

Environmental Public Health in Wales

Annual Review 2013/14

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Service overview, aim and objectives

Environmental public health is the discipline of identifying, assessing and managing risks linked to environmental hazards that can adversely affect individual and population health. Work in this field attempts to prevent or minimise hazardous exposures and impacts and contribute to healthy, fair and sustainable environments.

In Wales, the Environmental Public Health service (i.e. the service dealing with environmental hazards other than those responsible for communicable diseases) is led by Public Health Wales. It is delivered collaboratively through Public Health Wales' Health Protection Team and Public Health England's Centre for Radiation, Chemical and Environmental Hazards Wales. This integrated Team provides partner agencies (such as Health Boards, Welsh Government and local authorities) and the public with independent, specialist and contextualised advice and support. We undertake pro- and re-active work around agreed environmental public health priorities and aim to minimise exposures to, and resulting ill-health from, environmental hazards. Our service model is shown below.

Agreed service objectives help us achieve

our service aim:

- ◆ Taking appropriate, proportionate action to protect population health
- ◆ Developing data collection and analysis methods to inform actions
- ◆ Research and development with academic partners
- ◆ Auditing and acting upon learning points to improve the service
- ◆ Maximising collaboration and communication with partner agencies and the public.

In last year's review, we highlighted service successes and made recommendations to continue to improve our service. Against these recommendations, this review describes how, in addition to our routine responses to incidents and enquiries, we are working proactively to:

- ◆ quantify health burdens from different environmental hazard exposures
- ◆ develop surveillance systems and information/training materials
- ◆ audit service activity and forge stronger working links with other allied agencies and professionals.

Environmental Public Health in Wales: service model



Foreword



It is important to take time to look back at what we have achieved over the past year. Reflection helps inform performance review and development so changes can be made to improve future service delivery. Our Environmental Public Health Team has done just that through this, their second Annual Review.

Environmental public health is an important and growing part of Public Health Wales' work. The achievements reflected upon here demonstrate how the Team continues to deliver timely and appropriate public health advice and support, working collaboratively with different partner agencies, and most importantly, the public. Looking forward, the work priorities proposed show that there is much more still to do in this constantly evolving field. Challenging as they may be, these work priorities will be easier to achieve with such strong foundations to build upon.

I hope you enjoy reading the Annual Review.

Professor Sir Mansel Aylward CB (Chair, Public Health Wales)

As outlined in our Public Health Wales Strategy: *A Healthier, Happier and Fairer Wales*, we are committed to protecting people from infectious and environmental hazards. In light of mounting evidence around the influence of environmental hazard exposures on health, more and more emphasis is now being placed on the importance of managing environmental public health risks.

This Annual Review shows that the work of the Environmental Public Health Team is varied. Much time is spent reacting to community concerns of air, land and water contamination and responding to chemical incidents. As the Team has expanded, capacity has increased and future work priorities can now include proactive projects and research to help us understand more about, and address, the environmental public health burden in Wales.

Based within the Health Protection Division, our Environmental Public Health Team works across the organisation and beyond it with numerous partner agencies and the public. To ensure service integration and consistency, Public Health Wales works closely with Public Health England's Centre for Radiation, Chemicals and Environmental Hazards Wales through a unique collaborative arrangement.

The Team has not been able to capture everything they do in this Annual Review, but we hope you will enjoy reading it and that you find it a meaningful and informative snapshot of the work going on in this area. We know there is much more work to be done and so look forward to reviewing the Team's progress again next year!

Dr Tracey Cooper (Chief Executive, Public Health Wales)

Dr Quentin Sandifer (Executive Director of Public Health Services, Public Health Wales)



The Environmental Public Health service in Wales is an excellent example of collaboration between organisations and across boundaries in the UK. The work described in this report is truly jointly managed between Public Health Wales and CRCE Wales (part of Public Health England, PHE), with each organisation working to its academic strengths. The results and impact are the stronger for it. Mechanisms within PHE ensure that the work is shared in England too.

Dr John Harrison

(Director, Centre for Radiation, Chemicals and Environmental Hazards (CRCE)
Public Health England)

Environmental Public Health service quality

We have developed guidance, principles and procedures to ensure our service is delivered effectively and consistently. Joint operating procedures have been developed to underpin this as well as service standards.

The operating procedures cover many aspects of our service including: receiving and logging of incidents, information sharing, alert and response, establishment of an operations centre and air quality cell in large scale air pollution incidents, planning and environmental permit consultations, teaching and training and data control.

Service standards will enable us to deliver the service against specific targets and audit and measure effectiveness. These standards describe what our partners can expect to receive from the service and the manner in which the service will be delivered. Our performance will be periodically monitored to ensure targets are being met or exceeded, much as we have done through our review of environmental permit and planning application responses (below).

Review of responses to Environmental Permits and Planning Applications

We have undertaken a review of the current service provided to stakeholders with respect to Planning and Environmental Permit applications in Wales. The objectives of the review were to obtain views from stakeholders via a questionnaire to determine whether current service is adding value or not, and depending upon the outcome of this, to review current resource allocations.

To place this work in context, we received 36 planning applications via Health Boards in 2013. Examples included open-cast coal workings, new neighbourhood complexes and waste processing plants. We also received 25 environmental permit applications via Health Boards. Examples included large power plants, waste processing and landfill activities.

