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ABSTRACT

Toxic torts that are non-occupational in nature have started to emerge in Kenyan courts posing challenges to legal practitioners regarding proof of causation of injuries owing to the latent nature of injuries from such torts that take time to show. This article examines the nature of environmental incident response mechanisms deployed upon an occurrence of a pollution event and identifies public health assessment as a priority response measure that should be utilised to collect crucial epidemiology evidence. The examination is conducted through documentary review of international and national legal instruments and journal articles as well as interviews and case law analysis. The article proffers that failure to conduct a public health assessment is a missed opportunity for compensation as collection of critical evidence of causation is missed and mitigation of damage is not undertaken for victims of toxic exposure.

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Introduction

The release of pollution adversely impacts the environment and the health of the people who suffer environmental toxic injuries.¹ Environmental pollutants whether at low or high concentration cause environmental toxic injuries which need attention.² The injuries from large concentration of pollutants can lead to acute poisoning and even fatalities.³ Disease injury may range from diseases such as cancers, arthritis, mental disorders, disabilities, congenital anomalies and respiratory illnesses which are damaging, irreversible and could lead to fatalities.⁴ Toxic tort law becomes critical in providing remedies for environmental toxic injuries in form of compensation.⁵ The purpose of compensation is to restore the plaintiff to the position he occupied prior to the tortious act of the defendant, therefore toxic tort law as a legal response is expected to achieve this purpose.⁶

In establishing a legal case for compensation a plaintiff must show that the defendant had a legal duty to prevent harm, defendant violated that legal duty, plaintiff suffered a legally compensable injury, and defendant's action was the cause of the injury in question.⁷ The success of toxic tort litigation depends on being able to identify, by expert scientific evidence, both the nature of the toxin and the causal link between the plaintiff's exposure to the toxin and the injuries they have suffered.⁸

Toxic torts are characterised by environmental toxic injuries which are latent in nature as a long period tends to subsist between exposure and illness.⁹ Under traditional tort law principles, an individual exposed to a toxic substance has suffered no legally recognised injury entitling her to compensation until the individual manifests a detectable disease. In actual fact, the victim has suffered an increased risk of injury which is harm as the victim has to undergo medical monitoring which is important for early diagnosis and treatment of resulting disease.¹⁰ A compensation quandary presents as the medical monitoring costs need to be catered for by the polluter who cannot commit to such costs before a decision on liability is made. In addition, the victims must go through the rigours of litigation to prove liability including proving causation which is complex for toxic torts.¹¹

The latent nature of injury for toxic torts makes it difficult to distinguish the causative agent of disease injury against other background risks which might as well have caused the injury.¹² The plaintiff may have moved to different locations, and may have exposed themselves to a number of environmental hazards or toxic substances.¹³ The scientific uncertainty associated with many chemical substances and the manner in which the toxic substances cause the personal injuries in form of diseases is complex and creates a possibility of multiple causes in a claim making it difficult to tell what cause led to the injury

¹ Robin Kundis Craig, 'The Public Health Aspects of Environmental Enforcement' (2010) 4 *Pittsburgh Journal of Environmental and Public Health Law* 1.

² Zhou Xiaoguang, 'Constructing an Environmental Health Impact Assessment System in China' (2018) 6 *China Legal Sci* 105.

³ *ibid.*

⁴ Samuel Epstein and Dale Hattis, 'Pollution and Human Health' in William Murdoch (ed), *Environment: Resources, Pollution and Society* (2nd edn, Sinauer Associates Inc. Publishers 1975) 196.

⁵ Jean M Eggen, 'The Synergy of Toxic Tort Law and Public Health: Lessons from a Century of Cigarettes' (2008) 41 (2) *Connecticut Law Review* 563.

⁶ Stanley Ingbert, 'Rethinking Intangible Injuries: A Focus on Remedy' (1985) 73 *California Law Review* 772.

⁷ Carl F Cranor, 'The Science Veil over Tort Law Policy: How should Scientific Evidence be utilized in Toxic Tort Law?' (2005) 24 *Law & Philosophy* 139.

⁸ Jo Goodie, 'Toxic Tort and the Articulation of Environmental Risk' (2008) 12 *Law Text Culture* 69, 73.

⁹ Albert Lin 'Beyond Tort: Compensating Victims of Environmental Toxic Injury' (2005) 78 *Southern California Law Review* 1439.

¹⁰ Alan T Slagel, 'Medical Surveillance Damages: A Solution to the Inadequate Compensation of Toxic Tort Victims' (1988) 63(4) *Indiana Law Journal* 849; *Sienkiewicz v Greif* (UK) Ltd [2011] UKSC 58.

¹¹ Slagel (n 10) 852.

¹² Slagel (n 10) 852; Lin (n 9) 1446; John G Fleming, 'Mass Torts' (1994) 42(3) *American Journal of Comparative Law* 507; Anonymous, 'Causation in Environmental Law: Lessons from Toxic Torts' (2015) 128(8) *Harvard Law Review* 2256; Ann Taylor, 'Public Health Funds: The Next Step in the Evolution of Tort Law' (1994) 21(4) *Boston College of Environmental Affairs Law Review* 753.

¹³ J David Prince, 'Compensation for Victims of Hazardous Substance Exposure' (1985) 11(3) *William Mitchell Law Review* 688.

suffered.¹⁴ There could be existence of multiple defendants as well which makes it difficult to identify the causative agent.¹⁵ The latent period may impact on the statute of limitation period for bringing toxic tort actions. The delay in bringing a suit may go beyond three years which is the prescribed time within which one should bring such an action.

