

Environment and Health International



Magazine of the International Federation of Environmental Health



International Federation of Environmental Health:

World Congress on Environmental Health

3 – 6 May 2016, Lilongwe, Malawi



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Malawi**



**Malawi Environmental
Health Association**



**University of
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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.

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Front Cover Photo: Environmental Health World Congress, Malawi May 2016.

Report, IFEH President Peter Archer, FCIEH



Peter Archer

IFEH Journal December 2016

The International Federation of Environmental Health has never been so strong. We now have forty or more full member organisations (MOs) and a number of applications from potential members. In the past year, Haiti has achieved full membership and Fiji has recently submitted an application. Equally important are the new partnerships such as joining as a 'Partner Member of the World Federation of Public Health Associations' (WFPHA). Following lengthy discussions with the United Nations, we are now recognised as a partner in UNISDR (United Nations Office for Disaster Risk Reduction). As colleagues will know, negotiations with both the United Nations (UN) and the World Health Organisation (WHO) are slow which can be very frustrating for all those involved.

Currently the principal task of UNISDR is to ensure the prompt implementation of 'the Sendai Framework for Disaster Risk Reduction 2015-2030' (<http://www.unisdr.org/we/coordinate/sendai-framework>). Over the weekend of 9th December, IFEH former President, Henning Hansen will be in Geneva in order to provide IFEH input to the agenda for the Cancun, Mexico UNISDR World Congress in May 2017. Meanwhile I have been involved in assisting setting a framework for implementation of the 'Health Protection Policy Toolkit – Health System for Strengthening Health Security' - <https://www.thecommonwealth-healthhub.net/policy-toolkits/>. This toolkit which was launched in Geneva earlier this year, has a substantial section dealing with environmental health outcomes and is being strengthened by work of a team at the Commonwealth Institute assisted by Dr. Stephen Battersby and Peter Archer.

At the end of January 2017, the South African Institute of Environmental Health (SAIEH) is holding its annual conference at the Lord Charles Hotel in Cape Town. This conference which was to be held in November 2016 was postponed because of major changes of political control in the previous months' municipal elections. I am delighted to have been invited to this conference in January when I hope to

be able to provide detail of the work of IFEH and to outline the opportunities for joint working between member organisations. Anyone interested in joining colleagues at the conference should go the SAIEH website (<http://www.saieh.co.za/>)

In October 2017 the IFEH will be participating in the second world environmental health academic conference, which is being sponsored this year by the Jamaican Association of Public Health Inspectors (JAPHI). This is the first time that an IFEH congress has been held in the Caribbean, which will be at the Montego Bay Hilton Hotel on an all-inclusive basis. The conference theme is “One Health - One Global Environment” and will be held 22nd - 26th October 2017 with the IFEH Council Meeting & AGM taking place on 22nd & 23rd October. More information will shortly be available on the IFEH website (www.ifeh.org). This second world EH academic conference follows on from the previous one held in Coimbra, Portugal in September 2015.

We hope that you enjoy reading this edition of the IFEH Journal and remember to send further articles to our editor, Kathy Young. Also please look at the special interest groups (SIGs) on the IFEH website and get involved in your favourite subject!

Editorial, IFEH Honorary Editor



Kathy Young MEHAI.

Sincere thanks to all who contributed to the December 2016 edition of Environment and Health International the professional Journal of the International Federation of Environmental Health. Since we last spoke challenges facing world order appear to be ever increasing. Donald Trumps election in the United States, war in Syria and other parts of the world, Hurricane Matthew devastating Haiti and the refugee crisis. Whether they are natural or man made disasters, human suffering is ever increasing. United Kingdoms decision to leave Europe is just another example of the challenges we face in the future. The historic Climate Change agreement signed in Paris by 195 countries in December 2015 adopted the first ever universally legally binding global climate deal and is a welcome development in addressing a global challenge. Denis Naughten, Irelands Minister for Climate Change, has set out an ambitious plan to address this important issue.

This edition has an article by Anne Godfrey, Chief Executive of CIEH and outlines the challenges facing the Environmental Health profession. The question what does the future hold for EH is very pertinent but perhaps we should be asking what do we as a profession want the future professional landscape of Environmental Health to look like. This is so important for young EH professionals to define for their future and we can assist in this important task. I am heartened by the demand for recent graduates in private industry but this is tempered by EH functions being lost within the public service in Ireland.

Who do we want to be, how will we support the Environmental Health profession, be relevant to members and grow our value, influence and impact is aptly asked by Anne Godfrey in her contribution to this edition and the question could be posed to all EH Associations world-wide. A more diverse membership base as well as being able to influence and engage with key decision-makers to enable real change is called for in this article. See article by Dr Aoife Donnelly a recent addition to our EH team at Dublin Institute of Technology on increasing health and well being by exercising in green

spaces. Green exercise is defined as undertaking physical activity whilst being exposed to nature an important contribution considering our increasing urbanisation worldwide.

The Malawi World Congress took place in May 2016 and a detailed report by Dr Tracey Morse makes very interesting reading. Links between Universities and joint projects is the subject of a piece by undergraduates from the University of Ulster. It is great to see student contributions and a paper authored by DIT graduate Heather O Hanlon examines the increasing trend of Aflatoxin contamination in foodstuffs and growing concerns in relation to climate change.

World Environmental Health Day celebrated in Scotland examines what 10 years of smoke free means to 10 year olds in an article by Tom Bell, REHIS. A massive impact can be made by the EH profession in shaping young minds to improved health and wellbeing. Other articles include information on good land use planning in averting impacts from hazardous waste companies by Peter Wade, vector surveillance in the prevention of disease by Susana Paixao and a very useful reference to European Housing Resources which should be of benefit to anyone trying to influence housing policy in their respective countries, Currently we have over 6.500 people homeless in Ireland an increase of 40 % since last year, a shameful statistic in light of the UN policy of each individual being entitled to shelter as a basic human right. A number of case studies are presented to assist European governments facing housing challenges. The report states that for every €3 invested in improving housing conditions, €2 would be returned in one year in healthcare savings.

Happy Christmas from all at IFEH and Best Wishes for 2017.

Malawi Congress Report

Dr Tracy Morse.¹

¹National SHARE Coordinator
WASHTEC Centre
University of Malawi - Polytechnic

Executive Summary.

The 14th IFEH World Congress on Environmental Health was held in Lilongwe, Malawi from 1st – 6th May 2016. This successful event was organised over a period of 24 months by a wide range of stakeholders in Malawi. The main partners for the event were the International Federation for Environmental Health, Government of Malawi (Ministry of Health), University of Malawi (Polytechnic), and Malawi Environmental Health Association.

The programme took place over 6 days, with the full congress being 4 days (3rd – 6th May) and a series of meetings and events prior to the full congress including, IFEH Council meeting and series of regional meetings, International Environmental Health Faculty Forum, and the Africa Academy for Environmental Health.

The congress had attendance from 162 delegates from 23 countries in 5 continents, the organisers were delighted to be able to welcome such a dynamic group of practitioners and academics to Malawi to share learning and experiences, and look at the way forward for environmental health across the globe. The Honourable Minister for Health Dr. Peter Kumpalume and his delegation attended the opening session – his passionate speech struck a chord for all EHOs in Malawi, the speech and the National Dance Troupe alongside the Khalidwe brothers, school children, and Malawi's very own Environmental Health Ladies inspired the congress from the opening day.

The programme provided something for everyone, 6 plenary and 48 original research presentations, 4 hands on workshops and 3 panel discussions to increase active participation, and ensure that the focus of the conference was as much on practice as research and theory.

Some highlights were:

- The insight to the Ebola Outbreak and management in Liberia, which demonstrated the courage and selflessness shown by our Liberian colleagues in the face of diversity during the crisis.
- The discussions about the role of environmental health in achieving SDGs in the Science Café,
- Field visits to Nkhotakota and Salima Districts to see EH in action in Malawi.

Our programme covered a diverse range of topics including:

- Communicable diseases – including Ebola, Zika virus, and malaria
- Water, Sanitation and Hygiene
- Community, child and school health
- Training and practice
- Waste management
- Environmental Protection,
- Food Safety
- Occupational Health and Safety

Alongside the cross cutting issues of:

- Creating an evidence base of effective policy development
- Sustainable Development Goals

The organising committee wishes to extend a huge thank you to all those involved who made this an extremely interesting programme and also a thank you to all those who allowed themselves to be volunteered as both Chairs and Rapporteurs for sessions. The Congress Declaration concentrated on the role of environmental health in the implementation of the UN Sustainable Development Goals. Sponsorship was received in the form of financial donations as well as tangible goods. Overall, the congress received excellent feedback from delegates.

Finally, special thanks go to all members of the organising committee and secretariat for their hard work in ensuring this event was a success. Thanks also to all sponsors, presenters and delegates who made this a lively and interesting forum for moving environmental health forward.



Introduction

Between 3rd – 6th May 2016 over 160 delegates met in Lilongwe, Malawi for the 14th World Congress on Environmental Health. Delegates represented 23 countries from across 5 continents. The congress brought together Environmental Health officers, practitioners, managers, academics and students to discuss the primary congress theme of *emerging and prevailing global health risks*. The wide range of presentations made can now be found on the congress website www.2016wceh.org.

This was only the second time a world congress had been held on the continent of Africa; as such it was an excellent opportunity to bring African environmental health issues to the fore alongside other important global matters. The congress programme offered a diverse range of EH themes and participation and debate was encouraged. The congress field trips were a great opportunity for delegates to see WASH programmes at work in Malawi, connecting professionals from all over the world to active programmes in rural communities. This report gives a summary of the congress proceedings and the declarations and recommendations moving forward towards the 15th World Congress in New Zealand in 2018

Congress Partners

The organising committee acknowledges the welcome support of various partners in organising various aspects of the WCEH 2016:

- International Federation for Environmental Health
- Malawi Environmental Health Association
- Government of Malawi
- University of Malawi – Polytechnic

Organising Committee

The organising committee was set up in November 2014, and meetings were attended regularly in Blantyre and Lilongwe with the support of the University of Malawi (Polytechnic), Ministry of Health, and Malawi College of Health Sciences. Members were identified from potential stakeholders and were invited to attend. The following organisations involved included:

- Malawi Environmental Health Association
- Government of Malawi – Ministry of Health
- Government of Malawi – Office of President and Cabinet
- Government of Malawi – Ministry of Foreign Affairs
- Government of Malawi – Ministry of Culture, Tourism and Wildlife
- University of Malawi – Polytechnic
- Malawi Defence Force
- Lilongwe City Council
- Malawi College of Health Sciences
- Chair of the Organising Committee: Mr Holystone Kafanikhale (Ministry of Health)
- Chair of Logistics: Mr Limbani Kalumbi
- Chair of Technical and Scientific: Dr Tracy Morse
- Chair of Fundraising: Mr Elias Chimulambe
- Chair of Protocol: Mr Ben Mitochi
- Secretariat: Temwa Mzengeza
- Esther Kaunde
- Daniel McDonnell

Particular thanks also go to Chifundo Chilivumbo who designed and updated the Congress website free of charge, and to Sothin Ziba, Rossanie Daudi, Rebecca Laidlaw and MCHS students for their assistance during the congress.

