ITNs, with no physical contact between the net and the person sleeping under it, creating a barrier between the two (human and mosquitoes) (Hobgood 2002). The insecticide of choice in treating bednets which was developed in the 1980s is pyrethroid (detamethrin or permethrin) (Wiersma, 2003). According to Environmental Health Facts Sheet, (2007) and CDC (2008) when nets are treated (impregnated) with pyrethroid (insecticides), the insecticides work in three ways; first pyrethroids kill the mosquitoes through contact; secondly it has an irritant (excito-repellent) effect that does not allow the mosquito to rest on the net for a long time and thirdly pyrethroids have volatiles that cause deterrence, leading to fewer mosquitoes entering a hut / room. Use of ITNs can reduce infant mortality and morbidity by 20% in malarial areas (WHO, 2002, Manzava et al, 2000, PSI, 2001, WHO 2003, Smith, 2003). It is for this reason that African Governments had introduced ITNs to their respective countries to protect their citizens against mosquito bites and malarial disease. The ITNs method is cheaper and more effective in controlling malaria disease than indoor insecticides spraying with dichlorodiphenyltrichloroethane (DDT) (Manzava et al., 2000, WHO, 2008).

The ITNs biggest disadvantage is that it needs the full acceptance and willingness to pay for it (ITNs) by malaria affected population if positive results are to be achieved. A population that has reached this stage (of acceptance and willingness to pay) does not only provide an environment where efficacy and effectiveness of the service can be guaranteed but sustainability of the service is assured (WHO, 2008). Another important condition is that populations living in malaria endemic areas should agree to sleep under the ITNs and this holds the key to the success of a ITNs introduction programme (ALAI et al, 2003, Williams, 2002). For human populations to accept and be willing to pay for ITNs they (populations) should value and appreciate the ITNs services (Morrow and Kindane, 2000). Depending on the extent to which the ITNs meet the community needs, the populations will attach certain value to it. This will determine, to some extent, how the populations perceives the ITNs and how much the community is prepared to sacrifice for the ITNs (Hanson et al, 2003).

.Rowley (1997) estimates the cost of one ITN to be US\$8.00 (excluding the cost of distribution). The calculation of ITNs cost (including treatment) using the formula developed by Rowley (1997), assumes that the net material is strong enough to last for 4 years under harsh conditions. In calculating the cost of one ITN, Rowley (1997) estimated it at US\$4.00 untreated. The treatment is done twice a year, and annual cost for net treatment is estimated to be US\$0.50. Cost of one net in four (4) years = US\$4.00 + (US\$0.50 x 2 x 4) = US\$8.00. Lewis, (2001) in agreement with Rowley, (1997), states that the cost of a single ITN bednet is between US\$5.00 and US\$10.00 and a treatment cost estimated to be between US\$0.50 and US\$ 1.00. WHO (2008) recommend a free or highly subsidized cost of ITNs or highly subsidy cost. At average one net can accommodate three (3) people.

Introduction of ITNs in Swaziland

Malaria disease is endemic in the Lubombo plateau, lowveld and some parts of the middleveld of Swaziland (Ministry of Health and Welfare 2000). It is expected that, due to global warming, the existence of Anopheles mosquitoes (vector of malaria disease) is likely to spread to areas previously known to be malaria free (WHO, 2001, Shane, 2002). This might increase the population at risk of contracting malaria in Swaziland. Swaziland has suffered prolonged drought since 2002 (IRIN, 2008) and because rainfall has a direct impact on mosquito breeding, there has been a significant decline in the malaria cases

(Malaria Control Unit 2000). This has given a false impression that Swaziland is winning the war against malaria. The Swaziland Malaria Control Unit is even contemplating malaria eradication in the country as oppose to control (Williams, 2002, Erasmus, 2008). This is because in 2007 only five people died of malaria in Swaziland (Global Health Report, 2008, Erasmus, 2008). The Malaria Control Unit forgot to factor in the disease statistics and the effect of drought in the malaria cases decline. In 2004 the Malaria Control Unit acknowledged that the malaria burden can not be reduced any further without the addition of another intervention (Simon Kunene, Head of Malaria Programme, personal communication, 2004). At the time, indoor residual spraying method was a dominant vector control strategy in Swaziland and nothing new that was implemented can be accredited for the decline in malaria cases.