More challenges present as proof of causation in a hazardous substance personal injury case often requires large amounts of sophisticated, expensive medical and scientific evidence to demonstrate the causal connection between a disease and an environmental exposure.¹⁶ This is attributed to the cost of providing scientific testing and expert testimony necessary to prove the case.¹⁷ Many medical tests are needed to establish the toxic effects of both the hazardous substances and the interaction with environmental influences which often vary with individual characteristics such as race, age and sex.¹⁸

The victims must prove the existence of a compensable harm for toxic exposure even where there is no manifestation of injury but an increased risk of injury which defies traditional principle of tort law that addresses injury that is easily seen.¹⁹ An increased risk of disease corresponds to a general population exposed to the toxic substance and often cannot be particularised to the individual plaintiff.²⁰ This presents a problem when proving factual causation which is particularised to an individual. Nonetheless, it is important to reliably estimate the total number of injuries in a population, in order to establish causation link of disease affecting a population. The process involves determining the hazardous substance concentration levels at each geo-

graphic point where, and over all periods when, exposure might have taken place which is a complex process which should be done through a proper public health response framework in order to get reliable data that can explain causation link.²¹ Such a public health response should be part of an environment incidence response which is set rolling when environment incidents occur.²²

Generally, a public health response team that is formed to respond to a disaster or an incident is required to monitor health status; diagnose and investigate health problems by conducting a health assessment.²³ A public health assessment entails the evaluation of data and information on the release of hazardous substances into the environment in order to assess any past, current, or future impact on public health in order to develop advisories or other recommendations or to identify actions needed to evaluate and mitigate or prevent human health effects.²⁴ The process of health assessment provides opportunities for early diagnosis and treatment which helps in mitigation of damage hence limiting the scope of compensation. The diagnosis and treatment costs count towards total cost of damages payable in compensation. Early detection would constitute reasonable conduct which would help mitigate treatment costs.²⁵

In the process of public health assessment, tasks are initiated in order to collect clinical, toxicological and epidemiological data which can help explain whether a toxicant is associated with a particular illness.²⁶ Toxicological data provides

¹⁴ Ora Fred Harris Jr., 'Toxic Tort Litigation and the Causation Element: Is There Any Hope of Recognition' (1986) 40(3) *Southwestern Law Journal* 909; Edwin Peel and James Goudkamp, *Winfield & Jalowicz on Tort* (Sweet & Maxwell 2014) 312, 318; Allan Kanner 'The Politics of Toxic Tort Law' (1997) 2 *Widener Law Symposium Journal* 163, 170.

¹⁵ Lin (n 9) 1441, 1442.

¹⁶ Prince (n 13) 690.

¹⁷ Slagel (n 10) 855, 856

¹⁸ Prince (n 13) 668.

¹⁹ Slagel (n 10) 859.

²⁰ *ibid* 860.

²¹ Prince (n 13) 669.

²² Interview with Chemist, NEMA officer (Nairobi, 2 March 2021); Howard Frumkin and others, 'Climate Change: The Public Health Response' (2008) 98(3) *American Journal of Public Health* 435, 438-440; G P Morris and others, 'Getting Strategic about the Environment and Health' (2006) 120(10) *Journal of the Royal Institute of Public Health* 889; Interview with NEMA Inspector (Nairobi, 2 March 2021); Melissa Genereux and others, 'The Public Health Response during and after the Lac-Mégantic Train Derailment Tragedy: A Case Study' (2015) 2(3-4) *Disaster Health* 113.

²³ Frumkin and others (n 22) 438-440.

²⁴ Agency for Toxic Substances and Disease Registry (ATSDR), 'Public Health Assessment Guidance Manual (update)' (US Department of Health and Human Services 2005) 21.

²⁵ Taylor (n 12) 777.

²⁶ Gerald Boston, 'A Mass Exposure Model of Toxic causation: The Content of Scientific Proof and the Regulatory Experience' (1993) 18(1) *Columbia Journal of Environmental Law* 181, 213.

the scientific evidence that explain possible toxicological effects of chemicals and attempt to assess quantitatively the relationship between doses of chemicals and responses in the living systems.²⁷ The process of establishing dosage taken in by a person and response evoked explain path of causation of injury which well provides critical evidence for proving liability of the polluter. A further inquiry is needed to establish whether exposure of a specific individual to a chemical will result in a disease. A clinician or physician is required to investigate circumstances of exposure and related allegation to establish whether it is reasonable for an identified illness to occur under specified conditions of exposure. The expert will rely on medical testimony that focusses on the plaintiff, his background, medical history, lifestyle and other factors regarded as relevant in the diagnosis and treatment of disease.²⁸

Where a population is affected, epidemiology studies are conducted within the process of public health assessment to determine the distribution and determinants of disease in human population.²⁹ Epidemiology is a core public health science which uses statistical methodologies to elucidate the relationship between a disease and a factor.³⁰ The studies help in identifying disease,³¹ while monitoring disease outcomes.³² Therefore, the tool is able to single out number of patients, exposed residents and

area of exposure.³³ An opportunity is created for early diagnosis and treatment which complements compensation as the mitigation of injuries is done. Laws and regulations that protect health should be enforced at the point of conducting a public health assessment so that those who are responsible can be prosecuted for their wrongs and can be made to pay for treatment costs and restoration costs.³⁴

In 2015, an oil spill was detected that contaminated Thange River basin within Thange in Makueni County, Kenya, contaminating Thange River, groundwater resources and the environs.³⁵ The residents complained of pollution of water they used and the arable lands which was confirmed after an assessment was done.³⁶ Thousands of residents were exposed to oil pollutants suffering property and environmental losses hence the case forms a good starting point of inquiry with respect to whether a public health assessment as a public health response measure was undertaken to determine impact of the oil spill on the health of the people in the area.

This article posits that public health response measures are weakly embraced with regard to environmental incident response measures in Kenya and therefore opportunities are lost for proper collection of evidence, early diagnosis and treatment of illnesses which is critical for the process of compensation of injuries. To support this proposition the paper makes an inquiry into Thange oil spill that occurred in 2015.

To get into a more comprehensive analysis into the utility of epidemiology evidence in a compensation process for toxic torts section two explains the foundations of epidemiological evidence and locates it within a public health response framework; section three makes an inquiry on the role played by epidemiology evidence in the compensation process; section four examines the missed opportunity in Thange oil

²⁷ 'What is Toxicology?' (*Mailman School of Public Health*, 30 November 2020) <<https://www.publichealth.columbia.edu/public-health-now/news/what-toxicology>>; Boston (n 26) 214.

²⁸ Boston (n 26) 36.

²⁹ Abraham Lilienfeld and David Lilienfeld, *Foundations of Epidemiology* (2nd edn, OUP 1980); Boston (n 26) 231; Claire McIvor, 'Debunking Some Judicial Myths about Epidemiology and its Relevance to UK Tort Law' (2013) 21(4) *Medical Law Review* 553.

³⁰ McIvor (n 29) 554; Bert Black and David Lilienfeld, 'Epidemiologic Proof in Toxic Tort Litigation' (1984) 52(5) *Fordham Law Review* 732, 750.