Planning Meetings

A series of meetings for the full organising committee were held in Lilongwe and Blantyre for stakeholders to attend and members of subcommittees to report on progress. Regular subcommittee meetings were also held to achieve requirements of the dossiers. Meetings were held at no expense to the Congress, with all participants being funded by their institutions and organisations to attend.

Support and Sponsors

The committee also recognises the support of the following organisations for their sponsorship both through managing and funding specific sessions, and through direct sponsorship.

- Water for People
- SANDEC/EAWAG
- University of Strathclyde
- SHARE
- Water aid
- Hedgerow Software Ltd.

Congress Programme

The congress was planned over four days, including one day for field trips. The programme consisted of 6 plenary and 48 original research presentations, 4 hands on workshops, 3 panel discussions and 5 posters.

The Minister of Health, Dr. Peter Kumpalume MP, officially opened the congress and keynote presentations were given by Mr Henning Hansen – President of the IFEH, Mr Young Samanyika – President of MEHA and Professor John Saka – Vice Chancellor of the University of Malawi.

The programme can be summarised as follows:

Day 1 – 3 rd May 2016	Day 2 – 4 th May 2010	Day 3 – 5 th May 2010	Day 4 – 6 th May 2010
Opening Ceremony Plenary <ul style="list-style-type: none"> • SDG/ • Lessons from MDGs 	Plenary <ul style="list-style-type: none"> • Climate Change and Health • Community health 	Field visit Salima District Nkhotakota District	Plenary <ul style="list-style-type: none"> • Research evidence in Policy development
<u>Sessions</u> WASH Malaria Waste Management Student Presentations Science café – EH & SDGs	<u>Sessions</u> Climate change and health Community health School health Health Promotion EH training and systems IWRM model Household drinking water Solid waste management IFEH Policy 10		<u>Sessions</u> Food Safety and Hygiene Occupational Health and Safety Environmental Protection WASH and Under nutrition

Plenary session topics included:

- Sustainable Development Goals: The Role of Environmental Health in their Achievement (Dr Eugene Nyarko, WHO Malawi)
- Experience of the Millennium Development Village Programme (Mr Francis Mbundunvula, Millennium Promise)
- Climate Change and Health (Mr Humphreys Masuku, WHO Malawi)
- Community Health Approaches (Dr Tracy Morse, University of Strathclyde)
- Policy and Research Interface (Dr Abiba Longwe, AFIDEP)



- Role of WASH Research in Policy and Programme Development (Erin Flynn and Emily Balls, SHARE)

The breakaway sessions included presentations on the following congress sub themes:

- Communicable disease control
- Environmental protection
- Evidence based policy development
- Malaria control
- Waste management
- Community health
- School health
- Environmental health training and systems
- Healthy settings and health promotion
- Occupational health and safety, and food safety
- WASH
- Student presentations



Expert panel and workshop topics included:

- Lessons learned from the Ebola Outbreak (WHO and Liberia)
- Science Café – the role of environmental health in meeting the sustainable development goals (AFIDEP and Ministry of Health)
- Climate change and health (Expert panel)
- Integrated water resource management (Water for People)
- Household water quality (EAWAG)
- Solid Waste Management (EAWAG)
- Declaration on health equity IFEH Policy 10: Closing the gap, 101 postcards (IFEH)
- The role of WASH in tackling diarrhoeal disease and under-nutrition (SHARE)



Attendance

In total, 163 delegates attended the congress from 23 countries, including:

- | | |
|---------------|----------------|
| • Australia | • Nigeria |
| • Canada | • Portugal |
| • Croatia | • Scotland |
| • Denmark | • South Africa |
| • Estonia | • Sudan |
| • Indonesia | • Switzerland |
| • Ireland | • Uganda |
| • Kenya | • UK |
| • Liberia | • USA |
| • Malawi | • Zambia |
| • Namibia | • Zimbabwe |
| • New Zealand | |

Special events

Opening

The opening ceremony featured opening remarks from the IFEH President Henning Hansen, and MEHA President Young Samanyika, as well as an address and formal opening by the Minister of Health Dr. Peter Kumpalume MP. The opening ceremony also included outstanding performances from the National Dance Troupe, Primary School children and the Khalidwe brothers, as well as songs from the ladies of Malawi Environmental Health Association.

On the evening of the first day of the congress, a drinks reception was held at BICC, the Health Education Unit band played and the Mayor of Lilongwe addressed delegates.



Congress dinner

On the last evening of the congress a dinner was held at the Sunbird Capital Hotel in Lilongwe, once again delegates were entertained by the National Dance Troupe. Temwa Mzengeza entertainingly compered the evening.

The dinner also saw the official hand over of IFEH presidential duties from Henning Hansen to Peter Archer, both delivered remarks on their duties and intentions. Mr Steven Cooper was presented with the Eric Foskett Award, and MEHA presented a series of awards to those who have contributed to environmental health in Malawi including Mr Humphreys Masuku, Mr Ben Chandiyamba, Dr Steven Taulo, Dr Tracy Morse and Mr Young Samanyika.

MEHA President Young Samanyika also delivered closing remarks, and the IFEH flag was handed over to Darryl Thompson for the next IFEH world congress to be hosted in New Zealand in 2018.



Parallel Programme

A number of delegates were accompanied by their partners and therefore requested a parallel programme so that they could visit some areas of Malawi during the congress. As such a programme was set up for these delegates as outlined in Appendix 4. This programme cost and implementation was greatly supported by the use of the UNIMA- Polytechnic transport and Department of Tourism (Joseph Nkosi) for which the organising committee extremely grateful.

Exhibitors

The following organisations had exhibition stands at the WCEH 2016:

Hedgerow Software Limited

Hedgerow Software Ltd. is an award-winning provider of software solutions and services to agencies responsible for environmental health regulation and the protection of public safety.

WaterAid

Water Aid is an international charity that transforms lives by improving access to safe water, hygiene and sanitation. Malawian representatives exhibited the work of WaterAid in Malawi.



Water for People

Water for People is an international non-profit working across 9 countries (including Malawi) to bring safe water and sanitation to 4 million people.

WASHTED

The Centre for Water Sanitation Health and Appropriate Technology Development (WASHTED) is based at the University of Malawi—The Polytechnic. It is an umbrella institution that brings together researchers to address the most pressing WASH-related problems. WASHTED had several posters and an exhibition stand at the congress.

Scotland Chikwawa Health Initiative

The Scotland Chikwawa Health Initiative is a collaborative programme between the University of Strathclyde, Ministry of Health (Malawi) and the University of Malawi (Polytechnic). The programme aims to implement the healthy settings approach across all areas of community development in Malawi.



Field trips

Delegates had a choice of field trips to attend, community based projects or school based projects. Both field trips followed an afternoon at Livingstonia Beach on the shores of Lake Malawi. The field trips proved to be very popular, they offered delegates the opportunity to see community based sanitation projects at first hand, allowing Malawi to showcase the efforts being made to reduce the disease burden through appropriate water sanitation and hygiene approaches.

Traditional Authority Mwadzama, Sanitation promotion at community level

One of the approaches adopted by the Ministry of Health in sanitation promotion at the community level is the approach known as community led total sanitation (CLTS). This is a behavioural change strategy EHOs in Malawi use to promote sanitation. It involves creation of shame, fear and disgust to the people for them to stop open defecation. In the strategy subsidies are not encouraged and there is no prescription for the standards of pit latrine construction. Since its introduction in Malawi, TA Mwadzama is the second Traditional Authority (TA) to be declared open defecation free. This is a rare opportunity in Malawi for a full TA to be awarded a free open defecation status. In this TA a total population of 85149 live in an open defecation free environment. The morning allowed delegates to explore the village and to see the latrine and handwashing facilities. A ceremony followed and a certificate was passed to the Chief from the Ministry of Health, delegates were treated to the Chewa traditional dancers of the Gule Wamkulu.



IFEH School Sanitation - Proposed project.

IFEH is considering supporting charities in Malawi involved in sanitation, which will benefit school children.

Two Schools were visited in the district.

One Primary School with adequate sanitary and menstrual hygiene facilities and climate conservation activities, which were supported by Assemblies of God Care. Another project proposed school with inadequate sanitary and menstrual hygiene facilities. The visit is expected to appreciate the gap in the proposed project site, evaluate the cost of the project, and advise on the technical aspect of project implementation to decide if the donation is justified.

Speakers of event can be obtained from Dr Tracey Morse.



Appendix 1 Malawi Congress Declaration

Declaration on the Role of Environmental Health in the Delivery of the Sustainable Development Goals

The delegates of the 14th IFEH World Congress on Environmental Health held from 3rd – 6th May in Lilongwe (Malawi) have actively discussed the role of the environmental health profession in the global delivery of the UN 2030 Agenda for Sustainable Development, more commonly referred to as the Sustainable Development Goals (SDGs).

The professional handling and management of environmental health issues is key to successfully implementing a wide range of the Sustainable Development Goals. This Congress strongly supports the inter and multi-disciplinary nature of the SDGs, and the international recognition that one profession cannot address the needs of the population alone. We also applaud the UN in the development of goals, which have built on the experience of the Millennium Development Goals, and now allow for more innovative and country specific solutions, with a global rather than developing country perspective.

Although it is clear that environmental health will contribute primarily to SDGs 3 (Good Health and Well-Being) and 6 (Clean Water and Sanitation), the profession will also be integral to the delivery of all other SDGs as we work in partnership with other professions. More specifically, the wide range of discussions and presentations during this congress has clearly demonstrated the need to address the determinants of health, the impact of emerging diseases and climate change which all have implications for the future of environmental health practice. Addressing these issues places environmental health professionals in a strategic position for the successful delivery of the SDGs by 2030.