Need for the assessment of ITNs distribution coverage

In 2003, Swaziland introduced the ITNs concept to the Swazi community by distributing ITNs to pregnant women and mothers of under five children in the Lubombo region as a pilot project. When the ITN given to under five mothers it was assumed that the net was going to be used for the benefit of the child, as children of this age usually sleep with their mothers. Nurses and Rural Health Motivators were used in the distribution and demonstration of ITNs treatment procedures. A team of researchers undertook to investigate the ITNs distribution coverage and acceptance as determined by willingness to pay for it (ITNs) by communities who received them (ITNs) in the Lubombo Region of Swaziland. These variables were felt important as they hold the key to full-scale implementation of the ITNs distribution project in Swaziland, a country that has no history of bed nets use. The information elicited was used in developing strategies for full-scale ITNs distribution for malaria control in Swaziland.

Setting of the study area

The study was carried out in 11 Tinkhundla areas (Constituencies) of Lubombo Region. The 11 Tinkhundla areas are the only places where ITNs were distributed by the Malaria Control Unit and are the hardest hit areas in terms of malaria endemicity in Swaziland (Malaria Control Unit, 2000). The Lubombo plateau covers 8% of the total surface area of the country (estimated to be about 17,364km), with an altitude of 600 metres. The average annual rainfall is 700 mm with summer temperatures of 30.8 degrees centigrade and winters of 20 degrees

centigrade (Meteorology Station, 2002). About 8% of the country's population (estimated at 930,000 people resident in Swaziland) lives here (Census, 1997). The people in the area are farmers with the majority of the men working as manual labourers in sugarcane fields situated in the lowveld of the country.

Methodology

The study was conducted at the Lubombo Region using Tinkhundla (Constituencies) and Chiefdoms as focal points. The Study was based on a cross-sectional design incorporating both qualitative and quantitative research approaches, where open and closed-ended questions were used for in-depth retrieval of information. Respondents were followed at home for interviews; this provided an opportunity for data collection through observation.

Population and sampling

Pregnant women and mothers of children under 5yrs residing in the Lubombo Region were targeted. Sample size for quantitative approach was 425. Data saturation per Inkhundla determined the minimum size of the sample for the qualitative approach. A probability, simple random sampling was used to select five Tinkhundlas from eleven in the Lubombo region. A purposive, convenient sampling was used in selecting the study respondents from each selected Inkhundla. That is, in a household an interviewee must either be pregnant or have a child / children under five years. If more than one person is eligible for interview in a homestead all of them were interviewed.

Instrument development

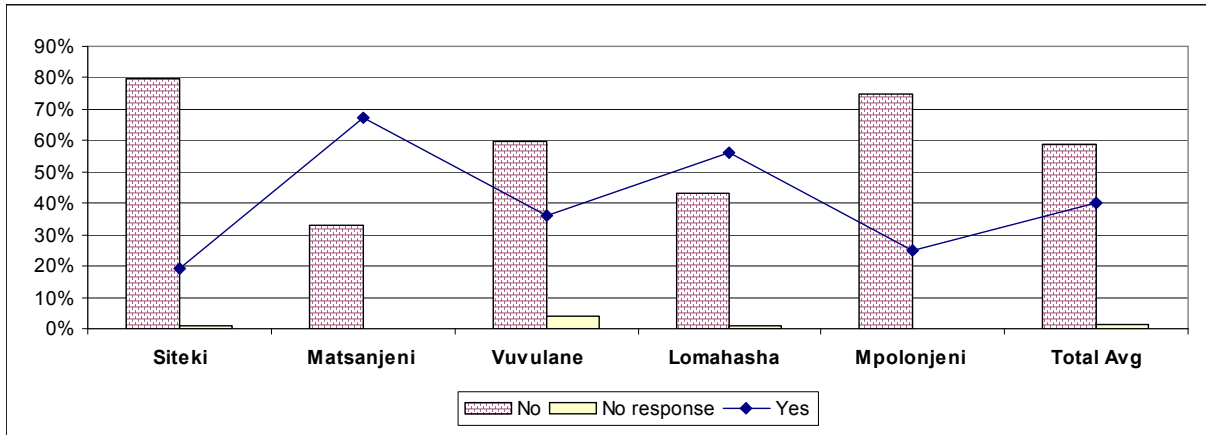
A questionnaire was developed to collect information from pregnant women and mothers of children under 5 yrs through a face to face interview. Pre-testing was done at Siphofaneni an area affected by malaria yet not under study. Data was also collected using a face to face interview of personnel responsible for ITNs distribution at facility level. Observation was used to get additional information. Data collectors were drawn from the Environmental Health Programme in the Faculty of Health Sciences to carry out the interviews. Prior to undertaking this task, the data collectors were trained by the researchers on research methodology. Data was analysed by use of computer SPSS data analyser package. Two workshops were organised to disseminate the findings of the study to stakeholders and stakeholders contributions were incorporated to the