³¹ J E Van der Plank, *Plant Diseases: Epidemics and Control* (Academic Press 1963) in J C Zadoks, 'The Role of Epidemiology in Modern Phytopathology' (1974) 64(7) *Phytopathology* 918; Kerriann Laubach, 'Epigenetics and Toxic Torts: How Epidemiological Evidence Informs Causation' (2016) 73(2) *Washington and Lee Law Review* 1019.

³² David Coggon, David Barker and Geoffrey Rose, 'What is Epidemiology?' in David Coggon, David Barker and Geoffrey Rose, *Epidemiology for the Uninitiated* (John Wiley & Sons 2009) <<https://www.bmj.com/about-bmj/resources-readers/publications/epidemiology-uninitiated/1-what-epidemiology>>.

³³ Toshihide Tsuda and others, 'Minamata Disease: Catastrophic Poisoning Due to A Failed Public Health Response' (2009) 30(1) *Journal of Public Health Policy* 54; Coggon, Barker and Rose (n 32).

³⁴ Frumkin and others (n 22) 438-40.

³⁵ Panafcon Limited & Kenya Pipeline Limited, 'Environmental and Social Economic Impact Assessment Study of Thange River Basin' (Vol A- 2016) 11.

³⁶ *ibid.*

spill to conduct epidemiology studies which may affect the compensation process and section five concludes the discussion and calls for strengthening the law in support of a proper public health response legal framework in environmental incidents.

Locating Epidemiology Studies Within the Legal Framework

Scientists do agree that human health and animal health are interdependent and are bound to the health of the ecosystems in which they exist which justification necessitated a call for a collaborative global approach to understanding risks for human, animal and ecosystem health.³⁷ The Chinese and Hippocratic traditions do also support the interdependence between health and environment that the pursuit of health is through the creation of an equilibrium between environmental factors and aspects of individual's way of life such as work, food and water consumption among other human habits.³⁸ The World Health Organisation, Food and Agriculture Organisation and World Organisation for Animal Health support the adoption of "One Health" approach in addressing health threat at the human- animal-environment interface. To address the health, the approach calls for collaboration, communication and coordination across all relevant sectors and disciplines bringing together a number of experts with the ultimate goal of achieving optimal health outcomes for both people and animals.³⁹ Legal experts cannot work in isolation of other experts in the litigation process that seeks compensation

for victims of pollution, therefore a collaborative approach is needed in order to be successful.

The human rights standards do form a legal basis for ensuring that an appropriate framework is put in place to allow effective public health response for environmental accidents. The International Convention of Economic and Social Rights (ICESC) provides for the right to enjoyment of the highest attainable standard of physical and mental health.⁴⁰ The state parties are expected to undertake measures in realisation of the rights that are to be enjoyed by the people. Such measures entail: promoting environmental hygiene; prevention, treatment and control of epidemic, endemic, occupational and other diseases; provision of medical service and medical attention in the event of sickness.⁴¹ The right to health includes right to treatment which calls for urgent medical care to be given in case of environmental pollution incidents.⁴²

The right to health also means the right to the enjoyment of a variety of facilities, goods, services and conditions necessary for the realisation of the highest attainable standard of health. Such conditions or services include health response measures to pollution incidents. Under the International Health Regulations of 2005, a country is supposed to establish control programmes that aim to reduce public health risks associated with chemical, toxic and environmentally induced events and develop systems that help in the control or containment of known existing risks to public health in surveillance, risk reduction, response and containment.⁴³ World Health Assembly (WHA) through resolution 55.16, recognised the need to have a global public health response to pollution incidents arising from natural, accidental or deliberate release of

³⁷ Katterine Bonilla-Aldana and others, 'Revisiting the One Health Approach in the Context of Covid 19: A Look into the Ecology of this Emerging Disease' (2020) 8(3) *Advances in Animal and Veterinary Sciences* 234.

³⁸ G P Morris and others, 'Getting Strategic about the Environment and Health' (2006) 120(10) *Journal of the Royal Institute of Public Health* 889.

³⁹ Sarah Humboldt-Dachroeden and Alberto Mantovani, 'Assessing Environmental Factors within the One Health Approach' (2021) 57(240) *Medicina* 57030240.

⁴⁰ Art 12, ICESCR.

⁴¹ International Covenant on Economic, Social and Cultural Rights, New York, 16 December 1966, 993 UNTS 3, Art 12.

⁴² Art 12.2(c), general comment para 16, UN Committee on Economic, Social and Cultural Rights (CESCR), 'General Comment No. 16: The Equal Right of Men and Women to the Enjoyment of All Economic, Social and Cultural Rights' (Art. 3 of the Covenant), 11 August 2005, E/C.12/2005/4 <<https://www.refworld.org/docid/43f3067ae.html>>.

⁴³ WHO, 'International Health Regulations, 2005: Areas of Work for Implementation' WHO/CDS/EPR/IHR/2007.1 (World Health Organisation 2007) 15, 25 <[https://www.who.int/publications/i/item/international-health-regulations-\(2005\)-areas-of-work-for-implementation](https://www.who.int/publications/i/item/international-health-regulations-(2005)-areas-of-work-for-implementation)>.

biological, chemical agents or radionuclear material that affect health.⁴⁴ WHA urged member states to put in place measures such as national disease surveillance plans and enhance national capacity in field epidemiology, toxicology and case management in response to pollution incidents.⁴⁵ Such measures prescribed in the resolutions and regulations are reflected in the national legal framework in the respective countries and continue to be developed. WHO through the World Health Assembly (WHA) formulates policies, regulations, instruments which provide direction for appropriate response to various risks to health such as pollution.⁴⁶ The legal instruments give direction on how a country should respond in case of environmental disasters or incidents that impact on the public health.⁴⁷ The resolutions provide precedents for use by individual countries who are members of WHA.⁴⁸

The right to health further embraces socio-economic factors that promote conditions in which people can lead a healthy life, and extends to the underlying determinants of health, such as food and nutrition, housing, access to safe and potable water and adequate sanitation, safe and healthy working conditions, and a healthy environment.⁴⁹ Therefore environmental rights are important as a healthy environment support the determinants of health. A clean and healthy environment is necessary for realisation of other rights such as the right to life and social economic rights such as right to health, right to adequate standard of living and adequate food and the right to a

healthy environment itself.⁵⁰ The right to a clean and healthy environment is recognised in the Africa Charter of Human and People Rights⁵¹ and several national constitutions, including the Kenyan one.