The survey sought feedback from two groups: Regulators (local authorities and Natural Resources Wales) and Health Boards. The overall response rate was around 50% (n=4 Health Boards, n=11 local authorities). Generally, there was a strong agreement from stakeholders that we should continue to provide public health impact assessments in respect of both planning and environmental permitting applications. Furthermore, there was appetite amongst stakeholders for the service to be developed by providing more detail on the local health context.



Currently, a number of steps are being taken by us to tailor the collective public health response and to target at which consultation stages public health considerations need to be taken into account, for both planning and permitting regimes.

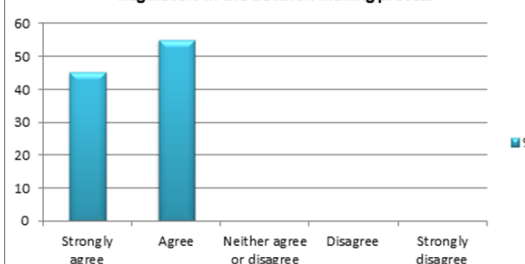
Successes

- ◆ Current service provision is valued by Health Boards and Regulators with a desire to further develop it
- ◆ Joint operating procedure and service standards
- ◆ Working together agreement established

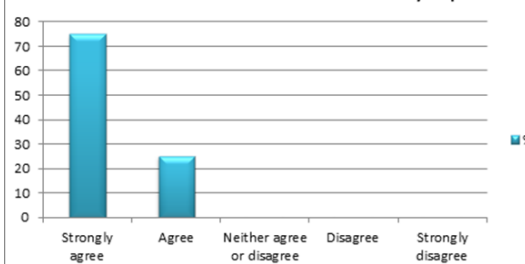
Challenges

- ◆ We continue raising awareness with Regulators over the consultation process and when to engage with Health Boards to maximise value in evaluating public health considerations
- ◆ To develop a working together agreement with Local Authority Planning Departments
- ◆ To develop a way to quantify and evaluate the extent to which the consultation responses influence ultimate decision making

Public Health Consultation Responses are valued by the Regulators in the decision making process



Provision of Public Health Consultation Risk Assessments enable Health Boards to formally respond



Service activity 2013/14

We record and categorise every enquiry, incident, application and consultation received to ensure prompt service delivery, manage work flows and record trends in contact with stakeholders using a joint database. During 2013/14 we received 208 queries, relating to both incidents (50) and enquiries (158) (Graph 1). In 2012 there were 193.

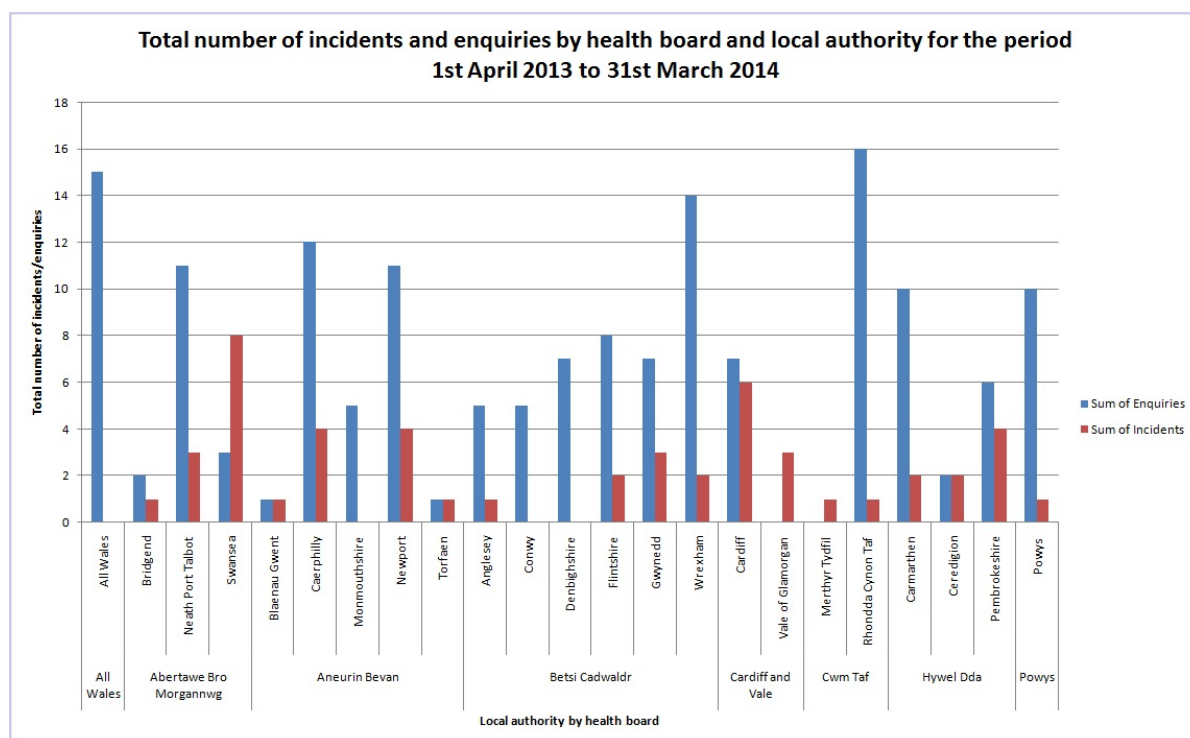
By their very nature the resources required to effectively manage incidents and enquiries is inherently variable. Some require a rapid response (minutes), while others can be prolonged and may require months or years of work.