Ethical issues

Permission to conduct the study was obtained from relevant authorities before accessing the study areas. Objectives of the study were explained to the interviewees. Anonymity and informed consent was maintained throughout the study, that is, names of the community members who participated in the study remained anonymous. The research observed

respondents interviewed were pregnant during the time of the interview and half of the pregnant women had bednets, giving 50% coverage of nets distributed to pregnant women. Of the women who were not pregnant (399) 157 had bednets giving coverage of 39% of nets distributed to children under 5 yrs.

Figure 4.1: Overall coverage of ITNs distribution in the Lubombo region



the right of the interviewees by maintaining their privacy and freedom through confidentiality.

RESULTS AND DISCUSSION

Demographic characteristics of respondents

The broad objective of the study was to assess the distribution coverage, and acceptance as demonstrated by willingness to pay for ITNs among pregnant and mothers of children under five years old in the Lubombo region. A majority of the respondents (60%) were married while 40% were single. About 37% of the respondents fall in the ages 15 to 24 years, an age group supposed to be at school or university but are either pregnant or nursing children. About 55% were within the child bearing ages of 25 to 40 years, while 8% fall in the risk category (above 40 yrs) in terms of pregnancy as defined by WHO (2003). About 64% of the respondents received primary education, 17% had secondary education, 4% had tertiary education and 15% had no formal education. This result shows the difficulty for the respondents to be employed or generate a meaningful income. A large majority (74%) of the respondents were unemployed while 14% were either self employed or in some form of temporary employment and 12% in permanent employment.

Distribution coverage of ITNs in the Lubombo Region of Swaziland

A total of 425 respondents were interviewed in the five Tinkhundla (Constituencies) and 26 of the re-

Overall ITNs distribution coverage in the Lubombo region was 40%. However the following Tinkhundla; Siteki, Mpolonjeni and Vuvulane were below the 40% coverage, as low as 20% in Siteki. This difference is statistically significant ($p < 0.05$). The 40% is still too low if one has to achieve a meaningful degree of prevention of mosquito bites among the pregnant women and under five children.

Acceptance of ITNs as demonstrated by practices and willingness to pay for the ITN