Despite having an elaborate global legal framework that provides for response measures upon environmental incidents, thousands of people most of whom are from developing countries such as Ecuador, Honduras and South Africa have suffered disease injuries following toxic exposure from toxic wastes.⁵² Such countries do not have effective health response measures that should respond to the pollution incidents and therefore in most incidents, the extent of contamination is not known and neither are victims able to get compensation due to failure to link their injuries to the toxic wastes.⁵³

The Kenyan constitution provides a basis for engaging public health responses mechanisms for pollution incidents that can potentially affect the health of the population. The national government and county government have roles to play in addressing public health concerns.⁵⁴ The national government is in charge of formulating health policies, establishing and implementing measures for managing environmental risk factors to curtail occurrence and distribution of diseases.⁵⁵ Measures include disease surveillance, health impact assessment guidelines which aim to contribute in reduction of disease burden arising from poor environmental hygiene, sanitation, occupational exposure and environ-

⁴⁴ WHA Resolution 55.16, 'Global Public Health Response to Natural Occurrence, Accidental Release or Deliberate Use of Biological and Chemical Agents or Radio Nuclear Material that Affect Health' <https://apps.who.int/gb/archive/pdf_files/WHA55/ewha5516.pdf>.

⁴⁵ *ibid.*

⁴⁶ CESCR General Comment No. 14: The Right to the Highest Attainable Standard of Health (Art. 12) adopted at the Twenty-second Session of the Committee on Economic, Social and Cultural Rights, on 11 August 2000 (Contained in Document E/C.12/2000/4) para 1. Interview with Dr Grace Ikahu, Key Informant (Nairobi, 6 June 2021).

⁴⁷ Priti Patnaik, 'The World Health Assembly: What it Does, Why it Matters' (*Global Health Now*, 13 May 2022) <<https://globalhealthnow.org/2022-05/world-health-assembly-what-it-does-why-it-matters>>.

⁴⁸ *ibid.*

⁴⁹ UN Committee on Economic, Social and Cultural Rights (CESCR), General Comment No. 14: 'The Right to the Highest Attainable Standard of Health' (Art. 12 of the Covenant) E/C.12/2000/4, para 4, 11 August 2000.

⁵⁰ John H Knox, 'Framework Principles on Human Rights and the Environment' (2018) UN Human Rights Special Procedures <<http://www.srenvironment.org/framework-principles>>.

⁵¹ African Charter on Human and Peoples' Rights, Banjul, 19 January 1982, 1520 UNTS 217, Art 24.

⁵² Fatma-Zohra Ksentini, 'Economic and Social Rights: Adverse Effects of the Illicit Movement and Dumping of Toxic and Dangerous Products and Wastes on the Enjoyment of Human Rights' Report submitted by the Special Rapporteur on Toxic Waste, UN Doc. E/CN.4/2001/55/Add1 (United Nations Economic and Social Council 2001).

⁵³ *ibid* 3, 5.

⁵⁴ The National Government is made up of the Legislature, Executive made up of the President, Deputy President and the Cabinet and finally the Judiciary. The country is divided into units called counties and the County government are in charge of running the affairs of the units.

⁵⁵ Constitution of Kenya, 4th Sch, Part 1.

mental pollution.⁵⁶ The national government is also in charge of disaster management.⁵⁷ Disasters may emanate from pollution events and therefore the national government must lead in the operations of disaster management which may entail response operations, assessment of damage and recovery operations.⁵⁸ The county government is in charge of county health facilities and must therefore ensure that the facilities are adequately equipped to address health concerns may arise including those caused by pollution incidents.⁵⁹

The national and county government are required to collaborate, consult and enter into agreements for the better carrying out the obligations of the Health Act.⁶⁰ In pollution events both levels of government should work together to ensure that health response measures are engaged effectively to address health concerns. The next section presents a deeper analysis of the utility of epidemiology studies as an enabler for compensation.

Epidemiology as an Enabler for Compensation

Scholars view epidemiology studies as a critical public health response tool that can help solve toxic tort challenge of lack of direct evidence of causation that is a prerequisite for establishing liability under the traditional common law torts.⁶¹ In most instances, there is lack of sufficient evidence to satisfy the traditional “but-for” test to

prove factual causation.⁶² The “but for” test was formulated in the case of *Barnett v Chelsea and Kensington Hospital Management Committee*⁶³ which was used to isolate events that lead to injury. To remedy such difficulties epidemiological evidence provides a potential causal link between the substance and the disease.⁶⁴

Epidemiology is a core public health science which looks at the distribution and determinants of diseases in human populations.⁶⁵ Epidemiology uses statistical methodologies to elucidate the relationship between a disease and a factor.⁶⁶ It entails “*comparing the incidence of disease across exposed and unexposed populations, or comparing the incidence of exposure across sick and healthy populations*”.⁶⁷ The studies seeks to find out number of patients, number of exposed residents and area of exposure.⁶⁸ Since epidemiology is based on the study of populations and not individuals, it focuses on the question of general causation rather than specific or individual causation.⁶⁹ Nonetheless, courts recognise the important role the evidence plays in demonstrating a plausible link between exposure and injury.⁷⁰

Few English courts have considered ways in which epidemiological evidence should be interpreted; in particular, the factors which should be taken into account when applying the “balance of probability” test, or the weight which should be attached to such factors but are otherwise sceptical on using it exclusively as causation

⁵⁶ Health Act s 68 (2) (a), s 69 (k) (m).

⁵⁷ Constitution of Kenya, 4th Sch, Part 1.

⁵⁸ B Wisner and J Adams (eds), ‘Environmental Health in Emergencies and Disasters: A Practical Guide’ (WHO 2002) 22, 42.

⁵⁹ Constitution of Kenya, 4th Sch, Part 2.

⁶⁰ Health Act (No.21 of 2017) s 106, 108.

⁶¹ Laubach (n 31) 1023; Michael Dore, ‘A Proposed Standard for Evaluating the Use of Epidemiological Evidence in Toxic Torts and other Personal Injury Cases’ (1985) 28 (3) Howard Law Journal 677.

⁶² Chris Turner, *Unlocking Torts* (3rd edn, Hodder Education 2010) 71.

⁶³ [1969] 1 QB 428.

⁶⁴ Aleksandra Kobylasheva, ‘Using Epidemiological Evidence in Tort Law: A Practical Guide’ (2014) 30 (3) *Professional Negligence* 124.