As such, the Lilongwe Declaration endorses the UN SDGs, however calls for the following:

- Continued and increased commitment from Governments in the support of preventive health services, such as environmental health, through financial contributions, building and supporting professional capacity, and advocating for the profession and practice at all levels.
- All environmental health professionals to engage with a wide range of stakeholders and professionals to holistically tackle the determinants of health on all levels.
- All professionals to engage with the general public to ensure broad public participation and community involvement in environmental health programmes, to ensure any impact on global health achieved is sustained and scaled up.
- Researchers and practitioners to effectively communicate collaborate and work hand in hand with policy makers to ensure that policies and plans are informed by a strong evidence base. This not only supports the SDGs but is also in line with the African Union Agenda 2063.
- This Declaration supports the IFEH belief that the needs of the individual and the development of a sustainable society for all must be given highest priority.

IFEH is a non-governmental worldwide organisation, run on a voluntary basis, of national organisations of environmental health or environment and health protection professionals, and academic institutions offering qualifications in environmental health. IFEH represents those who are professionally involved on an everyday basis in the implementation and enforcement of environment and health legislation, the promotion of health and the protection of the environment. Environmental Health Professionals are the interface between the politicians and the public and need to keep a delicate balance between individual and public needs and requirement

What does the future hold for Environmental Health?

Anne Godfrey, Chief Executive, CIEH

As I approach the end of my first 12 months at CIEH, I have found that Environmental Health is a multi-layered and complex profession. It's made up of dedicated and professional individuals working across the public, private and in a variety of areas and environments.

Inspecting conditions in the private rented sector, ensuring food safety in commercial businesses and monitoring air quality are just a sample of the Environmental Health kaleidoscope. But what unites them all is the core purpose of protecting the health and wellbeing of individuals, businesses and local communities.

Those who work in the field of Environmental Health in the UK have traditionally been employed in the public sector by local authorities. Unfortunately local government budgets have been decimated by austerity in recent years and, more often than not, environmental health services have borne the brunt.

However a core of dedicated professionals remain, working hard to protect the public with fewer people, less resources but greater innovation. In addition there are people up and down the country as environmental health professionals in the private and third sectors as well the 'traditional' local authority setting.

Take for instance those people who head up food safety for national restaurant chains or what about health and safety leads for national construction firms?

The future of Environmental Health is not all doom and gloom. In fact, there are multiple opportunities for the profession to move forwards and CIEH has a unique position in all of this.

As 2016 draws to a close, we face important questions: who do we want to be, how will we support the environmental health profession, be relevant to our members and grow our value, influence and impact?

To help answer those questions, we took a step back and asked our members exactly what they thought of us. Additionally, we engaged with people who work in the sphere of Environmental Health but are not members of CIEH.

The results were interesting and in places provided us with some cold hard truths. The great news, however, is that there are opportunities to increase our scale through attracting a more and diverse membership base. This in turn will help us be in a better position to support our members and the wider profession, as well as being able to influence and engage with key decision-makers to enable real change.

Environmental health and those professionals who work in this space will always be needed in order to protect and improve health and wellbeing in the UK. While the context in which we operate is changing, CIEH will be right at the forefront of this ever-changing landscape to ensure the right opportunities exist and that they are accessible to all of the Environmental Health profession.

Environmental Health Programme - Muhimbili University & Ulster University.

Ross Anderson, Jill Galbraith, Harri Moffett ¹

¹ *Ulster University.*



Over the past 15 years, the CIEH Northern Ireland Region has had a growing relationship with Muhimbili College of Health Sciences at the University of Dar es Salaam, eastern Tanzania and with CHAMATA, the Tanzanian EHO Association. Muhimbili is the oldest and largest public university in Tanzania, established in July of 1970. The Clarence Phenix Memorial library was opened in 2001 through funding by IFEH members in conjunction with CIEH NI to commemorate and memorialise the contribution of Clarence Phenix who was responsible for pioneering and developing Environmental Health Education in Tanzania. The library is separate from the university's main library and is for the exclusive use of its Environmental Health students. However, since it's opening, the Library itself has unfortunately begun to fall into disrepair through heavy use by the students it serves.

As 3rd year Environmental Health students studying at Ulster University, we have been presented with the fantastic opportunity to partner with the students of the Muhimbili University thanks to the extensive groundwork laid by Stephen Cooper. Steve has been pivotal in developing communication between the two institutions and ensuring the library remains stocked with literature and learning resources. In an attempt to develop the original foundations built by the IFEH initiative we have been tasked with continuing contact, maintenance and support of the environmental health programme in Muhimbili with the aim of further cultivating our relationship with Environmental Health practitioners in Tanzania. It is our hope that in doing so, we can share personal knowledge and experiences of environmental health, allowing us all to develop a global understanding of the discipline and contribute to growing the profession on an international scale.

Due to limited access to computers outside of Muhimbili, initial communication via email and video calls proved difficult. Our friends in Tanzania proposed the use of an Instant Messaging application for communicating via smartphones. This was successful in achieving initial contact and opening communication between both collectives of students. However it soon became apparent that due to the growing numbers of participants we were required to develop a method of communication that would facilitate the recording of information and provide a cloud-based workspace. This allowed participants to share a short biography about themselves along with information such as presentations, documents, journals and eBooks in an area that was easily accessed by all.

This was an important matter for us as the limited access to current resources and information was a challenge our colleagues in Tanzania had highlighted as a major roadblock in their education. Whilst they are extremely grateful for and enjoy the library provided by IFEH, they have limited access to an online database that would allow them to view academic journals and eBooks. Therefore, a cloud-based workspace allows us to share these resources in the interim whilst we

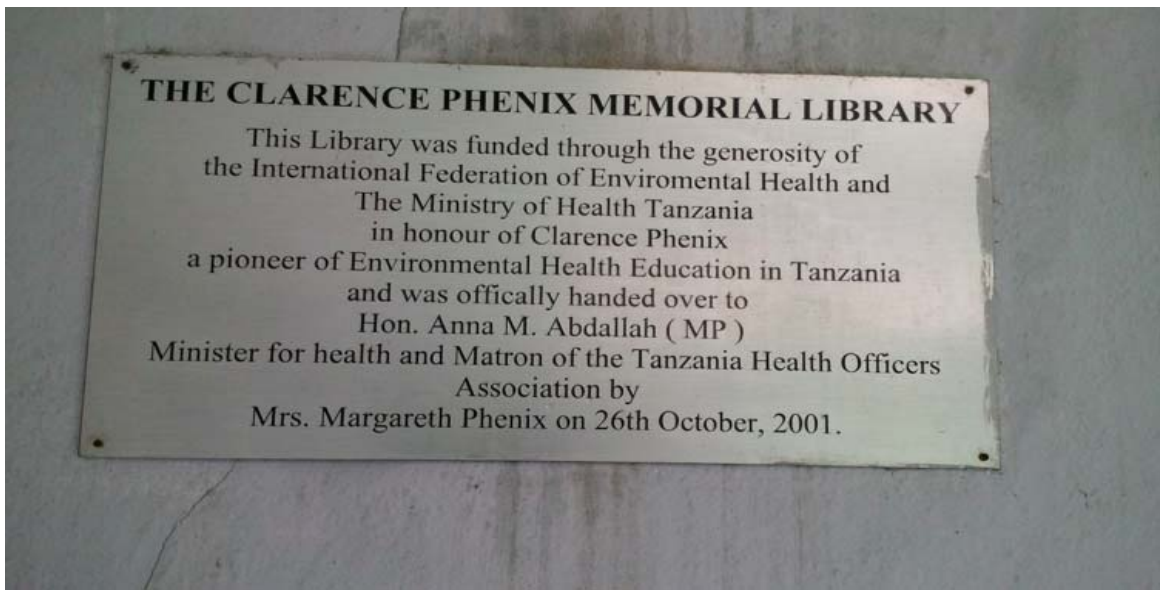
develop an intervention that would provide the students of Muhimbili with open access to the same databases that we have at Ulster University.

Students in Tanzania also expressed concerns about their voices being heard in relation to public health problems. In their second year of study, Muhimbili students are involved in a yearlong study into the nutritional status of children under 5 years of age in the local community. This research looks at factors such as stunted growth, malnutrition, morbidity rates, vaccination status and the occurrence of illnesses such as malaria and cholera. Through this research students have found strong links between malnutrition and the economic status of community groups. They have also identified strong relationships between malnutrition and the prevalence of malaria. They hope to use this research to develop strategies to address these public health concerns. However, due to poor prioritisation of research and development programmes, their findings often go overlooked. This has come to light following the aftermath of a 5.7 magnitude earthquake that struck the country in late September. In order to address this, we have proposed the integration of programmes into our current course curriculum that would enable us to work in groups with corresponding groups of Tanzanian students on these issues. This initiative will involve the students of Ulster University working closely with students in Dar es Salaam to develop interventions targeting an issue of their choice. It will then be the responsibility of the Tanzanian students to implement this intervention and monitor its success in the local community.

We hope that by working together globally, we can make our student voices stronger and perhaps the work of the Tanzanian students will become of interest to local government and they will have their findings realised.



Steve Cooper playing a pivotal role in EH Programme, Muhimbili University



Clarence Phenix Memorial Library.



Students enjoying the library facility.

Inadequate Housing in Europe: Costs and Consequence.

Eurofound

'This report aims to improve understanding of the true cost of inadequate housing to EU Member States and to suggest policy initiatives that might help address its social and financial consequences. The full impact of poor housing tends to be evident only in the longer term, and the savings to publicly funded services, the economy and society that investment in good quality accommodation can deliver are not always obvious. While housing policies are the prerogative of national governments, many Member States face similar challenges in this field. In some, projects to improve inadequate housing have already provided valuable practical experience that can usefully be shared, and this report presents eight such case studies. While improving poor living conditions would be costly, the report suggests the outlay could be recouped quite quickly from savings on healthcare and a range of publicly funded services – in the EU as a whole, for every €3 invested in improving housing conditions, €2 would come back in savings in one year.'

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Land-use Planning and Hazardous Companies.

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INTRODUCTION

Land-use planning (or spatial planning) in relation to industrial areas and hazardous companies is an old subject, at least 100 years old as a planning issue. I will attempt to draw a picture of some of the major planning issues that Environmental Health Professionals can be involved in concerning planning of and around hazardous industries. Nothing can replace best practice in the day to day management of a hazardous industry and the diligence of the inspection authorities in checking the level of safety management. But good land-use planning can help avert the worst effects on populations and the environment of many types of industrial accidents.

