

SUSTAINABLE WELL-BEING IN A CHANGING WORLD: THE “ONE- WORLD-ONE HEALTH-ONE MEDICINE” APPROACH

Olanike K. Adeyemo, *FCVSN, FAAS, FAS*



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Basic Facts about UI- www.ui.edu.ng

- Premier, Public University, founded on November 17th, 1948
- College of Medicine & 10 Faculties: Arts, Science, Agriculture & Forestry, Social Sciences, Education, Veterinary Medicine, Technology, Law, Public Health and Dentistry
- > 25,000 Undergraduate & Postgraduate student population, & >13,000 DL
- >1,300 Academic Staff, > 300 Professors
- Hosts the Earth and Life Sciences Node of the Pan-African University



OUTLINE

- Background
- One Health Concept
- Human Health
- Veterinary Public Health
- Environmental Health
- Innovative approach for Sustainable Wellbeing
- Environmental Health in a changing world
- Environmental Health & Animal Health
- Environmental Health & Wildlife Health
- Environmental Health & human health
- Well-being in a Changing World: Global Public Health
- One Health and Sustainable well-being
- Conclusion



Introduction

- The terms 'One Medicine' and 'One Health' have been used to describe the concept of an integrated approach to ANIMAL, HUMAN and ENVIRONMENTAL HEALTH and to acknowledge that we are all part of 'One World'
- in which animals, people and the environment are interdependent and must rely on each other for basic survival.
- Hence..... **ONE-WORLD-ONE HEALTH-ONE MEDICINE**



Historical Concept of Health

- The Biomedical Perspective/definitions focused on the theme of the body's ability to function
- "a state characterized by anatomic, physiologic, and psychological integrity; ability to perform personally valued family, work, and community roles; ability to deal with physical, biologic, psychological, and social stress“



Human Health-Definition

- The World Health Organization (WHO) defined “health” in its broader sense in its 1948 constitution as
 - “A state of complete physical, mental, and social **well-being** and not merely the absence of disease or infirmity”
- The 1984 WHO revised definition :
 - "the extent to which an individual or group is able to realize aspirations and satisfy needs, and to change **or cope with the environment**".



Veterinary Public Health

- Defined by the WHO consultation on "future trends in veterinary public health" held in Teramo, Italy in 1999 as:
 - “The sum of all contributions to the physical, mental and social well-being of humans through an understanding and application of veterinary science”
- Exemplifies “one health” because of Zoonoses:
 - 60% of human pathogens are zoonotic
 - 75% of emerging diseases are zoonotic
 - 80% of agents having a potential bioterrorist use are zoonotic pathogens



Environmental Health

WHO defined Environmental health:

- “addresses all the physical, chemical, and biological factors external to a person/animal that can potentially affect health”

It is targeted towards preventing disease and creating health-supportive environments





One Health- Definition

- The AVMA, FAO, OIE, WHO, UNICEF, and World Bank in their “Strategic Framework on One Health” established in 2008 that One Health is:

“The collaborative efforts of multiple disciplines working locally, nationally and globally to attain optimal health for people, animals and environment”



Innovative approach for Sustainable Wellbeing

- The interdependence of humans, animals, and their environment has prompted a call for:
- More Holistic, Collaborative (multi and interdisciplinary) approaches to:
 - Research
 - Disease prevention, monitoring, treatment (In Humans & Animals)
 - Environmental Health, Conservation & Management
 - Agricultural & livestock production Development (including Aquaculture)
 - Food Safety
 - Legislation and Policy etc
- Toward the goal of logical, practical and sustainable solutions to Environmental, Animal and Human well-being



Environmental Health in a changing world: The Case of Nigeria



The Environmentalist, 23, 297–306, 2003
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Consequences of Pollution and Degradation of Nigerian Aquatic Environment on Fisheries Resources

OLANIKE K. ADEYEMO*

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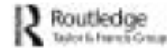
Summary. Throughout the world, human use of water, and bad planning have led to drier and polluted rivers, lakes, and groundwater resources with dramatic effects on the natural ecosystems. Nigeria's vast freshwater resources are among those most affected by environmental stress imposed by human population growth, urbanization, and industrialization. Disposal and management of wastes in Nigeria present serious environmental problems. The usual methods of waste disposal in the country are: land filling, dumpsites, land spreads, water disposal, and





Environmental Health

International Journal of Environmental Studies,
Vol. 64, No. 1, February 2007, 71–82



Waste management practices at the Bodija abattoir, Nigeria

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(Received 14 July 2006)

Because of high rates of resource consumption, cities face serious problems of high volumes of waste, characterized by inadequate disposal technologies, high costs of management, and the adverse impact of wastes on the environment. Abattoirs, or slaughterhouses, are a major source of water and air pollution worldwide. Waste generated by abattoirs in Nigeria includes condemned organs, carcasses, blood, hides, horns, hoofs, hairs, paunch content and carcass trimmings. The main waste disposal practice at Bodija abattoir is dumping. This paper assesses the environmental and public health implications of unhygienic waste disposal. The waste management at the Bodija abattoir is aesthetically unappealing, environmentally unsustainable and also makes the meat processed and offered for sale unwholesome. Waste disposal techniques of developed countries have been appraised. Recommendations to encourage the safe disposal of abattoir waste and limit the methods of disposal to those internationally permitted are suggested.





Ecosystem impact

- Lead level in surface water ranged between 0.5-0.90mg/l (mean=0.65 mg/l),
- Lead level in fish muscle sampled from surface water ranged between 0.05-0.07 mg/kg.
- The highest lead level (**10.28** mg/kg) was recorded the muscle of cultured fish

Adeyemo et al, 2007; African Journal of Aquatic Science. 32(2): 153–157.