⁶⁵ *Mclvor* (n 29) 554.

⁶⁶ *Black and Lilienfeld* (n 30) 750.

⁶⁷ Nicholas P Putz, ‘Developing Exposure-Based Preconception Tort Liability: A Scientific Challenge to Traditional Tort Concepts’ (2017) 66(2) *Catholic University Law Review* 484.

⁶⁸ *Tsuda and others* (n 33) 55.

⁶⁹ Richard Goldberg, ‘Epidemiological Uncertainty, Causation and Drug Product Liability’ (2014) 59(4) *McGill Law Journal* 777.

⁷⁰ Putz (n 67) 484,486; Dore (n 61) 682.

evidence.⁷¹ In *Corby Group Litigation v Corby District Council*,⁷² epidemiology evidence was used to establish the existence of a cluster of birth effects allegedly caused by toxic substances released during reclamation of land that was formerly the site of a steelworks which led to the case to be settled out-of-court after a High Court hearing.⁷³ The birth defects were allegedly caused by toxic substances (including dioxins) released during the reclamation of land formerly the site of a steel works. The evidence would have attracted more scrutiny in determining individual causation and the court would have been sceptical of statistical evidence, which is associated with epidemiology evidence, had been heard to conclusion.⁷⁴

On the other hand, the use of epidemiology evidence has been viewed as not being conclusive and one would require additional evidence to settle the question of causation.⁷⁵ Lord Rodgers, in the case of *Sienkiewicz v Greif (UK) Ltd* noted that epidemiological evidence, which is statistical in nature, could form an important element in proof of causation.⁷⁶ The court cautioned on the need to use further non statistical evidence to adjudge the aspect of causation.⁷⁷ In a similar fashion Lord Mance held similar views that “. . . epidemiological evidence used with proper caution, can be admissible and relevant in conjunction with specific evidence related to the individual circumstances and parties”,⁷⁸ but did not rule out the usage of the epidemiology evidence to explain causation. The significance a

court could attach to the evidence depended on the nature of the epidemiological evidence, and of the particular factual issues before the court.⁷⁹ Similarly, Goldberg opines that epidemiological evidence could be admissible where used together with specific evidence such as clinical evidence and toxicological evidence relating to the individual circumstances and parties.⁸⁰

Scholars argue that epidemiology can be used to prove specific causation where the study has been expertly executed and the data is suitably similar to the claimant’s case, even in the absence of, particularistic evidence.⁸¹ However, the epidemiology evidence has limitations associated with statistical methodologies which can affect reliability of the data collected. The limitations are: some factors that are to be tested cannot be controlled; epidemiology data is prone to bias and random errors. Nonetheless, it is accepted that a high quality observational study that takes account of these limitations can still be used to establish a causal association between a substance and a disease.⁸² The courts are accused of being averse to epidemiological evidence because of not using it for specific causation and has attributed it to their failure to utilise experts to such as qualified statisticians to analyse the data, rather than using judges and medical experts who are ill-placed to make complicated inferences from statistics that are beyond their expertise.⁸³

In Kenya the use of epidemiology studies was first seen in the case of *Kevin Musyoka and Others v Attorney General*⁸⁴ whose subject was a lead poisoning case in Owino Uhuru Mombasa in 2006 which adversely affected the health of the people, in addition to polluting the environment.⁸⁵

⁷¹ Kobyasheva (n 64) 124, 134.

⁷² [2009] EWHC 1944 (TCC).

⁷³ Chris Miller, ‘Epidemiology in the Court Room: Mixed Messages from Recent British Experience’ (2012) 11(1) *Law, Probability and Risk* 85; Kenneth Hamer, ‘Environmental Claims - A Claimant’s Perspective’ 26, 27 <<https://www.hendersonchambers.co.uk/wp-content/uploads/2017/11/environmental-claims.pdf>>.

⁷⁴ Miller (n 73) 88; Justine Thornton, ‘Significant UK Environmental Cases: 2009/2010’ (2010) 22(2) *Journal of Environmental Law* 315.

⁷⁵ *ibid* 85.

⁷⁶ Goldberg (n 69) 792; Miller (n 73) 88.

⁷⁷ Same view held by Lord Mance in *Sienkiewicz (Administratrix of the Estate of Enid Costello Deceased) v Greif (UK) Ltd* [2011] UKSC 10.

⁷⁸ Karen Sienkiewicz (Administratrix of the Estate of Enid Costello Deceased) v Greif (UK) Ltd [2011] UKSC 10 para 191-192; Miller (n 73) 87.

⁷⁹ *ibid*.

⁸⁰ Goldberg (n 69) 794.

⁸¹ Kobyasheva (n 64) 134.

⁸² Kobyasheva (n 64) 127.

⁸³ Laura Khoury, *Uncertain Causation in Medical Liability* (Hart Publishing 2006) 49-50; Mclvor (n 29) 553; Kobyasheva (n 64) 133.

⁸⁴ [2016] eKLR.

⁸⁵ Nancy A Etiang and others, ‘Environmental Assessment and Blood Lead Levels of Children in Owino Uhuru and Bangladesh Settlements in Kenya’ (2018) 8(18) *Journal of Health and Pollution* 1.

The team that undertook the studies used population-based and cross-sectional studies of children aged 12–59 months randomly selected from households in the *Dwina Uhuru* settlement and the neighbouring *Bangladesh* settlement. Adults were also selected from both settlements for the purpose of testing blood lead levels. Thus, toxicological results were also undertaken as part of the larger epidemiology studies done which helped provided proof that lead contamination had affected the people.⁸⁶ In addition environmental sampling was done which provided environmental evidence to show levels of lead contamination in the environment thus the lead contamination.⁸⁷

The epidemiology studies were recommended by parliament after Owino Uhuru residents petitioned the parliament for a remedial action.⁸⁸ The residents petitioned the parliament to make interventions after NEMA failed to take action on the pollution case. The team of experts would not have undertaken the studies had the parliament not recommended the studies be done. There is need to infuse public health response measures in the environmental response mechanisms in order to address health concerns in any given disaster or incident.

Pollution incidents that lead to toxic torts are inevitable in the world of industrialisation more so for a country like Kenya which is a developing country. Therefore, the Owino Uhuru lead poisoning case is not the only pollution incident Kenya will experience. The residents of Thange in Makueni County were exposed to oil pollutants after an oil spill in the area which contaminated the environment.⁸⁹ The next section

discusses the Thange oil spill and the dilemma in the failure to undertake public health assessment early in the incident to establish impact of oil pollution on the health of the people.