We are aware of a number of Health Board areas and Local Authorities where no or few incidents or enquiries are received, as a result we working with emergency services and local authorities to ensure incidents with a public health impact are reported and appropriate actions taken to improve health.

Table 1
Enquiries and incidents by Health Board and Local Authority

Health Board	Local Authority	Enquiries	Incidents
Abertawe Bro Morgannwg	Bridgend	2	1
	Neath Port Talbot	11	3
	Swansea	3	8
Aneurin Bevan	Blaenau Gwent	1	1
	Caerphilly	12	4
	Monmouthshire	5	0
	Newport	11	4
	Torfaen	1	1
Betsi Cadwaldr	Anglesey	5	1
	Conwy	5	0
	Denbighshire	7	0
	Flintshire	8	2
	Gwynedd	7	3
	Wrexham	14	2
Cardiff and Vale	Cardiff	7	6
	Vale of Glamorgan	0	3
Cwm Taf	Rhondda Cynon Taf	16	1
	Merthyr Tydfil	0	1
Hywel Dda	Carmarthen	10	2
	Ceredigion	2	2
	Pembrokeshire	6	4
Powys	Powys	10	1
All Wales (no specific location)		15	0
		158	50

Graph 1



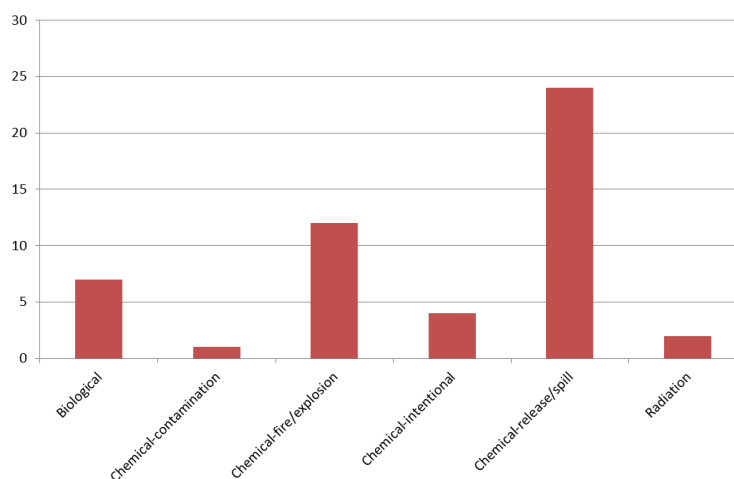
Service activity (continued)

We recorded 50 incidents in 2013/14, down from 59 in 2012/13. Out of the 12 fire and explosion incidents recorded, seven occurred at waste management sites, with the fires in Cardiff and the Vale requiring a significant public health response with multi-agency partners.

The majority (six) of biological incidents refer to chemical toxin-producing blue-green algae recreational water incidents.

The largest number of incidents reported for any local authority area is within Swansea, with eight incidents. Of these, three were classified as releases/spills and three as fire/explosion, on detailed review incidents have no commonality, but likely reflect a close working relationship between public health and the local authority.

Incidents by type
1st April 2013 to 31st March 2014

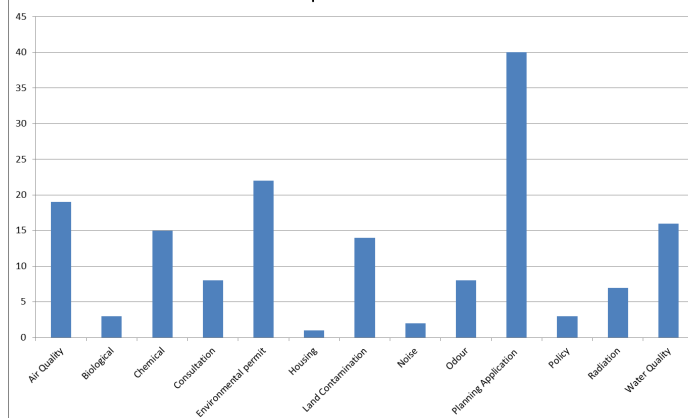


Graph 2
Incidents by type

Table 2
Incidents by type

Incident Type	Total
Biological	7
Chemical-contamination	1
Chemical-fire/explosion	12
Chemical-intentional	4
Chemical-release/spill	24
Radiation	2
	50

Total number of enquiries by type
1st April 2013 to 31st March 2014



Graph 3
Total number of enquiries by type.

Table 3
Incidents by type

Type of Enquiry	Total
Air quality	19
Biological	3
Chemical	15
Consultation	8
Environmental permit	22
Housing	1
Land contamination	14
Noise	2
Odour	8
Planning Application	40
Policy	3
Radiation	7
Water quality	16
	158

In 2013, 63 planning and permitting applications/consultations were received, 39% of all enquiries. This compares similarly to activity in 2012 with 60 planning and permitting enquiries. The majority (14) of water quality enquiries were with regard to Private Water Supplies not meeting standards set out in the Private Water Supplies (Wales) Regulations 2010. The remaining 2 enquiries were for the mains supply. Of the 7 radiation enquiries received, 5 detailed concerns over potential exposure to electro-magnetic radiation and the remaining 2 radon exposure and advice.