Definitions and Impacts.

Defining and describing a hazardous company, a type of industry that authorities should be wary of and make special plans for (ensuring appropriate distances from sensitive land-uses), is not an easy task. A list of hazardous companies covered by the European Union Seveso III Directive can be used as an example. See the links to the legislation on the European Commission site: <http://ec.europa.eu/environment/seveso/>. But examples from the recent past in Denmark show that non-Seveso sites can have tremendous impacts. A fire in 2015 in a palm oil storage site located close to other companies and close to a major traffic thoroughfare had major economic, logistical and environmental impacts. Questions have been raised concerning the proper location and separation distances from storage areas for combustible substances that are not covered by the Seveso directive.

The environmental health impact of hazardous companies can be extensive from long-term pollution of aquatic habitats to major loss of life and debilitating injury. Examples of the consequences of industrial accidents can be found in online databases. A good source is the ARIA (analysis, research and information on accidents) database operated by the French Ministry of Ecology, Sustainable Development and Energy (www.aria.developpement-durable.gouv.fr). It lists accidental events at hazardous industries, which have, or could have affected health, agriculture, nature or the environment.

Good land-use planning

What is good land-use planning? The classic planning picture we usually imagine is the one of creating a good buffer – placing hazardous activities as far away from housing and other sensitive areas as possible. In the Danish emergency management and planning legislation sensitive land uses are defined as:

- Public buildings (including buildings that are difficult to evacuate, e.g. hospitals)
- Public areas (e.g. parks), recreation areas (e.g. woods with walking paths)
- Housing areas of all types, hotels, nursing homes and other institutions where people live
- Schools of all types, daycare centers for children, shopping centers and shopping streets
- Roads and other transport infrastructure (the Seveso III directive's article 13 focuses on safety distances for "major transport routes")

Special focus in planning, when looking at emergency plans and societal risk, is put on buildings and institutions that are difficult to evacuate or important for emergency services (e.g. fire and rescue services).

Planning/placement of new hazardous activities and new plans around existing companies

Practical experience in well-established urban areas shows, that there are two major planning scenarios:

1) Planning/placement of new hazardous activities, 2). Planning around older industrial areas/hazardous activities. Historically, regional planning authorities in Denmark have tried to create new areas for heavily polluting industries at least 500 meters from existing or planned sensitive land uses. In a densely populated nation like Denmark this can be difficult, also due to other land-use demands (e.g. nature areas, coastal protection and agriculture). In 2005 the German Major Hazard Commission (Störfallkommission) developed a guideline that contained recommended general planning (consultation) distances in cases without detailed knowledge of accident consequences (typically when planning new installations). Here are some examples of these consultation distances:

Class I 200 meters	Class II 500 meters	Class III 900 meters	Class IV 1500 meters
Propane (F-gas) Methanol Acrylonitrile	Bromine Ammonia Hydrogen Fluoride	Hydrogen Sulphide Formaldehyde (>90%) Hydrogen Cyanide	Phosgene Acrolein Chlorine

Source: Table 12 in "Acceptkriterier i Danmark og EU", working report no. 8 2008, Danish Environmental Protection Agency. See English language summary (KAS-18K) here: http://www.kas-bmu.de/publikationen/pub_gb.htm. The distances are based on credible worst case accident scenarios that use a number of standard presumptions, e.g. about pipe bursts, access to ignition sources, etc. Note that off-site emergency planning is based on less likely "ultimate" worst case scenarios.

Qualitative assessments, that primarily define the consequences of credible worst-case accidents, can in many cases be sufficient in land-use planning situations, where there are no sensitive activities or plans

for sensitive developments within the consequence zones. When there are affected populations within these zones the risk assessment is normally supplemented by more detailed calculations of individual and societal risk – so-called quantitative assessment.

Quantitative assessment

Often, in connection with environmental impact assessment and/or very detailed environmental approval processes, detailed knowledge of industrial processes will be the basis for precise qualitative and quantitative risk assessment. In these cases, company specific planning distances become a part of the planning process. Fire, explosions and toxic scenarios are individually assessed with the use of professional risk assessment tools. In especially complicated situations with housing development pressures near old industrial areas the use of computer modeling, eg. of gas emission, can be necessary.

With the placement of new, hazardous sites good planning can consist of many other factors than the simple evaluation of the risk for sensitive activities. Future socio-economic interests in urban development for example, will often be a major factor. In this context it would be foolhardy, to make the same old planning mistakes again, of placing hazardous activities too close to urban development areas, that more likely in the future will contain sensitive activities.



Figure 1 (Denmark): Here is an example of an area with four fireworks depots. The blue zone is the standard planning “awareness zone” of 500 meters. The red zones are the safety zones, within which no sensitive activities may occur, for example open air concerts. In Denmark the safety zones for fireworks depots are based on standard calculations derived in large part from AASTP-1 (2010) Manual of NATO safety principles for the storage of military ammunition and explosives. May 2010, Change 3 (see www.msiac.nato.int/areas-of-expertise/munitions-safety-transport-storage)



Figure 2 (Denmark): This is an area with a chemical company established in the 1930's in a harbor area. City center sprawl towards the harbor area has affected the way societal risk and industrial development is assessed today. The blue zone is the standard planning "awareness zone", which is smaller than the calculated consequence zone (yellow). The red zone is the safety zone, within which no sensitive activities may occur. The yellow consequence zone indicates the area within which societal risk must be calculated (F/N curve), both for renewal of environmental approvals for the company and for new sensitive urban plans (eg. new hi-rise housing). In this case a quick societal risk assessment model was created, in order to give urgent

feedback to the political process in advance of new municipal plans. The model is in part inspired by the UK Padhi+ planning tool (now the "HSE Planning Advice Web App"

www.hse.gov.uk/landuseplanning/methodology.htm

Land-use planning - Some rules of thumb

Accidents happen – when planning new areas for hazardous companies, good buffer zones towards other companies (to prevent domino effects) and towards sensitive land-use are common sense. Good buffer zones also prevent the need for detailed societal risk assessments every time changes to accident scenarios are made or new sensitive developments are planned.

Consequence zone calculations can be complicated – Environmental Health officers/inspectors should have focus on quality in the risk assessment process. Be sure the consultant or employee doing calculations is well-qualified and using up to date and professionally recognized methods/software. It is up to the companies, consultants and the inspection authorities to ensure, that the in-data for calculations is based on all realistic accident scenarios and in the failure of all relevant barriers.

Land-use is politics too – in cases where there are important land-use pressures, the use of consultation zones (like the distances from German guidelines mentioned above) can be politically unviable. In such cases more quantitative assessment of individual and societal risk (consequences evaluated together with probability) are often necessary. In all cases there is a need of early cross-sectorial information and cooperation between industrial inspection authorities, environmental health professionals and planning authorities, for example making sure the right population numbers in existing and planned housing and other sensitive activities are used by the risk assessment consultants. As well it is important to involve the affected industries early in the planning process in order to avoid unnecessary land-use conflicts, both in the short- and long term.

Good guidelines are a great idea – not all countries have sufficient guidelines concerning land-use planning and hazardous activities. A good guideline helps to increase the quality of the planning process and save planning authorities and environmental health professionals thousands of work hours while they try to grasp the complexity of this particularly difficult land-use planning challenge.

Accident	Link
Explosions followed by fire outbreak at an oil storage depot 11. December, 2005 Buncefield – United Kingdom	http://www.aria.developpement-durable.gouv.fr/wp-content/files_mf/FD_31312_Buncefield_2005_ang.pdf
Explosion in a fireworks storage facility. 3. November 2004 Kolding, Denmark	http://www.aria.developpement-durable.gouv.fr/wp-content/files_mf/FD_28480_Kolding_2004_ang.pdf
Explosions within a warehouse containing hazardous substances 12. August 2015, Tianjin, China	http://www.aria.developpement-durable.gouv.fr/accident/46803_en/?lang=en
West Fertilizer Explosion and Fire 17. April 2013, West, Texas, USA	http://www.csb.gov/west-fertilizer-explosion-and-fire/

Table: A few examples of major accidents with issues concerning land-use planning, safety management, compliance and/or contraventions.

AFLATOXINS

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1. INTRODUCTION.

Climate Change and Global Warming are significant challenges in the world today and are affecting the environment. Climate Change may result in a higher production of Aflatoxins within food and feed such as cereals, nuts, spices, rice and chilli's that are grown within 3rd World Countries. The possibility of Aflatoxins growing in crops in Europe is becoming a potential environmental health risk, which may result in public health concerns. Fig 1.1 shows what Aflatoxin exposure looks like on crops such as corn. It can be seen to be a mould / fungal growth on the crop.



Figure 1.1 Aflatoxin Contamination of Corn.

Exposure can lead to such health effects as liver and brain cancer and impaired growth in children and humans and can affect animal health. In order to reduce the risk of Aflatoxins in food, sampling procedures must be carried out in every European country prior to releasing food for human consumption. This is set out by the Commission Regulation (EC) 669 / 2009 on the Increased level of Official Controls on Imports of certain Feed and Food of Non - Animal Origin. Sampling is enforced by Environmental Health Officers involved in Port Health within the Health Service Executive in Ireland.

1.1 What are Aflatoxins?

Aflatoxins are the best known Mycotoxins. Aflatoxins are a group of fungal metabolites, which are produced by various moulds of the genus *Aspergillus flavus*, and *Aspergillus parasiticus*. They are a genotoxic chemical carcinogen compound, which have the potential to cause acute or chronic toxicity in both humans and animals. They come in 4 main different types of Aflatoxins that are found in food which are B1, B2, G1, G2 and M1 which is found in dairy products. B1 is the most common and most toxic of the Aflatoxins. An outbreak occurred in Brazil among dogs on a farm due to corn that had been fed to dogs that contained Aflatoxins. It resulted in 60 of

65 dogs dying due to the exposure. (Wouters et al 2016). The toxins are quite strong as they can pass through processing stage in processed foods and reach human and animal consumption.



Figure 1. 2 Aflatoxin: Routes of Exposure

1.2. Health Effects of Aflatoxins.

Aflatoxins are linked to liver cancer which is the 3rd leading cause of cancer worldwide (WHO, 2011). Cases of liver cancer worldwide is at 600,000 and 155,000 of these cases may be due to exposure of Hepatocellular Carcinoma. The median survival frequency of Hepatocellular Carcinoma patients is less than 3 months unless it is detected early there is an 85% chance of a cure (WHO, 2011).