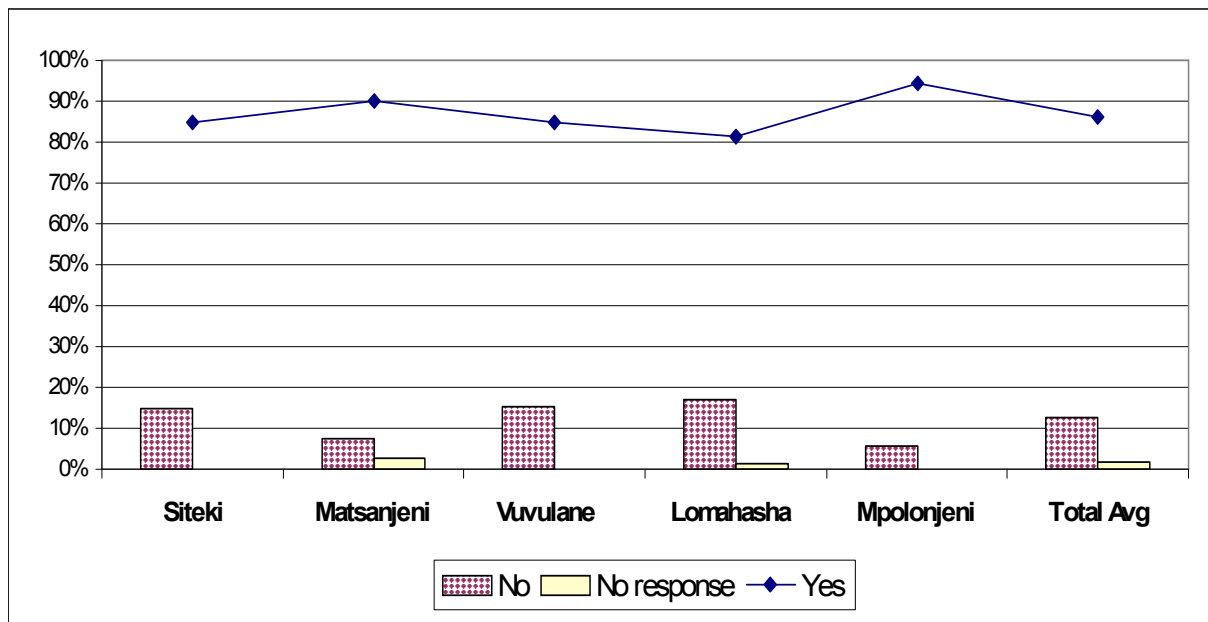
Practices of net users

Of the mothers with children under 5 years 69% slept with their children and sometimes with husbands under the bednets, only 0.6% of the respondents reported that only the husband sleeps under the net and 30% don't use them. Of the pregnant mothers 17% reported that they sleep under the bednet, giving 86% protected study population. Out of those respondents who received and used ITNs, 62% appropriately used them for the designed purpose. For those who received and did not use the ITNs, when asked as to why, gave various reasons, some saying that they were still waiting for the Rural Health Motivators to treat the nets while some said that there were no mosquitoes and that they will use the net, when mosquitoes are a problem to them. About (80%) of the respondents are aware that ITNs need to be treated. Only 26% correctly said that it should be treated once a year. About 64% knew that their ITNs had been treated. About 12% were either

not sure or knew they were not treated. On the other hand, the nurses who distributed the ITNs complained that they, themselves, were not trained on

Community willingness to pay for insecticide treated bednets (ITN)

Figure 4.4: Willingness to purchase ITNs



the ITNs treatment and that even if they were trained, there would be no time to demonstrate the treatment procedures to clients as there are always long queues of patients waiting for treatment. A majority of the respondents (84%) had knowledge about insecticide treated bednets as a method of malaria control and how they should be used and treated. Almost (93%) all the respondents believed that ITNs when properly used could protect them against mosquito bite and malaria disease. About (92%) of the respondents liked the size of their ITNs and 96% felt that the ITNs were big enough to cover their bed completely and 4% responded to the contrary. The 8%, who didn't like the ITNs, cited the shape of the ITN as the reason and felt that it should be a square shape that would fit properly over their beds, which are square shaped themselves. The difference in the acceptance of the ITNs across the Tinkhundla under study was not statistically significant ($p > 0.05$).

Most respondents (86%) did not have problems sleeping under the net. A few (14%) mentioned that they and their children, or their husbands suffocated under the net or were irritated by the insecticide smell; hence they did not like sleeping under it. Some mentioned that their children are allergic to the insecticide used to treat the net. A majority of the respondents (92%) are convinced that sleeping under the net will protect them against mosquito's bite and malaria disease.

About 85% of the respondents are willing to pay for the ITNs if they were to be available for sale. The difference in the willingness to pay in the different Tinkhundla is not statistically significant ($p < 0.05$). Willingness to pay was neither affected by educational status ($p > 0.05$) nor by marital status ($p > 0.05$). There were varying responses as to how much the respondents would be prepared to pay for an ITN. About (90%) of the respondents gave a range of between E30 to E59 and 8% gave a range of E60.00 to E100). A small group (2%) maintains that the bednets should still be given for free. Almost all the nets distributed were either blue or green. Almost all the respondents (91%) liked the colour of their nets because the colour did not become dirty easily. The 7% who did not like the colours did not give a clear reason except that blue or green are generally not their favorite. The majority is prepared to pay and they suggested that ITNs should be sold at local shops, clinics, Tinkhundla centres and Chiefdoms. Literature recommended an ITN cost of US\$8.00 (E80.00), this include cost for treatment but does not include the cost for nets distribution.