Case study: fires at waste management facilities - a growing cause for concern?

Over 17 million tonnes of waste are produced in Wales each year. Welsh Government policy is to become a “high recycling nation” by 2025 and a zero waste nation by 2050. Working towards achieving this goal has increased waste sorting, treatment and storage compared to traditional incineration and land-filling activity.

When fires occur at waste treatment sites they require a significant multi-agency response due to the often prolonged duration and variety of waste present. The public health role is to assess and control exposure to emissions.

In November 2013, two separate mixed waste fires occurred at waste management facilities located in Llandow in the Vale of Glamorgan. Wastes included large volumes of baled plastic and parts of the building fabric. Several businesses adjoined the sites including an LPG storage facility, go-cart track and caravan park, plus isolated homes within 500m.



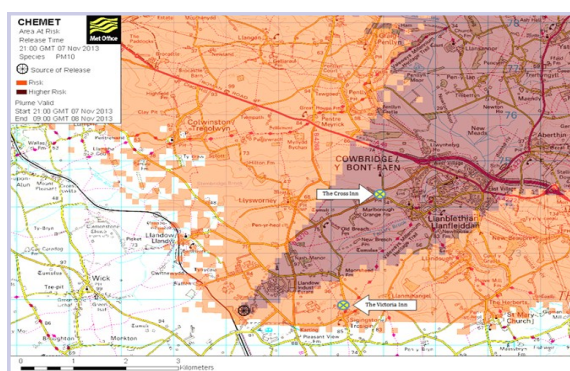
Such incidents produce airborne plumes which contain products of combustion including particulate matter and volatile organic compounds. They may also result in odours. Symptoms of those exposed to the smoke can include coughing and wheezing, breathlessness, sputum (phlegm) production and chest pain. People with asthma and other respiratory conditions may be more susceptible to exposure.

During the initial phase of the incidents, the temperature of the fire and the meteorological conditions allowed the smoke to rise reducing exposure to local residents.

As the fires cooled, the resultant grounding plumes caused sufficient public health concern to warrant public health agencies and Natural Resources Wales (NRW) agreeing to convene an Air Quality Cell (AQC) and deploy monitoring equipment to assess impacts on local air quality.

Smoke constituents, including particulate matter, nitrogen dioxide, sulphur dioxide, carbon monoxide and acrolein were monitored. Elevated levels of particulate matter were identified and advice to shelter was issued to the public to minimise exposure to the plume.

Using the Met Office CHEMET plume dispersion forecast service and the AQC data, respite and shelter periods for local residents and businesses were identified.



The AQC stood for 5 days (during both fires) and provided regular updates to multi-agency Silver groups led by the local authority.

There have been a number of similar large scale incidents in England and Wales recently, resulting in Air Quality Cells being established due to their duration and potential public health impacts.

These fires were the first test of the Wales AQC Working Together Agreement produced by ourselves and NRW and led to a successful implementation of the AQC and associated monitoring. A full debrief following both fires and the outcomes have been used to review and improve operational practice during air quality incidents.

We are analysing this and other incident debriefs. Our aim is to generate an evidence base to inform and improve responders' decision-making and practice. Evidence sought includes whether there are typical emissions from certain waste materials, if and when air quality monitoring is required and whether sheltering or evacuation is the default option.

The review intends to identify any common circumstances in which incidents occur. In turn, this information can be used in future policy making, permitting regimes and guidance. Ultimately our aim is to reduce/avoid such incidents and their impacts.

Environmental public health surveillance

In 2012, we undertook a review of surveillance in Wales. It was recognised that while a range of environmental hazard, exposure and health outcome information is routinely collected and recorded across many agencies there is currently no single integrated system able to link data in such a way that it informs collaborative action to tackle hazards and minimises associated health outcomes.

This review identified that environmental public health surveillance was a development priority. Over the last year, a working group in Wales has been examining the feasibility of developing environmental public health surveillance in Wales. The aim is to develop a comprehensive environmental public health surveillance system capable of systematically collecting, integrating and analysing data on environmental hazards and health effects. The complexity in developing such a system is challenging and will require collaboration at local, regional and national levels between health and other agencies.

Data will need to be shared and integrated in a standardised manner and communicated in a timely way. The overall aim is to develop one hub or portal for environmental and health data resources capable of providing web based information, dissemination and visualisation tools (maps, tables etc) to make environmental public health data timely, accessible and useful for health and other professionals, researchers and the general public.

Some data collation already takes place in Wales within specific topic areas and within specific research groups, such as air pollution and asthma, but the aim is to develop a system capable of linking data on an ongoing, sustainable basis.