Oil Extraction Activities In The Niger Delta

- The Niger Delta region of Nigeria covers an area of about 70 000km² and is inhabited by about 7 million people (NDES, 1997)
- It is Africa's largest and the world's third largest delta
- With diverse and sensitive ecosystems including freshwater swamps, mangroves, creeks, estuaries and barrier islands





Results

All the 16 priority PAHs were detected in five of the six Rivers sampled, in fresh fish samples and dry ready-to-eat fish samples

PAH, Aliphatic hydrocarbons and BTEX were detected in the water, sediments and fish samples from all impacted fishponds and **ALL “Control” sites**

Salami, Adeyemo & Oyedele, 2011





Oil Pollution in the Niger Delta

Many of the oil facilities and operations are located within sensitive habitats - including areas vital to fish breeding, sea turtle nesting, mangroves and rainforests

They have been severely damaged, contributing to increased biodiversity loss and poverty



Oil exploitation, fisheries resources and sustainable livelihood in the Niger delta, Nigeria

Olanike Kudirat Adeyemo¹, Oniovosa Eloho Ubiogoro² and Olufemi Bolarinwa Adedeji³

Summary

Mangroves, the coastal forests of the tropics, have traditionally provided a variety of plant products, fish and shellfish for local communities. They also provide services such as coastal stabilization, and food chain support for near-shore fisheries. This study assessed the status of the coastal area of Niger Delta, Africa's largest delta. In the Nigerian coastal environment, large areas of the mangrove ecosystem have been destroyed. The mangrove forests were once a source of both fuelwood for the indigenous people and a habitat for the area's rich biodiversity, but are now unable to survive the oil toxicity of their habitat. The harmful effects of oil spills on the environment are many. Oil kills plants and animals in the estuarine zone. Oil settles on beaches and kills organisms that live there; it also settles on ocean floor and kills benthic (bottom-dwelling) organisms such as crabs and disrupts major food chains. It also covers birds, impairing their flight or reducing the insulative property of their feathers. Oil endangers fish hatcheries in coastal waters and contaminates the flesh of commercially valuable fish. In many villages near oil installations, even when there has been no recent spill, an oily sheen can be seen on the water, which in fresh water areas is usually the same water that the people living there use for drinking and washing. Hence, the public health implication is grave. Several oil spill management policies and efforts are in place to reduce the menace of oil spill incidents in the country. However, most are poorly implemented and laws are usually not enforced. We therefore propose constant monitoring for oil spillage, stringent enforcement of laws and other policies and remediation efforts geared towards restoring the environment of the Niger Delta.

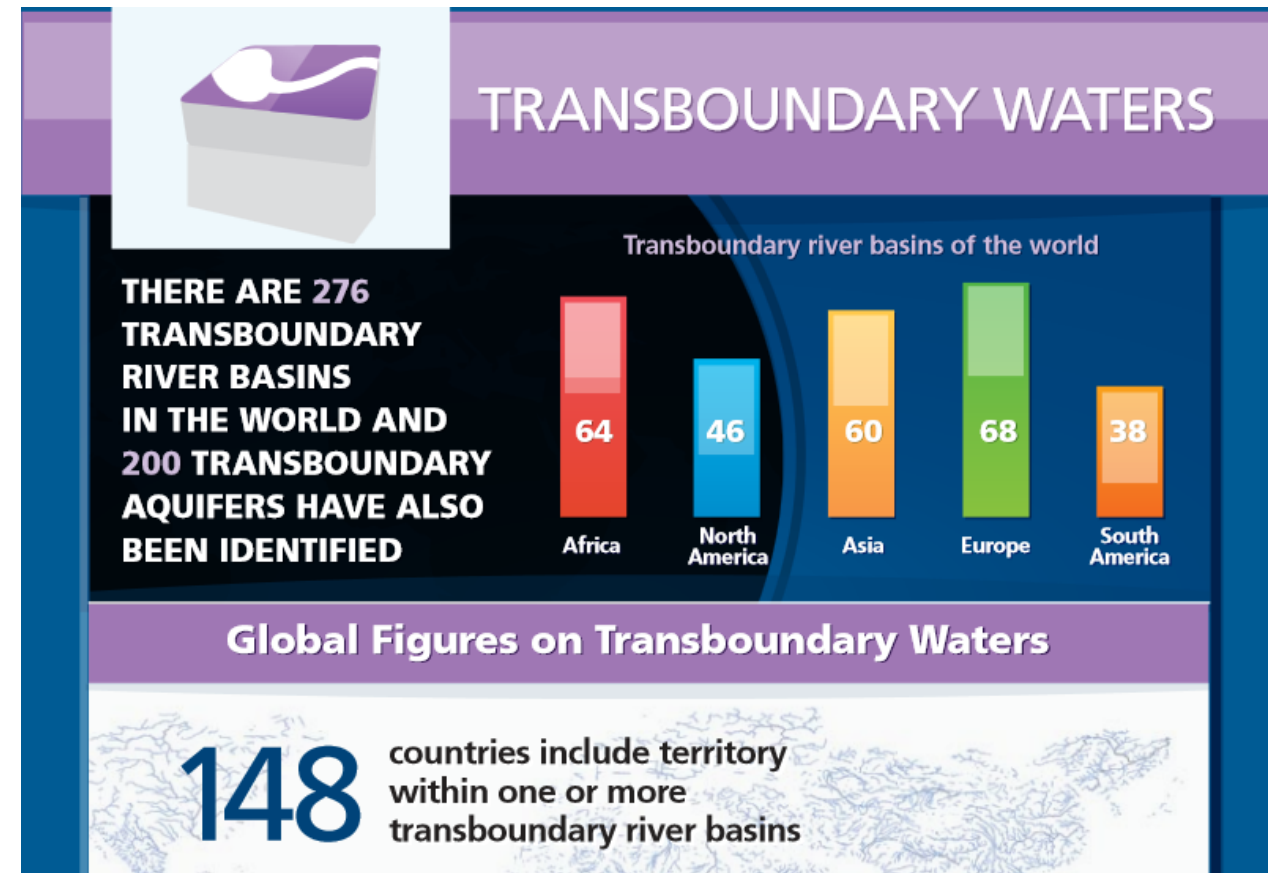
Introduction

The Niger Delta is located in Southern Nigeria and is Africa's largest delta and the third largest world mangrove forests. It covers about 70 000 square kilometers. About one-third of the delta consists of wetlands (Spalding *et al.*, 1997). The Niger Delta is unique in