WHO (2008) recommend a free distribution of ITNs or on a highly subsidy cost. While it may be advisable to provide these ITNs for those who can afford to purchase them, it is important to identify the very poor families and free ITNs distribution for them to be continued. A conclusion can be made that in all the study areas the respondents are willing to pay for the bednets.

Recommended future ITNs distribution points

Almost all the respondents (92.4%) received their ITNs from the clinics; the rest received them from Malaria Control Unit. There were varying responses on how communities could be assisted to get more ITNs. 37% said that more donations should be sought to subsidize the cost and the majority (98) was prepared to pay, suggesting that ITNs should be sold at local shops, clinics, Tinkhundla centres and Chiefdoms.

Conclusion

It was concluded that 40% distribution coverage of ITNs was achieved and that communities accept the use of ITNs and they are willing to pay for them.

Recommendations

The following recommendations are made:

The ITN may be distributed at a full-scale to every body in the malaria affected areas of Swaziland seeing that the communities accept it and are willing to pay.

The distribution points should be increased to cover every area in the malarial zone. Distribution points such as Tinkhundlas, schools and shops should be used as distribution points to increase the coverage.

Considering that one ITN cost about E80.00, taking an average of the respondents' recommendation, a subsidy of 50% can make the cost of an ITN affordable to many. While it may be advisable to provide these ITNs for those who can afford to purchase them, it is important to identify the families that cannot afford and continue rationing the ITNs for free to them.

Since the results reflected that some respondents did not use the ITNs upon receiving them because they were not treated, the ITNs should be distributed already treated to increase efficiency and effectiveness of the ITNs.

A study to find out the willingness to pay from the side of bread winners in the households should be conducted. This is because bread winners in any household exercise a great influence in the decision making process, especially when it come to purchasing the ITNs.

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The Canadian Institute of Public Health Inspectors (CIPHI) welcomes you to the 11th International Federation of Environmental Health's World Congress and CIPHI's 76th Annual Education Conference

Adam Grant

National President, CIPHI



I am pleased to send greetings to our members and colleagues here in Canada and abroad on behalf of the Canadian Institute of Public Health Inspectors (CIPHI) and welcome you to the 11th International Federation of Environmental Health's World Congress and CIPHI's 76th Annual Education Conference.

Our hosts Dominic Losito and Claudia Kurzac have been leading our dedicated volunteers to produce an event truly worthy of international

recognition. The members of the conference Committee, in beautiful British Columbia, have been working hard to put together a fantastic World Congress that promises to inspire, educate and stimulate new and ongoing discussion of environmental public health issues that will be relevant locally and globally.

CIPHI has been working tirelessly this past year to strengthen the profession of Environmental Public Health nationally which we hope will contribute to the global collective. Our organization is proudly entering 2010 with a monumental change to its structure by officially launching the Council of Professional Experience (CoPE) and the Continuing Professional Competencies (CPC) Program. For our new members and colleagues from abroad, CoPE is the result of five years of hard work undertaken as part of our CPC Program.

CIPHI and its many dedicated volunteers have developed the CPC Program to allow Environmental Public Health Professionals who have earned the CPHI(C) credential to demonstrate their ongoing dedication to their profession through continuous learning. CoPE is the administrative body that will oversee the CPC Program.

I want to thank the Public Health Agency of Canada for their guidance and financial support, Claudia Kurzac and Phi Phan for their extreme dedication and leadership in its formation, and most of all I want to thank the numerous volunteers that have done all the work to make CoPE and the CPC Program a reality.

I am honored to report that CIPHI was the 2010

recipient of the Public Health Agency of Canada/Canadian Public Health Association Health Human Resources Award.

Ken Gorman and I accepted the award on behalf of CIPHI at the CPHA Centennial Gala Dinner. This award recognizes innovation in public health practice to translate research or knowledge into a new product, practice, or strategy for public health workforce development or program delivery, including the preparation of individuals for practice. Our friends and colleagues from PHAC nominated us for all our work on the CPC Program and the Member Service Centre.