The treatment involves surgery, hepatic irradiation and anticancer drugs (WHO, 2011). Aflatoxins can also affect lungs, kidneys, acute Aflatoxicosis to the heart, acute necrosis, cirrhosis, Jaundice, impaired nutrient conversion. Most common locations that would have these high exposures include Southeast Asia, Sub Saharan Africa and China because of the climate. Fig 1.3 below gives a % of the exposures in different countries. Data shows that Europe 0% and Africa 40%.

This is due to climate variations and Europe has sampling procedures in place to prevent Aflatoxins been exposed to public Fig 1.4 gives a visual insight to liver cancer rates around the world. In Ireland, Liver cancer cases are on average 180 cases per year compared to United Kingdom of 5413 cases per year.

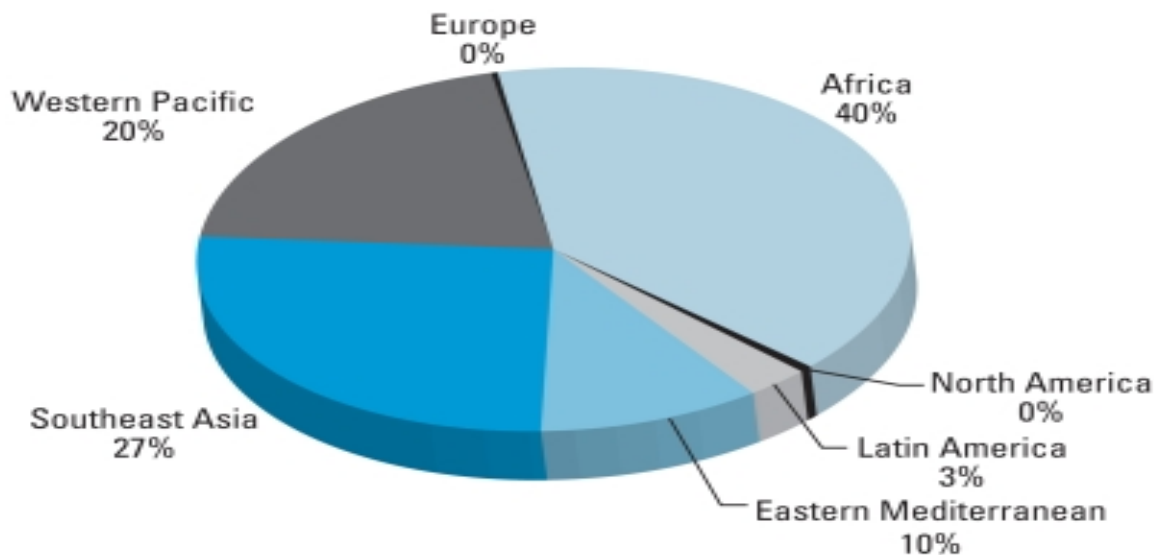
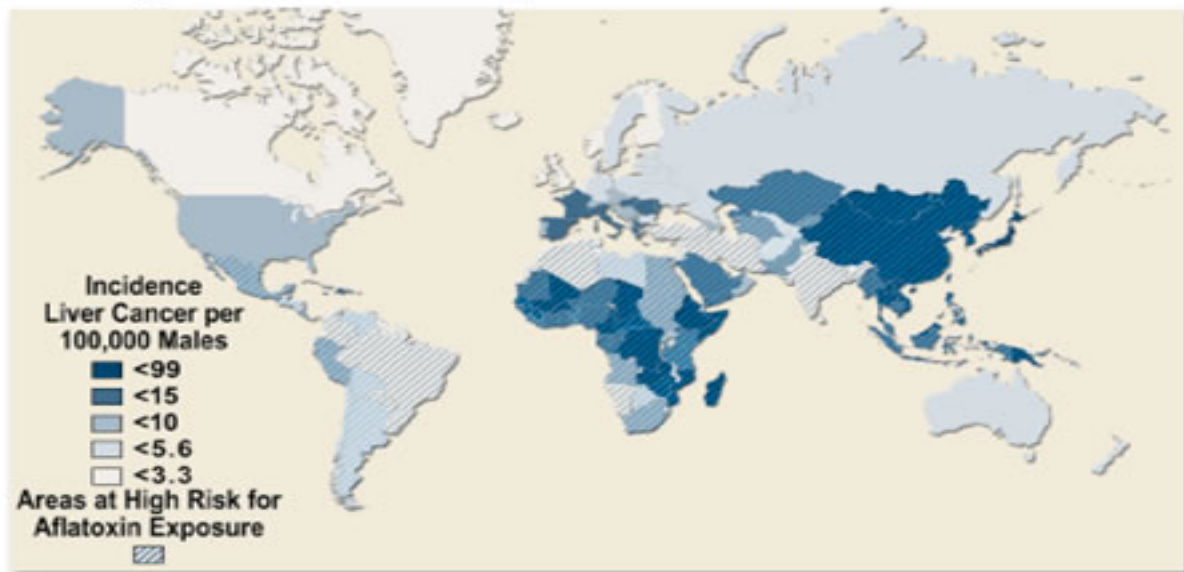


Figure 1.3 Aflatoxin Exposures in Different Countries.

Correlation Between Populations with High Liver Cancer Rates and High Risk of Chronic Exposure to Aflatoxin Contamination



Liver cancer data from the GLOBOCAN 2002 database
(http://www-dep.iarc.fr/GLOBOCAN_frame.htm)

Aflatoxin data from Williams et al., *Human Aflatoxicosis in Developing Countries*,
Am J Clin Nutr 80:1106–22, 2004.

Fig 1.4 – Liver Cancer Rates of Chronic Exposure due to Aflatoxin Contamination

1.3 Climate Change

Climate change has been reported as a driver for emerging food and feed safety issues worldwide and its expected impact on the presence of Mycotoxins in food and feed is of great concern (WHO, 2011). With the

rise of 2 – 5 Degrees Celsius in temperatures Aflatoxins can have an impact on European countries such as Greece, Albania, Southern Italy and Bulgaria, countries that are engaged in maize production. It is possible the rise in temperature will modify plant pathogen interactions.

Other factors that contribute to production of Aflatoxins are geographic location, agriculture and agronomic practices, processing, moisture, pH, drought conditions, insect activity and pre-harvest storage conditions (Occurrence and Health Risks). Northern European countries such as Denmark and Sweden are at very low risk for the foreseeable future of Aflatoxin growth due to the Oceanic climate.

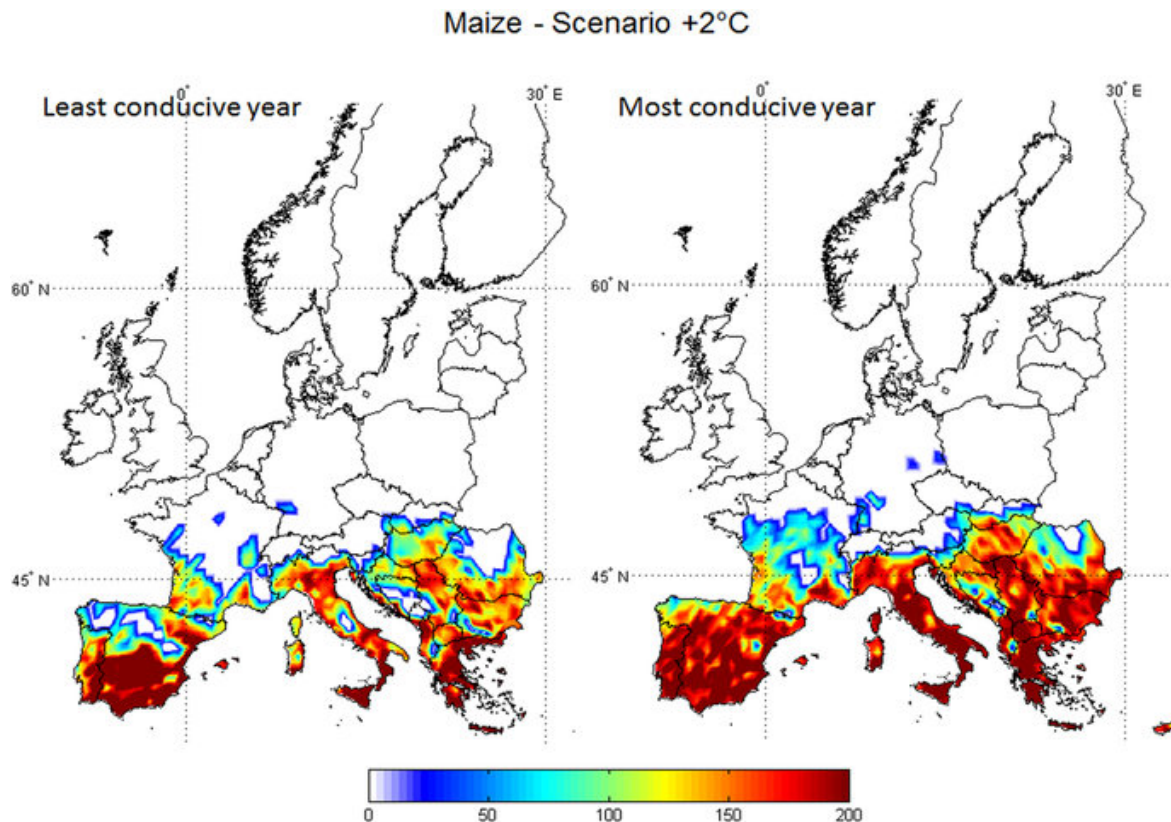


Fig 1.5 Risk Maps of Aflatoxin contamination in maize at harvest in 2 Degree Celsius climate scenarios

Future plans and actions need to be implemented into this area because it can have an increase in animal and human exposure to the toxin, which could relate in acute or chronic health problems. Regulations are already in place by European Union:

- EC Regulation 408 / 2006 Sampling of Foodstuffs
- EC Regulation 1881 / 2006 Limit values for foodstuffs
- EC Regulation 884 / 2014 Aflatoxins in food and feed from certain third countries.

2. SAMPLING PROCEDURES.

Sampling of food and feed takes place at Designated Point of Entry (Dublin Airport /Dublin Port). Sample sizes may vary due to the size of tonnes that have arrived to the Port. Samples of the food / feed would be placed in a container and labelled. They would be brought to the Public Analyst to carry out testing. The food would not be released until it is confirmed safe for human consumption. If food is found to contain toxins it is either sent back to its original location or disposed as waste.