As a first step, a number of proof of concept studies have been initiated focusing on disease relationships, hazards, exposure, interventions and outcomes. These studies will help identify existing datasets that could be linked within a wider environmental public health surveillance system and constitute an important first strategic step to identify the key elements of an environmental public health surveillance system and provide a foundation upon which to build. These studies will examine:

1. The accessibility and completeness of available data sets from different organisations
2. The benefits of being able to access and display these data sets in one access point
3. The availability and effectiveness of current IT platforms for data collection, display and analysis
4. Issues around data sharing and dissemination

5. Options for disseminating and communicating results
6. The resources necessary (both financial and human) required to implement and maintain the system

Two proof of concept studies on carbon monoxide and chemical incident surveillance have been initiated.

Case study: childhood lead exposure in South Wales

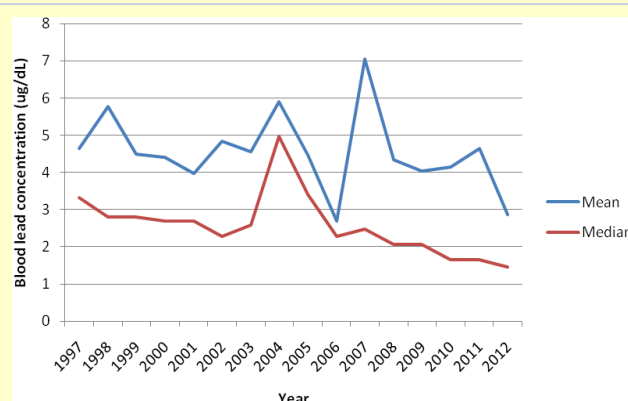
We have been exploring the health impacts of environmental lead exposure amongst children in South Wales. This is an important issue given the more stringent blood lead level ($5\mu\text{g}/\text{dL}$) for children aged 1 to 5 years.

An initial review of blood test result data (from the Medical Biochemistry and Immunology Department at the University Hospital of Wales, Cardiff) showed that blood lead levels in children (that had received a blood test) have fallen over the past 15 years. Given the small sample size, this may not be representative of all children in Wales.

Over the 15-year period, the mean blood lead level was $4.4\mu\text{g}/\text{dL}$ (median= $2.1\mu\text{g}/\text{dL}$). Environmental lead exposure remains a persistent public health problem for this vulnerable population group.

Interestingly, the number of blood lead tests performed each year appears to be increasing.

Although our findings may not be representative of the scenario for all children in Wales (data comprised sample results from ill or believed to be exposed children in parts of South Wales), they have prompted us to consider establishing a more formal and routine data sharing arrangement with laboratories with a view to link data and learn more about relationships between lead hazards, exposure, uptake and health impact.



Mean and median blood lead concentration trends, 1997 to 2012

Carbon monoxide in Wales

A **Carbon Monoxide (CO) in Wales Working Group** has been established with representatives from industry, emergency services, Health and Safety Executive, Health Boards, Local Authorities, Welsh Government and the Royal Society for the Prevention of Accidents.



The group links into a UK-wide carbon monoxide network via Policy Connect and the UK cross government group on gas safety and CO awareness.

The group aims to:

- ◆ Co-ordinate action, to prevent CO exposures,
- ◆ Improve the response to CO incidents
- ◆ Improve information sharing and incident/impact surveillance.

Over the next year, the group will contribute to:

- ◆ a CO summer safety campaign in conjunction with the Gas Safety Register's UK wide campaign
- ◆ a CO awareness campaign targeting students and private landlords
- ◆ raising awareness around CO impacts with health professionals to help improve diagnosis and early

intervention

- ◆ production of information packs for local authorities and others.

A CO subgroup has been established to map agency incident response roles and responsibilities and improve response.

We are also developing a Wales-wide CO impacts surveillance system to help inform our understanding of the epidemiological burden of CO and facilitate targeted interventions by identification of priority areas for action.

Annual analysis of the epidemiology of CO incidents in Wales will be incorporated into future Environmental Public Health annual reviews and fed into a range of multi agency groups including the CO in Wales Working Group and Welsh Government's Health Protection Committee.

The identification of any inequalities in the burden of CO impacts in Wales may lead to a focusing of preventative interventions towards at risk groups. The surveillance system will also facilitate the evaluation of such targeted interventions. The identification of inequalities may also be used as the focus of CO Awareness Week communications, each November.

Symptoms of carbon monoxide (CO) poisoning are vague:

These symptoms dissipate quickly when exposure ceases and are often difficult to distinguish from other causes of illness.



Global Health Security Action Group's Early Alerting and Reporting System

As part of its remit, the WHO Collaborating Centre (CC) (housed within PHE CRCE) provides timely support and expert advice on the public health consequences of chemical emergencies including acute chemical incidents. In addition, the WHO CC contributes to emergency preparedness through the development of guidance, principles and procedures for the public health management of acute chemical incidents. This includes advising on timely recognition and notification of chemical incidents.

The WHO CC is investigating methodologies for the establishment of early detection, alert and follow up mechanisms for surveillance of acute chemical incidents and help identify the location, frequency and nature of incidents, highlight gaps in public health knowledge and provide a basis for enhancing planning and preparedness.

The Early Alerting and Reporting (EAR) system is a single web-based platform that enables partners to access health threats identified from open source web-based public health intelligence systems, as well as to combine risk assessment processes. It incorporates an internet worm that searches the internet to detect information potentially relevant for epidemic intelligence.