Implications of Environmental ill-health

- Transboundary Waters: Effects of Environmental pollution and degradation is not location bound!
- USEPA estimates that 850 billion gallons of untreated discharges flow into water bodies annually, contributing to over 7 million illnesses each year.



http://www.unwater.org/fileadmin/user_upload/unwater_new/docs/transboundary_waters.pdf



Environmental Health and Animal Health

- Studies have demonstrated that low level of exposure to pollutants is often associated with chemical residues in animal system, and subtle or subclinical effects:
- Oxidative stress, immunotoxicity, carcinogenicity, teratogenicity and endocrine disruption (*Adeyemo et al, 2001, 2003, 2007, 2008, 2009, 2011, 2014, 2016*)
- Other adverse health effects are increased infectious disease susceptibility, immunosuppression, reproductive impairment, and neoplasia (*Adeyemo et al, 2008, 2011a, b, c, d, 2012, 2013, 2014a, b, 2016a, b, c*)



Environmental, Animal and Human Health

- Animals also share human' susceptibility to some diseases and environmental hazards.
- Because of this, they can serve as early warning signs of potential human illness.

Lead Poisoning Investigation in Northern Nigeria



In early 2010, ducks began to disappear in northern Nigeria. People would later report that they noticed there were fewer ducks in the area, but no one thought it was important at the time.

However, a few months later in May 2010, public health officials learned that hundreds of children had become sick in northern Nigeria. Reports stated that the children suffered from vomiting, abdominal pain, headaches, and seizures. After becoming ill, many of these children had died. The cause was unknown, and such a large number of childhood deaths and illnesses concerned public health officials.

A team was sent to one of the villages to find out the cause of the children's deaths. Team members came from the CDC-Nigeria office in Abuja, the Nigerian Federal Ministry of Health, the Nigerian Field Epidemiology and Laboratory Training Program, the World Health Organization, and Medecins Sans Frontieres (Doctors Without Borders). Dr. Lora Davis, a CDC Animal-Human Interface Officer in Nigeria, was one member of the team.

The Situation in Zamfara

The team traveled to Zamfara State in northern Nigeria and began the investigation to identify the cause of the outbreak in two villages. In each village, residents reported that one-fourth of all the children in their communities had died in the past year. The team found unsafe levels of lead inside most of the homes, and water from the community wells also had high levels of lead. Children in both villages had dangerous levels of lead in their blood.



Children in Zamfara sit atop bags of lead-contaminated soil, which were removed from their village during cleanup.



Environmental Health & Wildlife Health

Reduced Tree Swallow Hatching Success Associated with PFCs

USGS scientists and their collaborators studying the effects of exposure of tree swallows to perfluorinated compounds (PFCs) found that the exposed swallows had reduced hatching success. The tree swallows in the study nested on Lake Johanna, a lake contaminated with perfluorinated carboxylic and sulfonic acids in central Minnesota. PFCs are worldwide contaminants because of their widespread industrial usage. These compounds are used in fire-fighting foams; as a surface treatment on textiles, leather, and carpet (stain repellent); and in paper products used for food preparation and storage.

The researchers found that concentrations of nearly all PFCs were elevated in the tissues of tree swallows nesting around the contaminated Lake Johanna compared to tree swallows nesting on the nearby reference lake. Reduced hatching success was associated with higher concentrations of perfluorooctane sulfonate in tree swallow eggs.

This research was conducted in collaboration with the [Minnesota Pollution Control Agency](#) and the [Aquatic Toxicology Laboratory, Department of Biological Sciences at St. Cloud State University, St. Cloud, Minnesota](#). Funding was provided by the USGS Contaminant Biology Program and [Minnesota Pollution Control Agency](#).

More Information

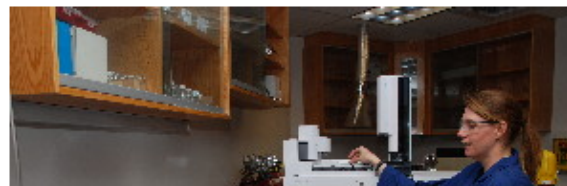
- For more information contact [Christine M. Custer](#) or [Thomas W. Custer](#)
- [Exposure and effects of perfluoroalkyl compounds on tree swallows nesting at Lake Johanna in east central Minnesota, USA](#): Reproductive Toxicology, 2012, v. 33, p. 556-562, doi:10.1016/j.reprotox.2011.01.005



Tree swallows have been used extensively for monitoring the exposure and effects of environmental contaminants because they feed on aquatic insects; concentrations of contaminants in eggs reflect sediment contamination. Photo credit: Tom Custer, USGS.
([Larger Version](#))

Pyrethroid Insecticide Contamination Increases with Urbanization

Contamination and toxicity in streambed sediments caused by pyrethroid insecticides generally increased with the degree of urbanization in seven metropolitan areas across the Nation, according to a USGS study. Pyrethroids are



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Wildlife and Human Health

GASTROENTERITIS: A PUBLIC HEALTH CONCERN OF BUSHMEAT CONSUMPTION

Olayinka Femi¹Adekunle and Olanike K. ²Adeyemo

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2. Department of Veterinary Public Health and Preventive Medicine, University of Ibadan, Ibadan, Nigeria. E-mail: olanikeadeyemo@hotmail.com

ABSTRACT

The term bushmeat, also called wild meat and game meat, refers to meat from non-domesticated mammals (apes, elephants, civets), reptiles (snakes, monitor lizards), amphibians and birds hunted for food in tropical forests. The consumption of a wide variety of species of bushmeat caught from the wild has been an important source of protein for humans world-wide for millennia. The volume of bush meat trade in West and Central Africa was estimated at 1 to 5 million tonnes per year at the turn of the century. It has been reported that in Congo basin, trade and consumption of game meat could reach up to 4.5 million tons annually.