Our Institute is incredibly proud to receive this award. We would like to acknowledge all the support and guidance that we have received from the Public Health Agency of Canada and thank CPHA for this mark of distinction.

CIPHI, with the support of Amicus Humani Generis, Friend of the Human Race, was able to conduct a work exchange with Tanzania this past winter. Jason MacDonald (AB Branch) was our successful candidate and will be providing a presentation of his experience during the World Congress.

Approximately 25 years ago, CIPHI lost one of its largest branches of our organization. It was a very dark time in our Institutes past. As of March, we were pleased to welcome our recently reactivated Quebec Branch to CIPHI and congratulate Oumar Ba on his election as the new Branch President.

It is with gratitude that I wish to acknowledge the efforts of Stefane Gravelle of Manitoba and his committee for collaborating with Oumar to reinstate our presence in Quebec. We look forward to working with both Oumar and his executive to ensure the successful return of Quebec to our fold.

The National Collaborative Centre for Environmental Health (NCCEH) has teamed with CIPHI to conduct a survey that will take an inven-

tory of environmental public health services across the country. Len Gallant and Brian Hutton have been contracted to undertake this task and facilitate the collection of the subsequent data. All environmental public health agencies have been asked to participate by completing a questionnaire that describes their various services.

In an effort to keep our finger on the changing pulse of environmental public health, CIPHI will explore methods for maintaining this data. The NCCEH plans to use the data to create resources that will assist environmental public health service providers to network and share resources. It is our intent that this data set will assist CIPHI in making effective and informed decisions in regards to our core business areas.

Finally, the NEC has been diligently working on a new strategic plan that included a member-nom member survey, allowing our national colleagues to provide direction, feedback and opinion on the efforts of the NEC and the direction they would like to see CIPHI move towards. The results of the survey clearly articulate the need for the Institute to be more transparent and accountable to its members.

I want to personally thank all of our colleagues who made the effort to provide us with their feedback via the online survey. All of the responses we received are truly valuable in the planning of direction we want CIPHI to take in the future. The new 3 year Strategic Plan addresses the issue of accountability and transparency and hopefully maintains the momentum the Institute has been building these past few years.

Before I end my 2010 report I would like to invite everyone to next years **77th Annual Educational Conference** June 26-29, 2011, at the Halifax Marriott Harbourfront Hotel Upper Water Street Halifax, Nova Scotia. I wish everyone continued success and hope everyone enjoys the IFEH's World Congress and CIPHI's Annual Education Conference.

Development of a generic curriculum for Enhancement of Environmental Health Training in Africa

Keraka M. N^{1,6}, Haman, T.N. ^{2,6}, Snyman, J².; Engelbrecht, J.C. ^{3,6}, Grimason A.⁴, Lungu, K. ^{5,6}, and Morse T.^{5,6}.

¹ Kenyatta University, Nairobi, Kenya

² University of Johannesburg, Johannesburg, South Africa

³ Tshwane University of Technology, Pretoria, South Africa.

⁴ Stratclyde University, UK

⁵ University of Malawi, Polytechnic, Blantyre, Malawi

⁶ Africa Academy for Environmental Health (AAEH)

Introduction

It has been recognized that many people in Africa are exposed to a series of environmental threats that impacts on their health, physical and mental development and even their survival. There has been increased morbidity and mortality due to unhealthy environmental conditions that are largely preventable by taking decisive action and finding innovative, healthy, cost effective and sustainable ways to develop and improve human livelihoods (Okonofua, 2005; Esposito *et al* 1995)

To ensure that there are adequate professionals trained to participate in the enhancement of good health, the International Federation of Environmental Health (IFEH) commissioned the International Faculty Forum (IFF) for Environmental Health educators to develop an international curriculum in Environmental Health.

The development of an international programme in Environmental Health is intended to ensure that irrespective of the location within Africa, all Environmental Health practitioners will be educated to the same core curriculum. This will ensure that cross-cultural insights have been shared and will ultimately lead to the development of Environmental Health Profession-

als who have a common, internationally recognized educational base. This will facilitate portability and mutual recognition of partners, not only in Africa but also for the rest of the world. The mission of the curriculum is to ensure the development of Environmental Health Professionals who have relevant knowledge, skills and attitudes through training and research required for the improvement of health in communities.