The Challenge of Compensation Where There is a Missed Call for Collection of Epidemiology Evidence in Thange Oil Spill

An oil spill was reported in 2015 in Thange location near Kinyambu township in Makueni County from a pipeline leak in an area which was approximately 50m from Thange River as shown in the map below.⁹⁰

The river supports the livelihoods of about 10,000 people.⁹¹ The residents grow crops such as butternut, vegetables, paw paws, mangoes, oranges and avocados while practising livestock farming.⁹² The groundwater at Thange River is located at the depths of between 1-4 metres deep and an aquifer is at 10 metres deep which greatly influenced the extent of pollution of the groundwater sources.⁹³ Oil pollutants seeped through the soil into the porous rock, finding its way to the shallow ground water and surface water of the Thange River.⁹⁴ The residents complained that they were exposed to the oil spill through air pollution and water pollution as the residents continued to use the water regardless of the pollution. The Water Resource Management Authority (WRMA-which is now Water Resources Authority) confirmed contamination

⁸⁶ *ibid*; Hannah Wamuyu, Collins Odote and Stephen Anyango, 'Compensating Toxic Torts in Kenya: Overcoming the Causation Dilemma' (2021) 12(2) *Journal of Sustainable Development Law and Policy* 272.

⁸⁷ Etiang and others (n 85) 4.

⁸⁸ 11th Parliament, 3rd Session, Report of the Standing Committee on Health on the Owino Uhuru Public Petition (approved 23 March 2015) 32.

⁸⁹ Pius Maundu, 'Residents Suffer Liver, Stomach Diseases after Oil Spill in Thange River' Nation (30 August 2016) <<https://nation.africa/kenya/counties/makueni/residents-suffer-liver-stomach-diseases-after-oil-spill-in-thange-river-1233320>>; Philip Muasya, 'Village Awaits Sh300m Payout for Oil Spill that Killed Life on its Farms' The Standard (25 May 2017) <<https://www.standardmedia.co.ke/article/2001231549/village-awaits-sh300m-payout-for-oil-spill-that-killed-life-on-its-farms>>; Interviews with Muindi Kimeu, Farmer Key Informant (Thange, 6 February 2021).

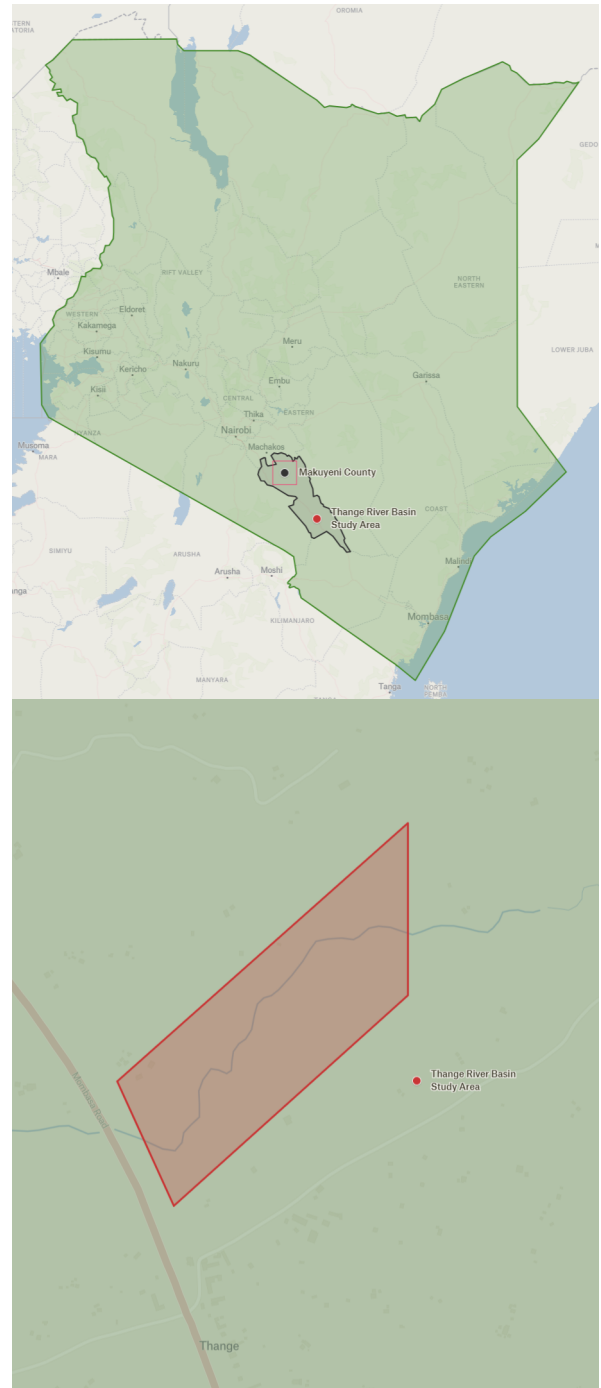
⁹⁰ Panafcon Limited & Kenya Pipeline Limited, 'Environmental and Social Economic Impact Assessment Study of Thange River Basin' (Vol A- 2016) 11.

⁹¹ Interview with Muindi Kimeu, Key Informant Resident (Thange, 6 February 2021).

⁹² Panafcon (n 90) 14.

⁹³ *ibid* 33, 34.

⁹⁴ *ibid* 11.