In developing world, enteric diseases are a major threat to public health and human cases of gastroenteritis are acquired through ingestion of contaminated foods and pathogenic *Escherichia coli*, *Campylobacter* spp. and *Salmonella* spp. are the most incriminated in gastroenteritis from zoonotic origin. Hunted and killed animals are transported in sacks on bicycles, motorcycles, roof racks of public transport exposed to the hot west African sun over long distances to marketing centre. It is common for animals killed on night hunting trips to be





Well-being in a Changing World: Global Public Health

- In 2001, a comprehensive review identified 1,415 species of pathogens infectious for humans, including:
 - 217 viruses and prions,
 - 538 bacteria and rickettsia,
 - 307 fungi,
 - 66 protozoa and
 - 287 helminths



Well-being in a Changing World: Global Public Health

- Out of these
 - 868 (61%) were classified as zoonotic
 - 175 pathogenic species were considered to be associated with emerging diseases, of which 75% were zoonotic
 - the vast majority of which is coming from **wildlife**



Well-being in a Changing World: Transboundary movement

This also poses a major threat to animal welfare and to wildlife species conservation (Tb, HIV)

A study of the drivers of disease emergence in wildlife showed that human movement of pathogens by trade and travel is the most important.





<http://www.my-walls.net/lion-nairobi-national-park/>

**Decisions on Wildlife
Management in Kenya
is not limited by
geographic boundary**



ONE-HEALTH-ONE-WORLD-ONE -MEDICINE

Essential for:

- Transformational breakthroughs in Research and Management of human, veterinary and Environmental health issues

These requires a paradigm shift in research conceptualization



Linking Environmental Pollution to Buruli Ulcer (*Mycobacteria ulceran*)

- *Mycobacterium ulcerans* disease, a neglected tropical disease. Third most common mycobacteriosis after tuberculosis and leprosy
- It has a global geographical distribution in about 33 countries with increased incidence in West African sub-region
- Epidemiology is still not clear, but it has been **associated with activities near water bodies** in tropical and subtropical regions

16th ICID • Cape Town, South Africa • April 2-5, 2014

Session: [Emerging Infectious Diseases](#)

Abstract No.: 51.049

Title: **Spatio-temporal pattern of buruli ulcer in Ogun state, South Western Nigeria**

Author(s): [P. I. Otuh](#)¹, O. K. Adeyemo², F. O. Soyinka³, E. E. Nwezza⁴; ¹University of Ibadan, Nigeria, Veterinary Public health and Preventive Medicine, Ibadan/NG, ²University of Ibadan, Nigeria, Veterinary Public health and Preventive Medicine, Ibadan/NG, ³Ministry of Health, Ogun State., Ogun State Tuberculosis, Leprosy and Buruli Ulcer Control Programme, Abeokuta/NG, ⁴Federal University Alike Ikwo, Mathematics/Computer Science/Statistics and Informatics, Abakaliki/NG

Abstract: **Background:** *Mycobacterium ulcerans* disease, a neglected tropical disease commonly referred to as buruli ulcer (BU) has a global geographical distribution in about 33 countries with widely reported increased incidence in West African sub-region. The yet to be discovered mode of transmission has contributed greatly to the obscurity in proffering



Pollution and Buruli Ulcer

Buruli ulcer causes chronic devastating skin ulcers and often bone disfiguration

We carried out a preliminary study to determine spatial pattern of BU in susceptible communities of Ogun State, Nigeria.





Appl Environ Microbiol. 2004 September; 70(9): 5679–5681.

PMCID: PMC520906

doi: [10.1128/AEM.70.9.5679-5681.2004](https://doi.org/10.1128/AEM.70.9.5679-5681.2004)

Potential Role for Fish in Transmission of *Mycobacterium ulcerans* Disease (Buruli Ulcer): an Environmental Study

Miriam Eddyani,^{1,*} David Ofori-Adjei,² Guy Teugels,³ David De Weirtdt,³ Daniel Boakye,² Wayne M. Meyers,⁴ and Françoise Portaels¹

[Author information](#) ▶ [Article notes](#) ▶ [Copyright and License information](#) ▶

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ABSTRACT

Go to:

This study reports a potential role that fish may play in the transmission of *Mycobacterium ulcerans* disease (Buruli ulcer). Fish found positive for *M. ulcerans* DNA all appear to feed on insects or plankton and are believed to concentrate *M. ulcerans* from this usual food source. These observations provide additional data supporting our previous hypothesis on sources of *M. ulcerans* and modes of transmission.

Mycobacterium ulcerans is an environmental organism that causes Buruli ulcer (BU), a necrotizing

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Formats:

Article | [PubReader](#) | [ePub \(beta\)](#) | [PDF \(46K\)](#)

Related citations in PubMed

Aquatic insects as a vector for *Mycobacterium ulcerans*.
[Appl Environ Microbiol. 2002]

In the case of transmission of *Mycobacterium ulcerans* in buruli ulcer disease *Acanthamoeba* species stand [Ghana Med J. 2011]

Protection against *Mycobacterium ulcerans* lesion development by exposure to aquatic insect saliva. [PLoS Med. 2007]

Terrestrial small mammals as reservoirs of *Mycobacterium ulcerans* in benin. [Appl Environ Microbiol. 2010]

Mycobacterium ulcerans in wild animals. [Rev Sci Tech. 2001]

[See reviews...](#)

[See all...](#)

Cited by other articles in PMC

Regulation of Mycolactone, the *Mycobacterium ulcerans* Toxin, Depends on Nutrient Source [PLoS Neglected Tropical Diseases.]