Objectives of the curriculum

The curriculum was intended to address the ongoing issues of professional identity, status and transportability of qualifications for Environmental Health Professionals that in the long run will contribute to sustainable development. The curriculum was specifically designed:

- To create a curriculum for Environmental Health Professionals which is aligned with quality assurance principles and facilitates increased articulation;
- To create a curriculum which can be adapted to individual institutional frameworks in order to offer a degree course in Environmental Health; and

- To create a curriculum for Africa which fits within the international framework for Environmental Health Professionals to increase global articulation and portability

Methods

A model was designed to guide the development of the curriculum in 2008 at the World Congress on Environmental Health in Brisbane. The model emphasized the concept of core skills for Environmental Health Professionals and focused on the development of a curriculum that enhances ability/skills that are uniquely entrenched and focused on by Health Professionals. Based on this model, as part of achieving its objective, the Africa Academy for Environmental Health (AAEH) (formed in 2008) was successful in being awarded a DelPHE (Development of Partnerships in Higher Education) award funded by the British Council. This fund was used to facilitate a number of curriculum development workshops in Africa during which important role-players such as academic institutions, professional bodies and – associations, government department (health and environment), municipalities, private industry as well as non-governmental organizations were involved. A refined curriculum was formally launched at the 2nd All Africa on Environmental Health that took place in Lilongwe, Malawi during May 2010.

Results

A curriculum was developed that had the following features:

Admission to the programme will require student compliance with the relevant national and institutional policies which should allow for vertical and horizontal articulation. Various entry routes will be considered for all potential scholars, for example, mature entry and school leavers.

Fundamental knowledge in Mathematics, Core sciences (Biology, Chemistry and Physics) and Language competency will have to be considered. Minimum and maximum duration of the proposed curriculum should be in line with in-

stitutional policies.

As regards to the competency criteria, all aspects of the curriculum must be achieved together with practical training to attain competency. The AAEH curriculum for the Bachelors degree in Environmental Health stipulates the minimum competencies that a graduate should achieve to practice. These competencies consist of relevant knowledge, skills and attitudes. These competencies can be achieved either through an integrated curriculum approach during the time of study at the Institution, or professional body certification/registration subsequent to graduate practical training. These should include teaching strategies such as, laboratory practices, field trips, industrial attachments; work integrated learning, service learning as detailed in the curriculum outcomes.

Assessment of competencies is to be aligned with institutional policies. A combination of various assessment strategies should be utilised in order to ensure achievement of the stated competencies and assessment criteria. Therefore the theoretical, practical and reflective aspect of the curriculum must be assessed. The level of assessment should be aligned with the level of the competency and assessment criteria (e.g. progression of learning). Grading of results/competencies is to be aligned with institutional policies. Credit transfer/ exemption/ waiver/progression can be considered where the policy of the institution allows. On successful completion of all requirements the Bachelors Degree in Environmental Health will be awarded.

The course structure for the curriculum was based on the five main pillars, that is, Community health, Pollution control, Built environment, Food and meat safety and Occupational health and safety. It is clear that the program should be built on a sound foundation of sciences that has to include the natural, social, mathematical, IT, language and social sciences. Finally, students need to be equipped with the necessary professional skills that would enable them to render an effective service. The following are regarded as important professional skills: risk management, development, interpre-

tation and application of legislative requirements and policies, epidemiology and research skills.

Conclusion

In conclusion, it is expected that adoption of the curriculum will be in line with the governing institution's policies as well as the national legislative frameworks of respective countries.

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National Environmental Health Services in Ireland: Steering a passage through choppy waters

Martin Fitzpatrick EOHA, Ireland

The downturn in the economic fortunes of Ireland has been well documented in recent years. In common with most other countries, public expenditure in Ireland has been under the spotlight, with hard questions asked in terms of the effectiveness and efficiency of public services.