*Map showing Kenya and Makueni County
Location of Thange River Basin, Study Area, Makueni Count*

of wells and the possible adverse impact on the health of the residents.⁹⁵ WRMA noted that a long time had lapsed to remedy the pollution problem which led to extensive contamination of the water sources.⁹⁶ KPC further provided the residents with alternative drinking water drinking water as Thange River water was polluted. Water tanks were distributed in the area at strategic points and filled regularly.⁹⁷ There were numerous complaints raised by the residents that the water was not enough and the distribution points were few therefore some had to walk for long distances to get the water.⁹⁸

Kenya Pipeline Corporation earlier reported the leakage to NEMA and started off emergency repairs to stop leakage.⁹⁹ NEMA inspected the area of the oil spill to establish the possible extent and impact of pollution which is important for the purpose of classifying an incident which then dictates the response mechanisms to an incident. KPC was required by National Environmental Management Authority (NEMA) to do an assessment in order to know the extent of pollution and the environmental, economic and social impact of the oil spill on the environment. An Environmental and Social Economic Impact Assessment (ESEIA) procured by the polluter company was conducted and revealed that the oil spill had contaminated the underground and riverine ecosystem leading to loss of water for domestic use and irrigation, loss of crops, livelihood.¹⁰⁰

A health assessment was done by a team of doctors who recorded their findings in the ESEIA report.¹⁰¹ The examination involved 46 individuals (18 women, 13 men and 15 children) from six different villages¹⁰² which used Thange River as a source of drinking water, water for livestock and

watering of crops. The examination revealed that all individuals examined had abnormalities of red blood cell, platelets, white blood cells, liver and kidney function abnormalities (all or a combination of this abnormalities). 5.6 percent exhibited abnormal liver function while 55.6 percent exhibited abnormal kidney function.¹⁰³ The experts concluded the observed conditions could have been caused by exposure to petrochemicals or other factors in the environment.¹⁰⁴ This meant that causation of the disease injuries was not established as no conclusive evidence was found to link health effects to the oil spill. Epidemiology studies would have helped establish a cluster of disease injuries associated with the exposure to oil pollutants and would have factored in other possible environment factors that could have contributed to disease injury. Thus, the studies would help identify number of people exposed to the oil pollutants, those affected and the area of geographical location under exposure.

The health assessment in Thange oil spill was done by the polluter in the disaster, KPC, a party that is not independent of the pollution incident which can affect reliability and credibility of the report. On the basis of the report, the polluter failed to compensate the people for their injuries due to lack of proof of causation to their injuries.¹⁰⁵ This was despite producing medical documents and receipts to show disease injury and medical costs which the residents attributed to the oil spill. Had there been any conclusive evidence of causation, compensation would have taken place through the insurer which process would have been quick enough and less tedious for the victims as opposed to the compensation process through courts.

⁹⁵ Ministry of Environment, 'Thange Oil Spill Incident Water Report' (Water Resource Management Authority, September 2015) 1.

⁹⁶ *ibid.*

⁹⁷ *ibid* 12.

⁹⁸ Interview with Elder, Thange Village (Thange, 4 February 2021).

⁹⁹ *ibid*

¹⁰⁰ Panafcon (n 90) 7, County Director of Environment, 'Makueni Petroleum Oil Spill Incidence Report- Makueni' (30 July 2015) 1, 2.

¹⁰¹ Panafcon (n 90) 24.

¹⁰² Thange, Moki, Mbulutini, Kyoani, Nzavoni and Muanza.

¹⁰³ Panafcon (n 90) 43.

¹⁰⁴ *ibid* 43, 50.

¹⁰⁵ Interview with Grace CIC Legal Officer (Nairobi, 3 June 2021).

A survey conducted by the authors sought to establish the perceptions of the residents with respect to the impact of the oil spill on their health and the reasons why they attributed their illnesses to the oil spills. A majority of residents interviewed believed that the oil spill had affected their health.¹⁰⁶ A total of 47 interviews were conducted by the authors. Forty percent of the interviewees were male while the remaining sixty percent were female with a majority (56.5 percent) of households having a density of between 5-10 people with the minority (17.4 percent) having a density of 0-5 people. Less than one third of the households (26.1 percent) had a more than 10 people. Almost all (96 percent) respondents believed that pollution had affected their health in different ways and gave their responses as follows:

About 45 percent of the respondents believed that their health had been affected following the exercise of the environmental, social and economic impact assessment¹⁰⁷ while 38 percent were informed by medical personnel from different health facilities while seeking treatment.¹⁰⁸ About 9 percent attributed their disease to the oil spill because they never ailed from the diseases prior to the oil spill incident while the rest were informed by the KPC employees and NEMA. None of the residents had tests that linked their disease injury to exposure to the oil pollutants. There was no government led health assessment process through which epidemiology studies would have been conducted that would help establish causation links.

	Number of responses	Proportion
Fear of future illness	28	24.1%
Kidney diseases	18	15.5%
Weakness in bones	17	14.7%
Respiratory diseases	16	13.8%
Gastrointestinal diseases	12	10.3%
Headache/Body ache / backbone ache	11	9.5%
Reproductive health complications	4	3.4%
Liver diseases	4	3.4%
Water borne diseases	1	0.90%
Skin ailments	1	0.90%
Mental sickness / Trauma	1	0.90%
Paralysis	1	0.90%
Other	2	1.7%
Total	116	100%

Table 1: How the pollution has affected respondents' health.

¹⁰⁶Interviews with Thange Area residents near Kinyambu, Kibwezi East Constituency, Kenya (3-7 February 2021)

¹⁰⁷ See Panarcon (n 90).

¹⁰⁸ See (n 107).

Some of the residents sued the polluter Kenya Pipeline Company and other state actors in the case of *Muindi Kimeu & 3285 Others v Kenya Pipeline Corporation and others* for compensation for their injuries and losses of property namely livestock and crops.¹⁰⁹ The litigation counsel relied on doctors and an occupational health expert to collect evidence of causation.¹¹⁰ The injuries did not occur in an employer employee relationship therefore this approach of collecting evidence is likely to be challenged in the trial process. Epidemiology evidence is ideal in toxic torts affecting a population as the experts are able to isolate other environmental factors that could have caused similar illnesses complained of by the residents. The litigation counsel cited challenges of costs in getting the doctors to collect evidence.¹¹¹ The litigation counsel bore the costs as most claimants could not afford to pay for litigation expenses. The medical doctors collected toxicological evidence from a third of the claimants randomly selected from the general area of the oil spill.