Environmental Distribution and Seasonal Prevalence of *Mycobacterium u* [Applied and Environmental Microbiology. 201...]

Fish and amphibians as potential reservoirs of *Mycobacterium*

A case of Bioconcentration of pathogen



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Rev Sci Tech. 2001 Apr;20(1):252-64.

Mycobacterium ulcerans in wild animals.

Portaels F, Chemlal K, Elsen P, Johnson PD, Hayman JA, Hibble J, Kirkwood R, Meyers WM.

Author information

Abstract

Mycobacterium ulcerans infection, or Buruli ulcer, is the third most frequent mycobacterial disease in humans, often causing serious deformities and disability. The disease is most closely associated with tropical wetlands, especially in west and central Africa. Most investigators believe that the aetiological agent proliferates in mud beneath stagnant waters. Modes of transmission may involve direct contact with the contaminated environment, aerosols from water surfaces, and water-dwelling fauna (e.g. insects). Person-to-person transmission is rare. Trauma at the site of skin contamination by M. ulcerans appears to play an important role in initiating disease. Once introduced into the skin or subcutaneous tissue, M. ulcerans multiplies and produces a toxin that causes necrosis. However, the type of disease induced varies from a localised nodule or ulcer, to widespread ulcerative or non-ulcerative disease and osteomyelitis. Although culture of M. ulcerans from a patient was first reported in 1948, attempts to culture the mycobacterium from many specimens of flora and fauna have been unsuccessful. Failure to cultivate this organism from nature may be attributable to inadequate sampling, conditions of transport, decontamination and culture of this fastidious heat-sensitive organism, and to a long generation time relative to that of other environmental mycobacteria. Nevertheless, recent molecular studies using specific primers have revealed M. ulcerans in water, mud, fish and insects. Although no natural reservoir has been found, the possibility that M. ulcerans may colonise microfauna such as free-living amoebae has not been investigated. The host range of experimental infection by M. ulcerans includes lizards, amphibians, chick embryos, possums, armadillos, rats, mice and cattle. Natural infections have been observed only in Australia, in koalas, ringtail possums and a captive alpaca. The lesions were clinically identical to those observed in humans. Mycobacterium ulcerans infection is a rapidly re-emerging disease in some developing tropical countries. The re-emergence may be related to environmental and socioeconomic factors, for example, deforestation leading to increased flooding, and population expansion without improved agricultural techniques, thus putting more people at risk. Eradication of diseases related to these factors is difficult. Whether wild animals have a role in transmission is an important question that, to date, has been virtually unexplored. To address this question, surveys of wild animals are urgently required in those areas in which Buruli ulcer is endemic.

PMID: 11288515 [PubMed - indexed for MEDLINE]

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Related citations in PubMed

[Review](#) Mycobacterium ulcerans infection. [Lancet. 1999]

[Review](#) Buruli ulcer (Mycobacterium ulcerans infection). [Trans R Soc Trop Med Hyg. 2008]

[Ecology and transmission of Mycobacterium ulcerans]. [Pathol Biol (Paris). 2003]

Distribution of Mycobacterium ulcerans in buruli ulcer endemic and no [PLoS Negl Trop Dis. 2008]

[Review](#) [Cutaneous and soft skin infections due to non-tuberc [Enferm Infecc Microbiol Clin. 2010]

[See reviews...](#)

[See all...](#)

Cited by 35 PubMed Central articles

Fish and amphibians as potential reservoirs of Mycobacterium ulce [Infect Ecol Epidemiol. 2013]

Environmental distribution and seasonal prevalence of Myco [Appl Environ Microbiol. 2013]



Pollution and Buruli Ulcer

- A significant association ($p=0.0001$) was established both between river pollution, *M. ulcerans* in environmental samples and incidence of BU in a “dose-dependence” manner.
- Duker et al 2004 also reported spatial dependency of Buruli ulcer prevalence on arsenic-enriched domains in Amansie West District, Ghana
- Geo-referenced maps showing the cases with their clusters, hotspots and correlator with polluted rivers were also produced