The table below Fig 2.1 gives an idea of the amount of samples that would be taken per tonne. 1 Tonne is equivalent to 1000kg. For example a container at 0.2 Tonnes would require 15 samples to be taken prior to release of foodstuff to the public.

< 0.1 Tonnes	5 Samples
< 0.2 Tonnes	15 Samples
< 5.0 Tonnes	60 Samples

Figure 2.1 Number of Samples per tonnage of product.

3. RESULTS.

The Health Service Executive publishes annual Public Analyst Reports, which gives data and results for samples taken by the Environmental Health profession throughout the HSE administrative areas. There is a limit value for B1 Aflatoxins in food at 2 - 5µg/kg. If the sample levels exceed this it is deemed to be unfit for human consumption.

Foodstuff	No of Samples Received	No of samples exceeding limits for Aflatoxin B1
Spices	10	4 samples were above 5µg/kg
Nut Products	3	1 sample of Peanut Candy 4 times over the limit of 2µg/kg

FIG 2.2 Health Service Executive Dublin Region Analyst's Laboratory Annual Report 2014

Foodstuff	No of Samples Received	No of samples exceeding limits for Aflatoxins B1
Spices	12	1 sample of biryani mix and one sample of chilli powder were c.2 and 3 times respectively above the B1 limit of 5.0 µg/kg
Nut Products	3	1 sample of peanut candy was 1.5 times over the B1 limit of 2.0 µg/kg

FIG 2,3 Health Service Executive Dublin Region Analyst's Laboratory Annual Report 2013

Foodstuff	No of Samples Received	No of samples exceeding limits for Aflatoxins B1
Spices	29	2 samples of fish masla were 2 times above the B1 limit of 5.0 µg/kg 1 sample of peanut ball (spices) was estimated to be 5 times over the limit
Nut Products	2	1 sample of peanut masala was estimated to be 1000 times over the limit
Seeds	2	1 sample of melon seeds was estimated to be 1.5 times over the limit

FIG 2.4 Health Service Executive Dublin Region Analyst's Laboratory Annual Report 2012

The results present the findings of excessive levels of B1 Aflatoxins within the Dublin Region over the last 3 years. Fig 2.1- Fig 2.4. Spices, nut products and seeds are the main foodstuffs that the toxins are found in. Even though the number of samples is low, the limitations specify what is exceeding levels and some foodstuffs such as Fig 2.2 2014 reveals four samples of spices that were above 5µg/kg. Analysis also revealed one sample 3 times over the limit of 5µg/kg. Ireland is extremely good at monitoring for Aflatoxins in food; Healthy Ireland policy sets out a theme for improving monitoring and measuring (Department of Health, 2013). Possibly in the future other techniques may be in place to determine if there are any toxins in the food at the time of arrival at the port.

The data shows that from 2012 until 2015 there has been an increase in B1 Aflatoxin contamination in foodstuffs. These foodstuffs originated from a 3rd World Country and imported to Europe. In the coming years B1 contamination may be seen at higher levels if climate change is continuing to happen with rising of temperatures. Countries that would depend on agriculture such as maize and crops will be affected due to the reduction of people buying and using these crops because of the impacts they may have on humans and animals.

4. DISCUSSION

It is obvious that Aflatoxin growth and exposure to human and animal health is becoming an increasing issue due to climate change. Globally exposure levels to Aflatoxins, which are linked to Hepatocellular Carcinoma, are on average 155,000 cases. These levels can rise and result in more liver cancer exposures unless more strategies and data modelling procedures are implemented to reduce risks to the toxin. Third world countries are exposed to these toxins the most because of the warm climate including Africa and Asia. Due to the changing plant genetic makeup Aflatoxins will become more common this could potentially result in reducing the growth of maize crops and causing a loss to their economy.

Studies have been carried out and show the extent of the exposure of Aflatoxins and the effects they have on health such as maize in dog food and climate change affecting crop growth. More studies should be carried out to compare the previous results to new updated results.

In Ireland, on average Liver cancer exposures are at 180 cases per year. Although other causes such as alcohol consumption may be a contributory factor incidences may also be linked to chronic Aflatoxin exposure. In order to retain low levels, sampling must be carried out constantly on consignments that are coming into ports. More samples should be taken per tonne than at present, as this will ensure public health protection. Sampling and analysis will ensure less toxin exposure that may pass through to human consumption stage. Results from the Public Analyst Reports show that there are low numbers of foodstuffs being sampled and of these an increasing number are positive for Aflatoxins.

The Healthy Ireland Framework sets out visions and goals that they hope to achieve by 2025. One of these goals is to improve monitoring, reporting and evaluation. To achieve these goals new methods for data collection are to be identified and they will be assessed on the basis of how well they are working. (Department of Health. 2013).

More emphasis should be placed within the section of Port Health in the Health Service Executive Dublin North East. This section currently has 6 – 10 Environmental Health Officers compared to 40 – 50 Environmental Health Officers that are involved with food safety such as Fingal Food. This section is an important area of control within the Health Service Executive and should have more resources allocated as Port Health includes areas of emerging concern within Food Safety.

5. CONCLUSION

This is an emerging issue for not only Dublin North East but for the rest of regions throughout Ireland and European Countries. Aflatoxin is not only a public health issue but also a food safety issue so this is why specific training either as an integral component of undergraduate degree programmes or in association with Continuing Professional Development should be a matter of priority to protect public health in this important emerging area of concern.

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- Fig 1.3 & Fig 1.4 Global Trends of Aflatoxin Exposure – Global Burden of Aflatoxin Induced Hepatocellular Carcinoma: A Risk Assessment – (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2898859>)
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- HBV and hepatocellular carcinoma (HCC), Hepatitis B, Emergencies preparedness, response, World Health Organisation (<http://www.who.int/csr/disease/hepatitis/whocdscsrlyo20022/en/index3.html#HBV>) [Accessed 23:49, 19/04/2016]

Investigating the Impact of Green Exercise on population health and wellbeing in a small community in Ireland – a novel approach using a natural laboratory ecosystem.

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ABSTRACT: Green exercise is defined as undertaking physical activity whilst being directly exposed to nature (Pretty et al., 2005; 2007). Pretty et al. (2003) were among the first wave of researchers to investigate the synergistic benefits of incorporating physical activity and exposure to the natural environment to produce positive psychological affect. Over the past decade, investigations into the possible additive effects on well-being of green exercise and how it can be used as an influential tool to help combat the rising rate of both physical inactivity and non –communicable disease has gained prominence in scientific literature. However, there is still a need to investigate the mechanisms behind observed health benefits of the natural environment and to gain a deeper understanding of the benefits of environmental components and how this has potential to improve wellbeing and increase autonomous motivation in physical activity in a community setting. The research project GoGreenEx (Going Outdoors: Gathering Research Evidence on ENvironment and Exercise) aims to build engagement between expert researchers across interdisciplinary perspectives (psychology, physiology, biomechanics, environmental sciences and physical activity) and societal groups, both from the charity sector (Mental Health Ireland-a charity that promotes positive mental health) and the sporting domain (Local Sport Partnerships and commercial entities-e.g., Clarisford Park). This novel research in the field of public health will use the natural laboratory of Clarisford Park to study the impacts and underlying processes that surround green exercise and further add to our understanding of its potential effects on population health and well-being.

Key words: *Self-Regulation; Community health and wellbeing; Green Exercise; Physical Activity; Behaviour Change*

1. INTRODUCTION

1.1 Green Exercise

Research over a decade ago led to the coining of the term *green exercise* to account for the effects of activity in natural blue and green spaces (Pretty et al., 2003). Green exercise is a concept that explores the potential impact of physical activity, in conjunction with an immersion in nature based environments, on our mental and physical health (Pretty et al., 2005; 2007). Green exercise can be defined as undertaking physical activity whilst being directly exposed to nature (Pretty et al., 2005; 2007). Pretty et al. (2003) investigated the synergistic benefits of incorporating physical activity and exposure to the natural environment to produce positive psychological affect. Over the past decade, investigations into the possible additive effects of well-being on green exercise has gained prominence in the scientific literature and globally, there is an emerging consensus on ecosystem benefits for health and well-being (Gladwell et al., 2013; www.phenotype.eu 2012-2015; Hartig & Kahn, 2016). For instance, the European Union funded a €3.5m multi-study investigation of the explanatory mechanisms that link exposure to the natural outdoor environment and human health and well-being (www.phenotype.eu 2012-2015) and have now expanded to exploring blue health (the positive health impact of our connectedness to water) in a €6m study (www.bluehealth2020.org). Recently, leading scientific journals, Science (Hartig & Kahn, 2016) and Nature (Kardan et al., 2015), and similarly, high profile periodicals including Scientific American (Rodriguez, 2016) have all featured articles on the human nature interaction.

Research examining green exercise has led to findings that provide tentative evidence for an array of psychological and physiological consequences (Brymer, Cuddihy, & Sharma-Brymer, 2010), including

improvement in self esteem and commensurate reductions in total mood disturbances (Thompson Coon, Boddy, Stein, Whear, Barton, & Depledge, 2011; Barton & Pretty, 2010), mental health benefits and wellbeing (Bowler, Buyung-Ali, Knight, & Pullin, 2010; Bauman, 2004; Bodin & Hartig, 2003; Hug, Hartig, Hansmann, Seeland, & Hornung, 2009.; Pretty et al., 2005; Thompson Coon et al., 2011), facilitating social interaction within communities which can foster social inclusion and social connectedness (Hug, Hartig, Hansmann, Seeland, & Hornung, 2009), improving restorative attention effects (Bodin & Hartig, 2003; Hug et al, 2009; Pretty et al., 2007; Pretty, Peacock, Sellens, & Griffin, 2005; Thompson Coon et al., 2011), and decreases in stress and negative affect (Barton, Griffin, & Pretty, 2011). Furthermore, increased feelings of vitality (Kaplan & Kaplan, 1989), improvements in concentration (Pretty et al., 2007), heightened perceptions of connectivity with nature (Mayer & Frantz, 2004; Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2008) and increased prosocial behaviour (e.g., positive environmental behaviours) (Balseviciene et al., 2014) are among the other factors that have been linked to green exercise.