A six week pilot study was undertaken using a predefined definition of a chemical incident to identify incidents that had an adverse impact on public health. Over 5,000 media articles were identified by the system with key words related to pre-defined chemicals (i.e. most commonly reported chemicals). Nearly 200 of these articles matched the working definition and related to both large and small scale incidents reported worldwide.

International Health Regulations

We are currently developing e-learning materials on the chemical aspects of International Health Regulations (IHR) which will use scenarios to illustrate various aspects of chemical incidents that need assessment under IHR. Our aim is to develop scenarios to help demonstrate how you risk assess chemical incidents using IHR core criteria: identify key local, national and international partners and highlight technical needs such as surveillance systems and laboratory capacity.

The scenarios will focus on the need to engage with the non-health sector such as environmental regulators, environmental protection agencies, local authorities, industry etc. We feel that this is particularly important as partner agencies may be managing chemical type incidents at a local level and may not understand how this fits into IHR and how to engage health partners to assess whether an incident is a potential international concern.

In order to develop the e-learning materials, we have reviewed data held at WHO CC and within Public Health England. This has included review of all IHR alerts from our National Focal Point over the last 2 years of data. As the number of actual IHR alerts we have received over this period is very low (<10) we have widened our review to include a broader range of events and incidents to identify those that were (or should have been) risk assessed under IHR but perhaps did not meet more than one criterion. This has included reviewing data in the EAR system which is also currently being assessed under the Clearing House Pilot and discussed with partners including Health Canada.



Air quality update



An air quality monitoring station

“Air pollution is estimated to reduce the life expectancy of every person in the UK by an average of 7-8 months. The impacts may be even more significant amongst the most vulnerable people living in pollution ‘hotspots’ in areas of low socioeconomic status”

House of Commons Environmental Audit Committee (2011): <http://www.publications.parliament.uk/pa/cm200910/cmselect/cmenvaud/229/22902.htm>

“The UK economic cost from air pollution impacts is estimated at £9-19 billion per year, comparable to the cost of obesity”

Institute of Occupational Medicine (IOM) (2006). *Comparing estimated risks for air pollution with risks for other health effects*. Accessed: http://www.iom-world.org/pubs/IOM_0601.pdf on 27th Mar 2014.

Clean air is an essential ingredient for a healthy life. It is well accepted that air pollution is *the* most influential environmental determinant of health.

Whilst air quality across the UK has, on the whole, improved over recent decades, problems persist at the local level and can pose increased health risks (Public Health England, 2014). This is confirmed by the designation of 38 *Air Quality Management Areas* in Wales.

Generally, air pollution exposure is more likely to affect vulnerable groups including children, older people and those with pre-existing medical conditions such as asthma. Spatial variations in air pollution exist and can further create a disproportionate disease burden both *between* and *within* communities. The ‘triple jeopardy’ of low socioeconomic status, pollution and pre-existing impaired health (and thus increased susceptibility) may exacerbate these problems.

A recently published report stated that, in Wales in 2010, around 1,320 deaths could be attributed to long-term exposure to fine particles (PM_{2.5}) inhaled deep into the lungs (Public Health England, 2014).

Across Wales, for the same year, the proportion of deaths estimated to be due to long-term exposure to fine particulates ranged from 3.1% to 5.4%. The highest estimates were in urban areas such as Cardiff and Newport and the lowest in more rural areas such as Gwynedd and Ceredigion. In Wales 13,549 years of life were lost due to exposure to air pollution in 2010.

Since the age-distribution of the population is an important factor in deriving impact estimates, the number of deaths attributable to air pollution exposure will be lower in areas with a younger population. As such, these estimates must be interpreted with caution.

Public Health England (2014). *Estimating local mortality*

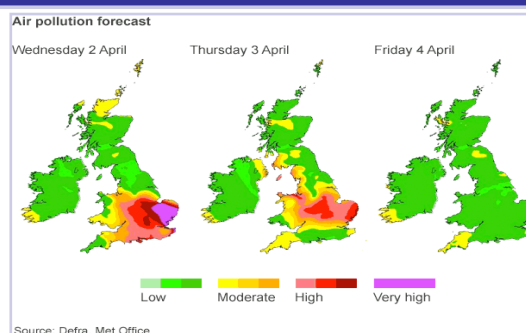
Public Health Wales research to enhance the Local Air Quality Management regime

Research is being undertaken to determine the scope of air quality and health problems in Wales and improve the public health effectiveness of the Local Air Quality Management (LAQM) regime. This work will:

- ◆ Assess the local health burden of air pollution in Wales and determine the need for effective LAQM policy and practice;
- ◆ Evaluate the public health effectiveness of the existing LAQM process in Wales at reducing this health burden;
- ◆ Review LAQM-related policy and practice in Wales to identify how each can be enhanced to improve public health engagement, consideration, action and impact;
- ◆ Develop an enhanced, evidence-based and public health-focused LAQM model.

Case study: air pollution episode

In March/April 2014, we proactively issued advice in response to forecasts of raised air pollution levels due to a combination of local emissions and Saharan desert sand. The advice was shared with Welsh Government, NHS Wales partners and local authorities. Web pages were updated. The BBC and other media used the same advice to raise the profile of this issue and communicated general actions to take to reduce the likelihood of adverse health impacts from exposure to fine airborne dust.