16th ICID • Cape Town, South Africa • April 2-5, 2014

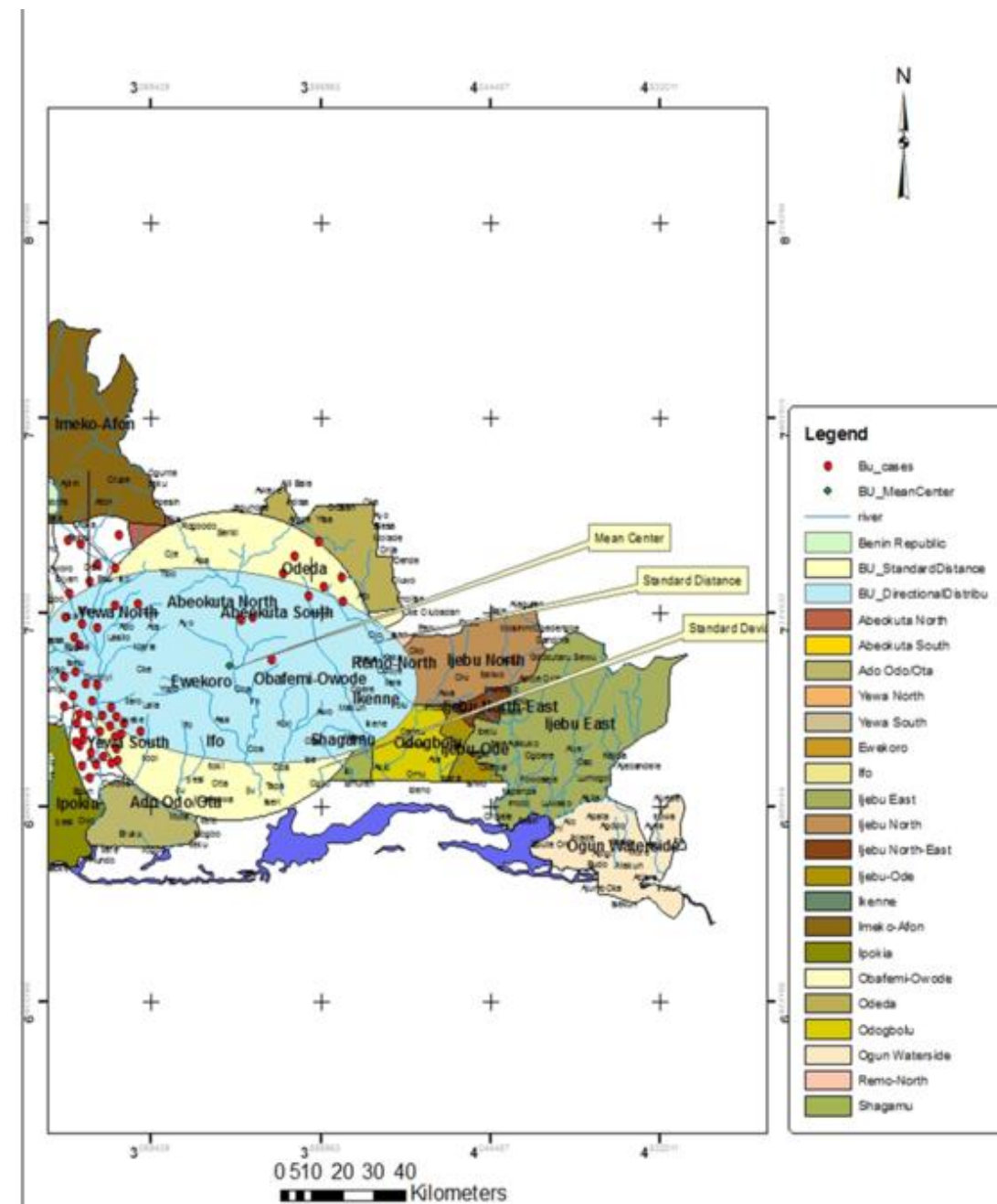
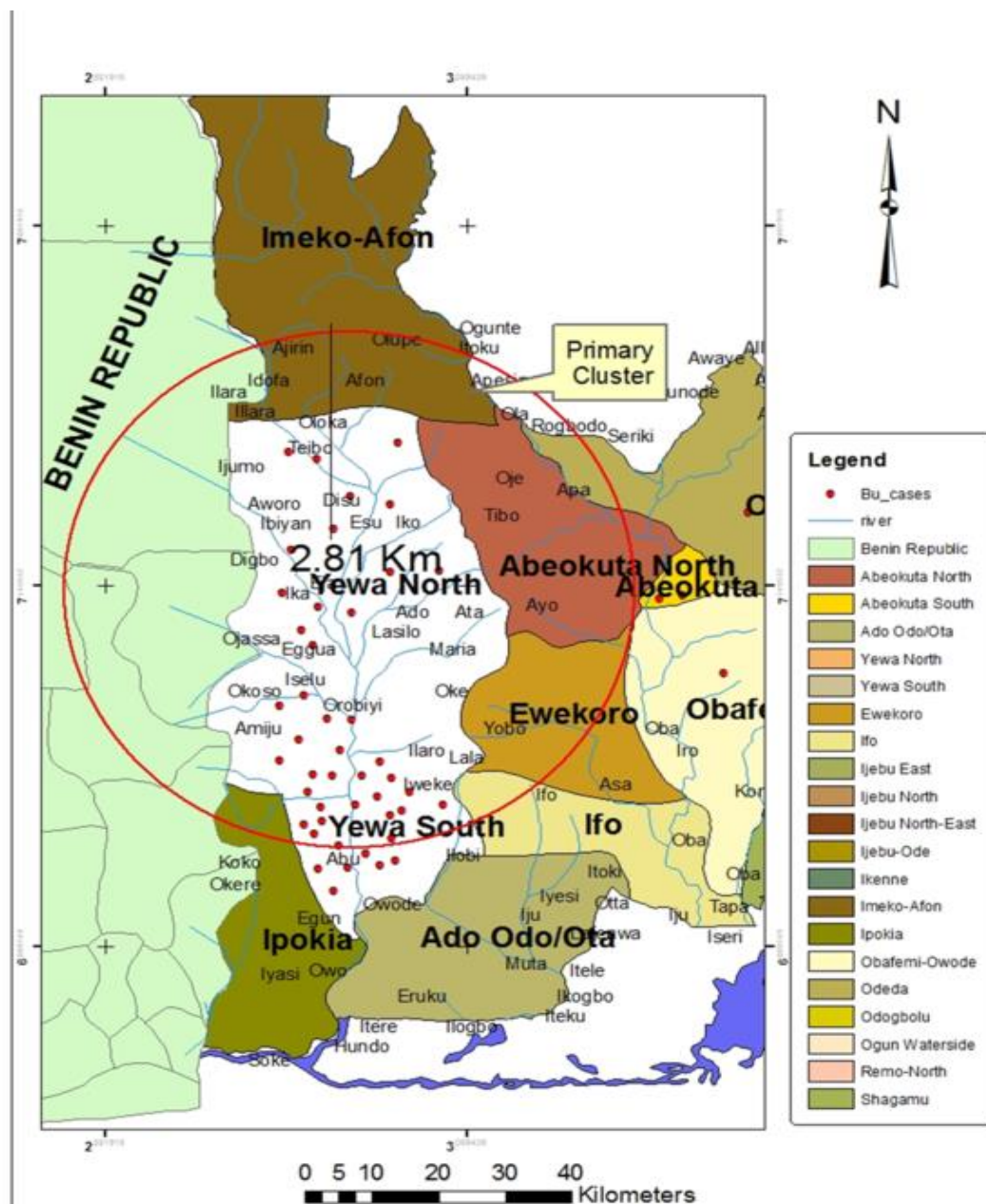
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Epidemiology, Prevention and Management of Buruli Ulcer

Like Most infectious diseases, requires continued collaboration between

- Physicians
 - Veterinarians
 - Public health Experts
 - Environmental Health researchers
 - Sociologist etc
-
- A unifying environmental/ecological approach to the study of the disease and its prevention.