Epidemiology experts were better placed to collect evidence of causation as they are better placed to isolate other possible factors that could cause similar symptoms of disease. Further the delay in engaging the experts can distort evidence of causation as other factors could have created a similar risk of causing disease injury. The case is still in court waiting for hearing and determination.¹¹² An opportunity was missed to conduct epidemiology studies which would have helped establish any cluster of disease that was associated with the oil pollutants. The processes would have paved way for early diagnosis and treatment for those already with injury or increased risk of disease which would have helped mitigate the damage. This is despite the fact that a government multi sectoral team¹¹³ set up by the Cabinet Secretary for Energy Ministry to investigate the oil pollution incident, had recommen-

ded the Ministry of Health to conduct a comparative medical analysis over a number of years to determine unique medical cases that could be attributed to the oil incident.¹¹⁴ Similarly, the County Director of Environment advised that a comprehensive health impact should be done in order to determine impact of pollution but was not done.¹¹⁵

NEMA did not see the need to engage the health officials as according to them there was no health impact from the oil spill.¹¹⁶ The decision was not informed by any professional engagement and thus victims of pollution risk injustice of non-compensation as an opportunity is lost for collecting critical evidence that could help explain causation link for disease injury which is a prerequisite for compensation. The missed chance for the conduct of a comprehensive health assessment signifies absence of a legal framework stipulates processes that should follow to safeguard the health of the public that is exposed to pollution. A legal framework that lays down the structure of collaboration in the events of pollution disasters would ensure that all agencies are involved including the health agencies in laying down response and recovery efforts in case of pollution disasters. NEMA belatedly is in the process of amending environmental assessment regulations in order to incorporate public health aspects in environmental assessment process.¹¹⁷ Regulations should provide for the conduct of health assessments whenever there are pollution incidents which could go a long way in providing claimants with evidence of causation.

¹⁰⁹ ELC Makueni Petition 9/2019 consolidated with petition No 8, 12 of 2019.

¹¹⁰ Interview with Musembi, Advocate (Nakuru, 3 October 2021).

¹¹¹ *ibid.*

¹¹² Telephone Interview with Muindi Kimeu, Key Informant (Thange, 3 April 2023).

¹¹³ The team was drawn from NEMA, National Land Commission, Kenya Petroleum Refineries Limited and Water Resources Management Authority.

¹¹⁴ NEMA, 'Detailed Incident Investigation Report' (Thange, Kibwezi Makueni County, 26 February 2016) 14.

¹¹⁵ County Director of Environment -NEMA, 'Makueni Petroleum Oil Spill Incidence Report' (30 July 2015) 1.

¹¹⁶ Interview with NEMA Inspector (Nairobi, 20 May 2021).

¹¹⁷ Interview with Director, Legal Department, NEMA (Nairobi, 2 December 2021).

Borrowing a Leaf From the Institutionalised Public Health Assessment Process in the US

Public health assessments (PHA) in the US are elaborate and are provided in under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. The process of public health assessment is institutionalised within government and is regulated by CERCLA,¹¹⁸ in order to protect the public from hazardous wastes and environmental spills of hazardous substances.¹¹⁹ The Agency for Toxic Substances and Disease Registry (ATSDR), a body established under CERCLA, is authorised to conduct public health assessments at these sites, when requested by the Environmental Protection Agency (EPA), states, or individuals.¹²⁰ ATSDR is able to generate data necessary to determine extent of public exposure to toxic chemicals at sites of pollution.¹²¹

The public health assessment process enables ATSDR to prioritise and identify additional steps needed to answer public health questions, and defines follow-up activities needed to protect public health.¹²² The institutionalised process involves a number of tasks that should be completed and are important to establish the extent of health impact of pollution. The tasks involve: evaluation of site conditions and establishing the nature and extent of environmental contamination which task helps delineate geographical location under exposure. Other tasks involve; defining potential human exposure pathways

related to site-specific environmental contaminants and identifying persons exposed to environmental contamination associated with a site whether past, current, and future. This will help identify how the pollutant was taken in by the victim which could be through ingestion, inhaling or through skin besides in identifying persons affected by the exposure to the pollutants. Other important health tasks are: examining the public health implications of site-related exposures, through the examination of environmental and health effects data which data can be toxicological or epidemiological, addressing those implications by recommending relevant public health actions to prevent harmful exposures and the identification and responding to community health concerns and communicating the findings of the assessment.¹²³

The information generated from such a health assessment process is important in providing evidence for proving causation of injury which would be almost impossible to have it without an institution assisting the process of collection of data. It is near impossible to put up a team of experts through private means due to costs challenge and delay that would be involved in bringing the affected population into a consensus in engaging in such a process. In the Kenyan set up the environmental response mechanisms are bereft of health response measures that should be deployed where there is toxic exposure in environmental incidents. There is also no framework of engagement between NEMA and the Ministry of Health or County Government which is best suited to carry out a health assessment to establish disease injury affecting a population. NEMA only covers environmental concerns but not health concerns making it difficult for victims of pollution to prove causation of their injuries in court.

¹¹⁸ CERCLA provided the congressional mandate to remove or clean up abandoned and inactive hazardous waste sites and to provide federal assistance in toxic emergencies.

¹¹⁹ Agency for Toxic Substances and Disease Registry (ATSDR), Background and Congressional Mandates (5 July 2018) <<https://www.atsdr.cdc.gov/about/congress.html>>.

¹²⁰ ATSDR (n 24) 12; J N Logue, 'Disasters, the Environment and Public Health: Improving our Response' (1996) 86(9) *American Journal of Public Health* 1208.

¹²¹ Data Needs Work Group, *Environmental Data Needed for Public Health Assessment - A Guidance Manual- 1994* (US Department of Health and Human Services 1994) <<https://www.atsdr.cdc.gov/ednpha.html>>.

¹²² ATSDR (n 24) 22.

¹²³ *ibid.*

Conclusion

Kenya lacks an effective environmental incident response mechanism that addresses the health impact of population which exposes vulnerable populations to unmitigated harm. Such is the case in Thange oil spill case. Victims are left to sue and therefore struggle with the challenges of collecting evidence of causation for their injuries. There is need for environmental incidence response mechanisms to incorporate public health processes such as epidemiology studies which help in the assessment of health impact which process consequentially provides evidence of causation for pollution victims.

The public health response processes should be codified into law in order to guarantee protection that is critical for a healthy population. There

should be mandatory collaboration between NEMA and Ministry of Health rather than discretionary with respect to delivering appropriate public health response for pollution incidents.

The courts and legal practitioners need to recognise toxic tort challenges of proving causation in order to appreciate the importance of epidemiology evidence which can help in the collection of such evidence critical for compensation. The legal practitioners can be trained in the discipline of public health law in order to better appreciate interventions that should be placed by state in occasions of disasters that endanger population health.¹²⁴ With a legal framework in place that allows the conduct of public health assessment, environmental incidents can be dealt with effectively to allow collection of evidence of causation and mitigation of damage where early diagnosis and treatment is done.

¹²⁴ Sonia Allan, 'Public Health Law and Public Health Policy' in *International Encyclopedia of Public Health* (2nd edn, Elsevier 2017) 200.

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