Land contamination

During 2013/14, we continued to provide advice on the public health implications associated with land contamination, with support given to a range of stakeholders including Welsh Government, local authorities, local health practitioners and the public.

Seven new enquiries were received during the reporting period comprising :

- ◆ three risk assessments, relating to historical contamination,
- ◆ two, for planning and development, and
- ◆ Two, for health effects from soil contamination.

Advice ranged from risk assessment, toxicology, risk communication and public health interventions (e.g. washing locally grown produce etc).

We provided strategic advice to Welsh Government, including the development and use of new Category 4 Screening Levels (CRCE Wales formed part of the DEFRA steering group) and assistance in developing future land contamination strategic plans via national consultation.

We attend a number of multi-agency contaminated land groups including the Wales Local Authority Contaminated Land Working Group and the Welsh Government Steering Group.



We are committed to providing clear advice and guidance on contaminated land and other hazards. For example, we have co-authored and co-edited a book aimed at local authority and public health professionals on the Essentials of Environmental Public Health Science.

This includes a chapter on contaminated land which provides an overview of the current UK contaminated land regime, details on soil contaminants and routes of exposure, contaminated land risk assessment, remediation and risk communications good practice. It combines current information and status of key areas including legislation, roles and responsibilities, toxicology and health effects and describes how these are applied throughout the assessment and remediation processes by means of relevant UK case studies.

Case study: lead contaminated soil

Lead in soil can be a major source of exposure to lead and remains a significant public health issue

Lead can be toxic via ingestion and inhalation with adverse effects on cognitive and neurological development (particularly in the young) as well as potential impacts on renal function and hypertension.



During 2013, a North Wales local authority commissioned investigation of a housing estate under Part 2a of the Environmental Protection Act 1990. The site was a former lead smelting works and results

identified elevated concentrations of lead in soil and a range of other contaminants

We provided a critical appraisal of the risk assessment undertaken, giving advice on current toxicological opinion for lead as well as guidance with regard to interpretation of data and potential risks to public health. Seventeen properties were subsequently determined as contaminated land in respect of posing significant risk of significant harm to health and will undergo remedial measures. In order to communicate clearly with local residents, we arranged for opportunities for local people to speak to us on a one-to-one basis.

Land contamination can be an emotive issue when it directly affects residences. We helped the local authority develop a series of frequently asked questions and explanatory information for residents and GPs. Further, we provided a service for residents to contact us directly should they require one-to-one advice based on their personal circumstances.

Drinking water contamination

Our service provides specialist advice on chemical hazards, often as part of multi-agency incident teams. Advice covers potable supplies, ground and surface waters, waste water, flood water as well as coastal and marine waters.

We regularly provide advice on public health impacts arising from water contamination including private water supplies and water pollution incidents. Last year, we contributed to national consultations around drinking water including the Water Strategy for Wales. We also support the Wales Water Health Partnership.

During 2013/14 enquiries received included requests for advice on chemical failures in private water supplies, blue green algae and unknown substances washed up on shorelines.

In all cases, we were able to help resolve issues and support those dealing directly with public concerns by undertaking dynamic risk assessments and communicating risks identified in an appropriate manner.



Case study: commercial company using contaminated private water supply



In January 2014, we were notified of a failure of a private water supply at a commercial premises producing food stuffs, for a range of major retailers.

The supply had failed to meet the regulatory standard for Trichloroethylene, a toxic liquid solvent and probable human carcinogen. The supply was used both by staff at the facility and in the food production processes.

As part of a multiagency Incident Management Team, we advised about the public health risks from use of the supply for consumption and, with the Food Standards Agency (FSA), risks associated with potentially contaminated food products.

Support was also given in identifying the cause of the contamination and options for remediation.

Key actions from the multiagency advice involved ensuring workers used an alternative supply for consumption and halting production using the supply until a suitable treatment had been installed and resulting water quality verified. Advice was also issued to the Local Authority in order to respond to any public or media enquiries in relation to potentially affected products.

International research and development: maritime pollution events

We have developed international guidance and tools to aid the public health response to maritime events. This work has been undertaken through the EU funded ARCOPOL (Atlantic Region Coastal Pollution Response) programme. Our aim is to enhance preparedness, response and mitigation capabilities of local responders to shoreline pollution incidents.

This has helped improve preparedness across Wales for such events, created opportunities for international collaboration and has helped establish the team as a centre of expertise in this area. As a result, local responders in Wales are better prepared to deal with such events.

Such opportunities enable our organisations to build on international collaborations, access developments in response techniques, raise the profile of the work undertaken in Wales and the benefits in respect of public health.

We have published a peer reviewed paper in a special edition of *Environment International* explaining the development of a risk prioritisation tool for maritime pollution events.

In addition, we continue to provide public health advice to Wales Environment Groups and response in the event of maritime incidents, as illustrated below.

Year	Incident/ activity	Actions
2014	Exercise	NRW Maritime event— presentation and assistance to facilitate desk top exercise
2013/ 14	Management	Participated and presented at Bristol Channel SEG and National Environment Group
2013	Incident	Unknown chemicals S Wales coastline - Chemical and public health advice to local authorities re: chemicals washing ashore subsequently identified as vegetable oils
2013 / 14	Arcopol Platform	On-going EU research programme for shoreline response to maritime incidents.