It is against this background of economic uncertainties that fundamental reorganisation of environmental health services has progressed over the past four years. The good sense in commencing this change back in relatively calmer economic waters is now beginning to bear fruit. In the wider context, these changes within environmental health reflect the efforts being made to fundamentally reorganise all health services delivered in Ireland. The origins of Irish environmental health services can be traced back to the Public Health (Ireland) Act of 1878 which has been described as the “Bible” of public health legislation. Local Authorities were empowered to recruit medical officers and health inspectors (title changed Environmental Health Officers in early 1980’s).

In 1971 following the establishment of 8 (later 11) Health Boards all personnel dealing with Public Health and Environmental Health were transferred from the Local Authorities to these boards. Provision was made for environmental health staff employed by the Health Boards to undertake duties for the Local Authorities in an “agency arrangement”. This involved Environmental Health Officers employed by the health boards delivering a wide range of Environmental Health Services to Local Authorities who in turn reimbursed health boards for these services. These arrangements have been the source of tensions and frustration between the stakeholders over the years and subsequently many aspects of environmental health were underdeveloped.

In January 2005, all eleven Health Boards were

dissolved following the establishment of the Health Service Executive (HSE). The establishment of the HSE heralded a new move to the delivery of health and personal social services within one national unified structure. The establishment of the HSE also provided a clear opportunity to consider where best to place the Environmental Health Service from a service delivery perspective having regard not only to the views of the profession itself but also the wider context formed by contractual and legal obligations, and the clearer population health focus under the new HSE structures.

As a first step, the post of Assistant National Director with strategic responsibility for Environmental Health was established. Simultaneously a tripartite group consisting of the Environmental Health Officers Association, the Principal Environmental Health Officer’s Forum and the IMPACT trade union submitted a position paper to the HSE on the future direction of Environmental Health Services. This position paper highlighted the unique roles and functions of the Environmental Health Service and the potential for the further development of the service within the context of the wider health service reform. Following negotiations, a review group comprising members of the tripartite group along with senior health managers were given the task of carrying out a review of environmental health services. Their subsequent report has been the blue print for the reorganisation of services.

The initial successes in the reorganisation process were in a sense “below the water line” achievements. Realigning the budgets of what were previously 11 different organisations into one national budget was a tricky manoeuvre. Establishing staffing complements of what had been previously 11 different employers into one unified service was equally challenging. The ap-

pointment of 4 Area Chief Environmental Health Officers with both geographic and specific strategic remits was central to getting these initial pieces of the jigsaw in place. In terms of service delivery, the more tangible elements are now falling into place.

The development of a national environmental health information system that can seamlessly integrate the many strands of work carried out by Environmental Health Officers and be used as a powerful management tool to guide service delivery is underway. This is an exciting development that will bolster the evidence base for environmental health interventions. Side by side with this is the emergence of supporting work-based research within environmental health services. While there have been very good individual examples of this in Ireland, the possibility to do this on a national, integrated basis is a big step forward. In conjunction with these initiatives there is now a national continuous professional development programme that targets training resources and needs of Environmental Health Officers on a strategic basis. One of the very concrete example of this is the work being done to strengthen Environmental Health Officers contribution to environmental impact assessment.

The ever increasing emphasis at European Union level on strategically influencing environmental assessment has proved to be a very timely catalyst in this regard. One of the very

clearest benefits to date has been the manner in which a national environmental health service can interact with external stakeholders. Whereas previously 11 different health boards, with sometimes very different priorities, negotiated and entered into contractual agreements with external stakeholders, this can be done on a basis that ensures greater equity across services and geographic regions.

The issue of service equity is very much at the centre of the new arrangements. There is a well known cliché in Ireland – *“much done – much more to do”*. In many respects this is now where Irish environmental health services stand. What is clear though is that the development of a national unified service has helped to withstand the buffeting of colder economic climes and given a heightened sense of common purpose to all those on board. Paradoxically it has also given rise to a healthy debate amongst Environmental Health Officers about very fundamental questions; Questions such as *“what is our primary role ”* or *“ how do we decide what are our priorities”*?

This process of questioning and debate is crucial to a healthy profession and should not be ducked or avoided. It is this internal collective debate that strengthens a profession’s ability to reinvent itself as necessary and ensure that when the hard questions are being posed from external sources , we have also at least have begun to consider the answers.