Environmental Psychologists have found links between access to green environments and decreases in mood disturbances (Pretty, Peacock, Hine, Sellens, South, & Griffin, 2007; Takano, Nakamura, & Watanabe 2002) as well as increases in self esteem, cognitive functioning and specific physiological changes (Bodin & Hartig 2003; Felsten 2009; Kaplan 1995; Pretty, Peacock, Sellens & Griffin, 2005). A number of physiological effects were also highlighted. These include significantly reduced blood pressure (Ochiai et al., 2015), significantly enhanced human immune function and reduced levels of stress hormones (Li, 2009; Tam, Astephenson Wilson, Noakes, & Tucker, 2013) and decreased levels of perceived physical exertion (Wolf & Wohlfart, 2014). The positive physiological and psychological effects of exercising in green environments despite some inconsistencies among the findings have inspired action amongst policymakers and key stakeholders. As a result, green spaces are increasingly regarded as an important component of health-promoting environments (Nilsson, Sangster, Gallis, Hartig, De Vries, Seeland, & Schipperijn, 2010). "Green exercise provides us with the idea that physical and mental health programs need not necessarily be "pursued," as such opportunities are essentially innate to the natural environment and, thus, readily available" (Garrin, 2015, p.18).

1.2 Why promote Green exercise?

Green exercise research is beneficial in addressing a number of health issues as it provides practical, non-invasive methodologies for proselytising positive health ideals which can aid in addressing health issues such as physical inactivity. Physical inactivity has been recognised as the fourth leading risk factor for global mortality (Yeh, Stone, Churchill, Wheat, Brymer, & Davids, 2015). The World Health Organization have provided physical activity guidelines but levels of physical activity are still declining in the general population (WHO, 2014). This has been linked to an increase in a number of health related problems such as obesity, coronary heart disease, stroke, cancer and diabetes (Goldstein et al., 2001; Hamilton, Hamilton, & Zderic 2007; Lakka, Laaksonen, Lakka, Niskanen, Kumpusalo, Tuomilehto, & Salonen, 2002). Encouraging physically active lifestyles remains a crucial element of preventive health strategies (Walsh, 2011).

2. RESEARCH DIRECTIONS

A number of systematic reviews investigating the effects of being physically active in the natural environment (Thompson Coon et al, 2011; Bowler, Buyung-Ali, Knight, & Pullin, 2010; Calogiuri & Chroni, 2014) and the mental health benefits of being in nature (Gascon et al., 2015) have been conducted in recent years. The consensus appears to be that being physically active in the natural environment shows some promising effects on psychological and physiological health. However, the systematic reviews combined with contemporary research demonstrate some contrasting findings. The research can be hampered by a number of gaps in the literature and there remains a paucity of high quality evidence. Given that our interactions with nature are complex and multifaceted it is not surprising that many of the concepts are blurred and the field of research has numerous methodological limitations (Gladwell et al., 2013).

2.1 GoGreenEx research

At present, there is a pressing need for more robust evidence through sophisticated research designs and a focus on illuminating the underlying mechanisms of green exercise. Research is now being carried out by the University of Limerick (UL) in conjunction with Dublin Institute of Technology (DIT) as part of the GoGreenEx project to further our understanding of the effects of Green Exercise. This research aims to address these

methodological limitations and provide conceptual clarity through transdisciplinary collaboration. The combination of expertise from researchers in social, cognitive, organizational and sport psychology and those in allied fields (e.g., sport science and environmental science) may yield new knowledge which can be translated from theory to practice across a range of contexts. This approach transcends previous paradigms by exploring research questions from a new viewpoint, one which is transdisciplinary and based on theory-driven investigation of well-being and pro-environmental behaviour from action in natural settings.

This research idea was developed from the Lead Postgraduate Researchers experience and knowledge from being a Sport and Exercise Psychologist and as a Community Hub Facilitator in Clarisford Park, a position developed from funding from the Irish Sports Council Dormant Account Fund. The research draws on the Researchers knowledge on the psychological aspects of self-regulation strategies, lifestyle behaviours and green exercise on wellbeing and combines with the knowledge developed from being a Community Hub Facilitator, the promotion of physical activity and how sport and recreation can facilitate change in community lives whilst improving health and wellbeing. This combination of expertise and knowledge complements the vision of achieving a community in which everyone can enjoy physical and mental health and wellbeing to their full potential whilst incorporating the natural environment as a source of psychological and physical wellbeing.

2.2 Clarisford Park

This research also incorporates Clarisford Park and its natural environment as a natural laboratory, collaborating with local communities to gather valuable research. Clarisford Park is an all-inclusive community sports facility set in 10 hectares of open grassland and mature woodland on the banks of the River Shannon in Killaloe, Co. Clare. The setting provides the backdrop for a range of sport and community facilities including a full size soccer and rugby pitch, 3G all-weather pitch, sand based all-weather pitch, scouts paddock, training areas, multipurpose sports pavilion, 1km running/walking trail, open space and parking facilities. Clarisford Park is an example of how sport and recreation can facilitate change in community lives whilst improving health and wellbeing. The mission of Clarisford Ltd stems from three core values of Sport & Recreation, Quality of Life and Collaboration & Partnership.



Figure 1 Clarisford Park Aerial view (left) and lake view (right)

This park is about harnessing the potential of people and place and it is based on a defined need, it is change centric, it is innovative and it is sustainable. For a community project like Clarisford Park, the key viability indicator is the existence of a demographic that can support the facility and create a sustainable longevity for the lifespan of the project. Clarisford Park facilitates a municipal intergenerational sports facility which promotes sport and recreation as a catalyst for a healthy lifestyle, and it positively contributes and improves health, wellbeing and quality of life in the community whilst providing a natural laboratory for the research programme.



Figure 2 Walking/running track in Clarisford Park (left) and Aerial view of sports pitches (right)

Encouraging the sustainable use of ecosystems services for physical activity and managing the ecosystems is central to the ethos of Clarisford Park. It is an example of managing an ecosystem by using the natural environment to promote physical activity within the towns of Killaloe-Ballina and it creates an awareness and appreciation of the natural environment where sport, recreation and physical activity and environment and biodiversity work together. Exploring the interaction between the landscapes, the quality of the environment, affinity towards the natural world, perceived benefits of interacting with the environment with the emergence of pro-environmental behaviour are central themes in this research.



Figure 3 - Natural eco-systems in Clarisford Park

3. CONCLUSIONS

This research will address a number of scientific questions designed to determine what the impact and specific health benefits of exercising in the natural environment are. This work proposes to gain a deeper understanding of the benefits of environmental components and how this has potential to improve wellbeing and increase autonomous motivation in physical activity in a community setting. The research will augment conventional interventions with innovative strategies that focus on the potential of understanding the link with ecosystems in order to see the benefits it may have for health. This research addresses both H2020 societal challenges (e.g., mental health; sustainable environment) and national priorities (e.g., Healthy Ireland initiative). This research ultimately aims to improve our understanding of how interacting with the environment can influence pro

environmental behaviour and it presents an opportunity for incorporating citizen science into the research methods in addition to the more traditional approaches.

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Environmental Health in the surveillance of culcidae vectors – Portugal case

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Dengue is considered one of the emerging diseases of the 21st century and is one of the main public health problems in the world, not only because it affects thousands of people, since the *Aedes Aegypti* mosquito tends to reproduce in domestic environments, but also because it is considered one of the most important viruses transmitted by animals.

Environmental Health is responsible for sanitary control of the environment, and its mission is to analyse, prevent and correct the risks to health, whether environmental or potential.

It is in this sense that Environmental Health is so important to end this disease, or while this does not prevent it from affecting human health.

According to the National Adaptation Strategy to Climate Change published in May 2015 by the Portuguese Environment Agency "Climate change is potentially affected by social and environmental determinants of health risks. Examples are related to the increase in diseases associated with air pollution and airborne allergens, extreme events (floods and droughts), increase in the frequency and intensity of heat waves, changes in the distribution and incidence of vector-borne diseases, and changes in availability And water quality and toxic-infections, among others. Climate change can lead to significant changes in the geographical and seasonal distribution and spread of vector-borne diseases. These diseases are of great importance and in Portugal mainland the most worrying are the *Aedes aegypti* mosquito (especially dengue). *Aedes* species are present in nearby regions - *Aedes aegypti* in the Madeira Island and *Aedes albopictus* in Spain. "

According to the WHO, dengue fever is the most important viral infection transmitted by mosquitoes. In the last decades the incidence of dengue has increased dramatically throughout the world an estimated estimated 2.5 billion people (40% of the world population) being at risk of contracting dengue fever and 50-100 million infections every year.

As temperature increases as a consequence of climate change, it is expected to increase the number of favourable months for the development of these vectors and consequently increase the risk of diseases transmitted by them.

The organisms that ensure the active biological (or mechanical) transmission of pathogens between different vertebrate hosts are considered vectors. Mosquito-borne viral encephalitis is now known in Europe. (Abrantes P, Silveira H, 2009) Factors such as population density of vectors and their hosts, the prevalence of pathogens adapted to vectors and their hosts, the immune status of the human population and local environmental conditions are determinant for establishment the disease transmission process. (Rodhain F, Perez C, 1997)

In all vector-borne diseases, the risk of transmission is not only dependent on the number of vectors infected in the region, but also on the possible contact with humans, that is, on the conditions that are provided for their dissemination (CMCascais, 2011)

The Madeira Island is located in the subtropical region, presenting a mild climate, both in winter and summer, however, and due to depression systems, during the summer months, abundant rainfall occurs. (Santos D, Aguiar R, 2006).

The cases of the disease on the Island began to appear in October 2012 and since then several efforts have been made by the Municipality of Funchal, such as the creation of a Municipal Mosquito Control Plan and numerous activities carried out by IASAÚDE technicians, IP-RAM (Made up of Environmental Health officers). These activities focused on monitoring; control; prevention; placement and collection of traps for eggs, larvae and adult mosquitoes and performance in REVIVE (National Program for Surveillance of Culicidae Vectors), etc. This is because it is known that it is difficult to eliminate the mosquito, so it is necessary to resort to sensitization and prevention, starting with eliminating or decreasing the breeding grounds. (IASaúde, 2012) (CMFunchal, 2012). It should be noted that, up to the date, no exotic / invasive species were identified in mainland Portugal. All identified species are already part of the Culicidae fauna.