The interaction of humans, animals, wildlife and their environment has never been more important than now







One Health approach – an integrated response to “**what needs to be done?**” -- as opposed to the classical approach based on “**what can I do?**”



Human Health



Animal (domestic
and wild) Health



Environmental
Health

ONE HEALTH APPROACH



ONE WORLD-ONE HEALTH

Public Health Veterinarians have pivotal obligations, opportunities, and Contributions In amongst others:

- Enhancing public health,
- Recognising and responding to zoonotic disease transmission,
- maintaining food and water quality, and
- promoting wildlife and ecosystem health



ONE HEALTH: GLOBAL TREND

Some of the most prominent issues putting pressure on global health today include:

- Food safety and public health;
- Combating emerging or re-emerging diseases, especially zoonoses with the necessary disease surveillance and management of risks;
- Food security and animal production to address the ever increasing states of human malnutrition and poverty;
- Safeguarding biodiversity and addressing environmental management and sustainability; and
- Bio-security and meeting threats of bio-terrorism

All require holistic, collaborative strategy to strengthen the collective capacity to meet these challenges



ONE HEALTH: GLOBAL TREND

USGS Publishes Its First Environmental Health Science Strategy

The new USGS Environmental Health Science Strategy describes the vision for, and priorities of, USGS environmental health science. Implementation of this strategy is intended to aid coordination of USGS environmental health activities with other Federal agencies and to provide a focal point for disseminating information to stakeholders. The Science Strategy will serve as a framework for USGS environmental health science goals, actions, and outcomes for the next decade.

Vision – The USGS is a premier source of the environmental health science needed to safeguard the health of the environment, fish and wildlife, domesticated animals, and people.

Mission – The mission of the USGS in environmental health science is to contribute scientific information to environmental, agricultural, natural resources, and public-health managers who use that information to support sound decision making. USGS will provide science to achieve the following societal goals:

- **Goal 1** – Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern.
- **Goal 2** – Reduce the impact of contaminants on the environment, fish and wildlife, domesticated animals, and people.
- **Goal 3** – Reduce the impact of pathogens on the environment, fish and wildlife, domesticated animals, and people.
- **Goal 4** – Discover the complex interactions and combined effects of exposure to contaminants and pathogens.
- **Goal 5** – Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters.

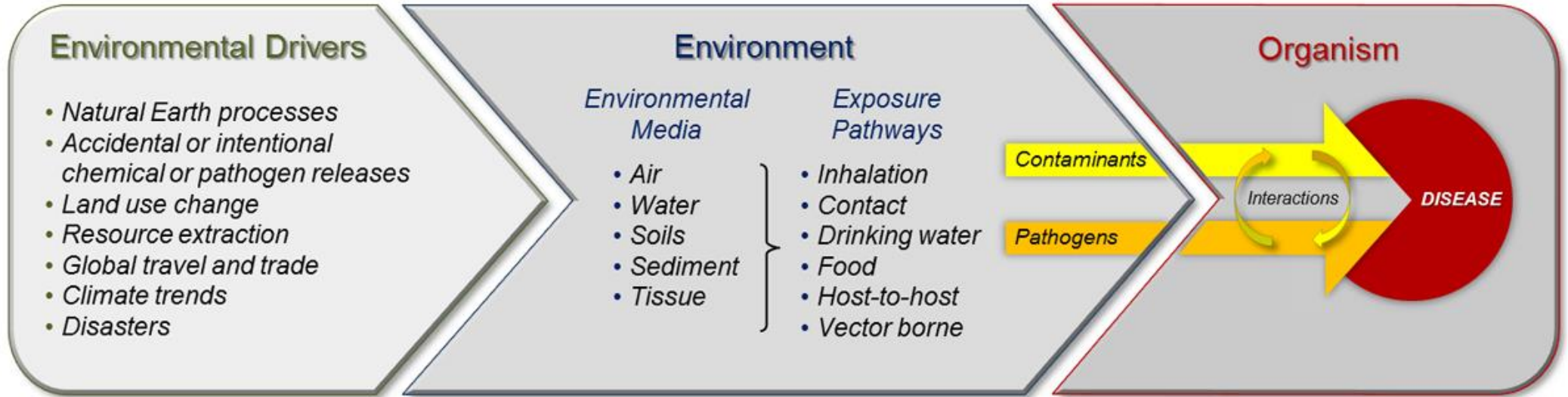
More Information

- For more information contact [Patricia R. Bright](#) or [Herbert T. Buxton](#)
- [USGS Environmental Health Science Strategy—Providing Environmental Health Science for a Changing World—Public Review Release](#): USGS Open-File Report 2012–1069





ONE HEALTH: GLOBAL TREND



The USGS Environmental Health Science Strategy addresses the relationship among:

- Environmental drivers
- Exposure to disease agents (contaminants and pathogens),
- The complex responses to contaminants and pathogens that result in **environmental disease** in wildlife, domesticated animals, and people

http://toxics.usgs.gov/highlights/usgs_envirohealth_strategy.html



MEETING

One Health
bovine

Alberto A Pérez

ente^{*5,6}, Peter J

Matthew T Messe

David G Hewitt¹⁷,

Carlos E Suarez¹⁹,

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Abstract

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Excerpt

Most food-borne illnesses are preventable. The planetary environment(s); and billions of food from a reactive to a more anticipatory, proactive [Health](#) approach to food safety—which has been nationally, and globally—to attain optimal health to be implemented for food safety, it may hold the spectrum of multiple health domains including the wildlife and aquatic health and ecology

Contents

Review of Institute of Medicine and National Research Council Recommendations for One Health Initiative

Carol Rubin, Tanya Myers, William Stokes, Bernadette Dunham, Stic Harris, Beth Lautner, and Joseph Annelli

Human health is inextricably linked to the health of animals and the viability of ecosystems; this is a concept commonly known as One Health. Over the last 2 decades, the Institute of Medicine (IOM) and the National Research Council (NRC) have published consensus reports and workshop summaries addressing a variety of threats to animal, human, and ecosystem health. We reviewed a selection of these publications and identified recommendations from NRC and IOM/NRC consensus reports and from opinions expressed in workshop summaries that are relevant to implementation of the One Health paradigm shift. We grouped these recommendations and opinions into thematic categories to determine if sufficient attention has been given to various aspects of One Health. We conclude that

Initiative Task Force defined One Health as the collaborative effort of multiple disciplines—working locally, nationally, and globally—to attain optimal health for people, animals and our environment. The report included the recommendation that the AVMA, the American Medical Association, and other interested parties should “plan a summit on One Health to be conducted by the National Academy of Sciences and secure the necessary funding to underwrite this effort” (1). In 2009, the Institute of Medicine and National Research Council (NRC) co-hosted the One Health Commission Summit, described as “a forerunner of an IOM study on One Health...[that will be] used to develop a strategic roadmap for public and private p



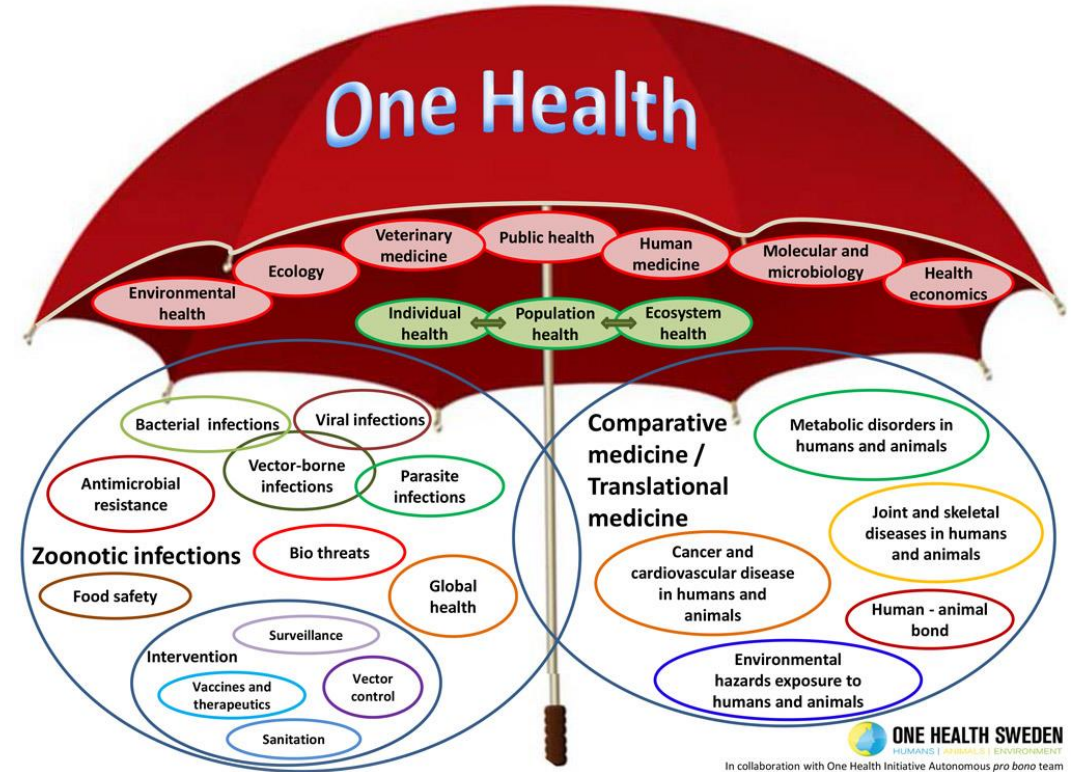
ONE HEALTH: GLOBAL TREND

- Internationally, OIE, FAO, and WHO have received USAID EPT funds to improve networking among human and animal laboratories.
- In 2012, UF announced a PhD in Public Health with One health concentration (<http://egh.phhp.ufl.edu/academic-programs/doctoral-programs/phd-in-one-health/>)
- “In particular, recommendations that point toward collaboration, resource sharing, coordinated research, and strengthened lines of communication deserve greater attention” (Emerging Infectious Diseases, www.cdc.gov/eid, Vol. 19, No. 12, December 2013)



Conclusion

- The health and welfare of the environment, animals and people are closely linked
- they have been developed separately and should be re-integrated
- For sustainable solutions we have to think innovative strategies, integrating environmental, human and animal health.





Innovative approach for Sustainable Well-being

- The interdependence of humans, animals, and their environment has prompted a call for:
- More Holistic, Collaborative (multi and interdisciplinary) approaches to:
 - Research
 - Disease prevention, monitoring, treatment (In Humans & Animals)
 - Environmental Health, Conservation & Management
 - Agricultural & livestock production Development (including Aquaculture)
 - Food Safety
 - Legislation and Policy etc
- Toward the goal of logical, practical and sustainable solutions to Environmental, Animal and Human well-being

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Thank you for your attention