The National Culicid Vectors Surveillance Program, approved in 2007, results from collaboration between institutions of the Ministry of Health and aims to implement a Vector Surveillance Network (REVIVE) for education / information through periodic or Surveillance of vector mosquito activity, species characterization and seasonal occurrence at selected sites, as well as timely detection of exotic mosquitoes, namely *Aedes albopictus* and *Aedes Aegypti*, and the issuing of alerts to Adequacy of control measures. (Chivian E, 2008)

Crops under the REVIVE program are carried out using CO₂-lined CDC traps and aspirators for the capture of live culicids. When harvesting, the minimum and maximum temperatures, relative humidity and geo-reference temperatures are recorded. The frequency varies from May to October in mainland Portugal; From April to November on the island of Madeira; And all year round at ports and airports.

In order to capture adult mosquitoes, the twilight or nocturnal period is preferred for harvesting, since it is at this time of day that the perfect conditions for feeding are reached, the place should be on the outskirts of the urban centers, Preferably in places with pools or ponds. So to carry out this capture are used CDC type light traps, which are composed of a flashlight that attracts mosquitoes, a fan that sucks them and a bag where they are pushed by the fan.

This trap has a photo sensor that allows the electrical system to work only when it gets dark and until dawn. Beside this trap can be placed bait or not. Habitually the bait under the REVIVE program is a bag with dry ice, since releasing CO₂ simulates the breathing of an animal, thus increasing the probability of success and efficiency of capture.

Usually in the Public Health Units in Portugal, these traps are placed at the end of the day and collected during the morning. In order to harvest larvae and pupae, a location should be chosen close to the populations, and shrimp are used for this collection, and these are placed in collection bottles.

The periodicity of collection should be defined by the Public Health Unit. After the capture the samples are sent to the National Institute of Health Dr. Ricardo Jorge (INSA), conditioned in refrigerated system, until 3 days after the beginning of the fieldwork. All samples come accompanied by the respective bulletins of adult mosquito and immature stages.

According to the United States Center for Disease Control and Prevention, health promotion and disease prevention will create healthy homes, workplaces, schools and communities so people can live long, productive lives and still reduce health costs. Better health improves population and economy.

It is also fundamental the role of Environmental Health, in the sense in which it develops activities of identification and characterization of environmental risk factors for health, given that Environmental Health aims at Health Prevention and Promotion, as well as Your intervention in case of risk.

Prevention is the best measure to be taken to eliminate any disease. However, this requires the efforts of the entire population to combat the problem at so

The origin of the *Aedes aegypti* mosquito is African but several regions in the world are known to be affected by this disease. Although the first outbreak of the disease on European soil was recorded in 1920, the mosquito was first sighted on the island of Madeira in 2005 in the municipality of Funchal, more precisely in the parish of Santa Luzia, after reports and some reactions in the skin of the population which were subsequently related to the bite of a mosquito.

This type of mosquito is smaller in size than the common mosquito and has a black-colored body with white-silver stripes. The male is distinguished from the female, among other characteristics, as it contains more feathery antennae.

The female of the mosquito deposits the eggs individually in places capable of accumulating water - breeding grounds. It is the female that itches because it lacks the blood for the maturing of the eggs and the male feeds on sugary fluids. This species can survive for a year in tropical and subtropical climates. (IASaúde, 2012) The life cycle to be completed varies from 7 to 15 days and consists of 4 phases: The Egg, the Larva, the Pupa and, finally, the Adult Mosquito.

The important issue is to eliminate potential mosquito breeding sites. Awareness raising and education for this problem is an essential and necessary weapon for effective prevention. (Dengue, 2007)

Climate change and the expected effects on the distribution and prevalence of diseases in Portugal may lead to new demands on health systems, requiring adaptation work that should be carried out as early as possible to prevent and reduce the extent of effects on health systems the population

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World Environmental Health Day 2016.

What 10 years of a smoke-free Scotland means to 10 year olds.

Tom Bell, Chief Executive, REHIS.

The Royal Environmental Health Institute of Scotland (REHIS) welcomed the announcement that the Federation's theme for World Environmental Health Day 2016 was unanimously agreed to be 'Tobacco Control... a response to the global tobacco pandemic'.

REHIS and local authority Environmental Health Officers have played a crucial role in implementing and ensuring the success of a ban on smoking in enclosed public places in Scotland and great credit goes to the general public and operators of businesses and organisations who have actively supported progress towards a smoke-free Scotland.

The Institute had been supportive of the introduction of controls to reduce exposure to environmental tobacco smoke (ETS) for many years and took its first formal action in August 1999 when it responded to the UK Health and Safety Commission's 'Proposal for an Approved Code of Practice (ACOP) on Passive Smoking at Work. In its response the Institute stated that an ACOP was not the right approach to controlling the exposure to ETS and opined that a much firmer approach was required. The Institute advised the Commission that no employee should be subjected to ETS and that 'the only mechanism to ensure protection, particularly for those in the hospitality industry, is an outright ban on smoking in the workplace'.

When the Scottish Executive (now the Scottish Government) published its proposals to control smoking in public places in 2004 the Institute responded by declaring its support for the introduction of such a ban. The Institute had also been supportive of Stewart Maxwell MSP's 'Prohibition of Smoking in Regulated Areas (Scotland) Bill which was set aside by Mr Maxwell (now a long standing Honorary Vice-President of the Institute) in favour of the Scottish Executive's wider ranging proposals.

The culmination of the efforts of so many individuals and organisations was the coming in to effect, on 26 March 2006, of the smoke-free provisions of The Smoking, Health and Social Care (Scotland) Act 2005 – a piece of legislation widely considered to have brought about the greatest improvement to public health in Scotland for decades.

The Institute agreed to promote the success of 10 years of a smoke-free Scotland and to actively support and promote World Environmental Health Day 2016 through the launch of a competition for Scottish primary schools by inviting Primary 6 pupils to demonstrate what 10 years of a smoke-free Scotland means to them as 10 year olds.

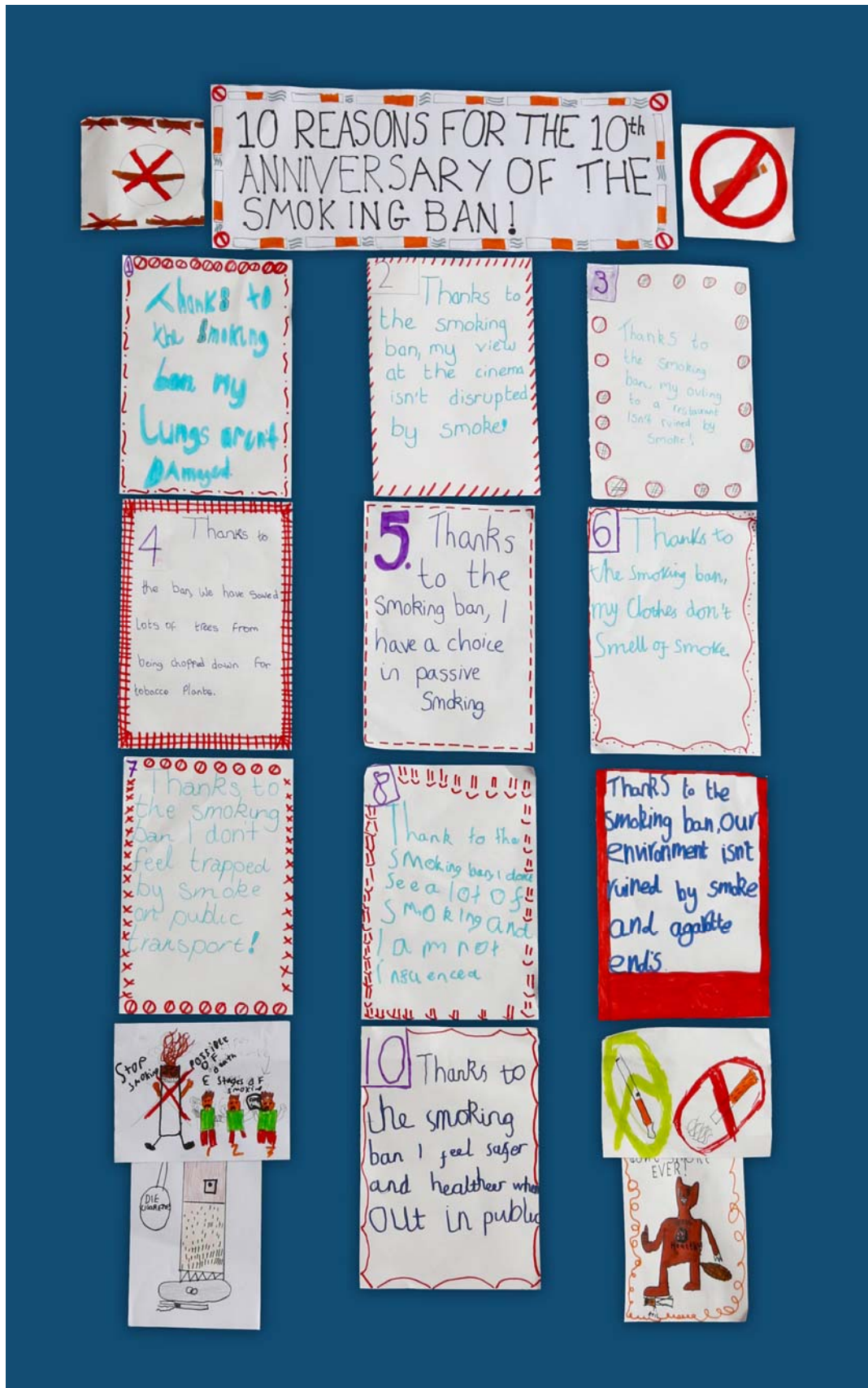
The winning entry, a short and hugely inspiring video was submitted by Blacklands Primary School, Kilwinning and was uploaded to the REHIS website (www.rehis.com). A cheque for £1,000 was presented to the school at morning assembly on 7 October by Professor Kofi Aidoo, Bernard Forteath and Colin Wallace.

The runners-up, Viewlands Primary School, Perth submitted a very colourful and informative poster and have received a cheque for £500.00.

Feedback from the staff at the schools which participated in the competition indicates that the pupils had great fun learning about the dangers of smoking tobacco and of the effects of passive smoking. According to Elaine McNeil, Headteacher at Blacklands Primary Schools, her pupils 'have become specialists in the dangers of second-hand smoke and are proudly spreading the word to their friends and families'. Education and advocacy – what more could we ask for on World Environmental Health Day?



Primary 6 pupils from Blacklands Primary School celebrate their success.



10 pupils give 10 reasons to celebrate a smoke-free Scotland.

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