Case study: a toolkit for Maritime Incident Response

We organised a two-day conference with support from Pembroke Council and the International Training Centre (comprising WHO CC and Cardiff Metropolitan University), as part of the ARCOPOL plus project.

The conference comprised five themed sessions including planning and preparedness, risk communication, incident response and recovery.

Presentations and workshops by a range of leading UK and international speakers covered current ARCOPOL outputs by partners from UK and Europe. Almost 100 delegates attended from a range of organisations.

A series of workshop sessions ran concurrently during the 2 day conference, highlighting the outputs of the ARCOPOL project including guidance, training and reference materials developed for shoreline



response, as well as state of the art tools for risk prioritisation, contaminant modelling, image capture and data interpretation.

Outputs highlighted

- ◆ the importance of acknowledging public health implications of a maritime spill
- ◆ the need for contingency planning to respond to both chemical and oil spills
- ◆ demonstrating how ARCOPOL including CRCE Wales and Public Health Wales continues to strengthen EU preparedness and response to such incidents.



Conference papers/presentations available through the Arcopolplus website - www.arcopol.eu

Case study: ARCOPOL e-learning course on Shoreline Response

E-learning is fast becoming a preferred method of vocational training, offering low cost, easily accessible resources, capable of being completed in relatively short time periods.

We have been active in developing training resources using these approaches to enhance preparedness and resilience.

As part of an on-going European project called ARCOPOL (Atlantic Region Coastal Pollution Response) we have produced a series of E-learning modules designed to train responders in key public health aspects of maritime incidents.

The ARCOPOL course has been developed on a modular basis encompassing:

- ◆ **Introduction to chemicals carried by sea**—providing information on maritime transport, chemical classifications labelling and
- ◆ **Hazard and risk**—introducing concepts of hazard and risk and their application to maritime transport and shoreline incidents.
- ◆ **Incident Planning and Preparedness**—defining the essentials of planning, response structures, alerting mechanisms, training and exercises.
- ◆ **Response and Recovery**—giving details of at-sea and shoreline response techniques, risk

communication and stakeholder engagement, remediation and restoration

- ◆ **Waste Management**—outlining concepts of waste management, management techniques and specific issues for maritime incidents.

The course uses materials developed by us including:

- ◆ Risk Prioritisation Tools
- ◆ Risk Communication Strategies
- ◆ Stakeholder Engagement procedures
- ◆ FAQs and Recovery Handbook tools
- ◆ Multiple choice quizzes assess users understanding and allow progression through units.

The course is aimed at responders and supervisors whilst an overview course has also been produced aimed at students, community groups and those with a general interest in maritime / industrial incident management. This course links closely with already-established chemical incident e-learning modules developed through the International Training Centre.

The course has been trialled by Local Authority and Environment Group members with positive feedback and is freely available via :

<http://moodle.uwic.ac.uk>

The image displays four screenshots of the ARCOPOL e-learning course interface. The top-left screenshot shows the 'Unit 2 - Hazard and Risk' title screen with a 'CLICK TO BEGIN' button. The top-right screenshot shows a 'Risk Assessment - Source Pathway Receptor' diagram. The bottom-left screenshot shows a multiple-choice quiz question: 'Which of the following are correct - A hazard...'. The bottom-right screenshot shows a person sitting at a desk using a computer to access the course.

Go to <http://moodle.uwic.ac.uk> On the right hand side of screen click **School of Health Sciences** under Course Categories., select **ARCOPOL+ Maritime Shoreline Incident Response** Login as a Guest found bottom of screen.

Health impacts of wind turbine noise

With more and more wind turbines being sited in Wales, there is a need to consider the associated public health implications. Despite reports from Local Authorities that wind turbines are generally compliant with current guidelines, noise related complaints from residents living near turbines continue to be received.

In September 2013, we undertook a literature review around wind turbine generated noise and health effects, to develop more informed and consistent responses to complainants and regulatory agencies, as well as developing a position statement.

Many different areas of turbine related annoyance were identified, but a direct relationship between turbine generated noise and health was not established.

The main findings of the review were:

- ◆ The audible impact of turbines is greatly influenced by background noise, with well designed turbines being relatively quiet compared to most road traffic noise.
- ◆ Messages communicated about impact of turbines on health can influence public understanding and perception. Information should therefore be appropriate, proportionate and based on available evidence.
- ◆ Some people living near turbines reported sleeplessness and stress. Stress, tension and irritation can be linked with the perception of there being a noise, rather than noise itself.
- ◆ Visual dissatisfaction with turbines can influence people's perception of noise.



Photo: courtesy of Mark Paduch, Glyneath

Position statement

We have reviewed the evidence on wind turbine-generated noise and health.

This review identified no evidence to suggest that noise from wind turbines has a direct physiological impact on health. Characteristics of turbine generated noise vary, with amplitude modulation and low frequency noise being key aspects of associated complaints.

Perception of adverse health impacts associated with wind turbines may be influenced by turbine appearance, concern about their effect on local environments and personal and economic factors. We acknowledge that annoyance from wind turbine operation may cause stress and anxiety which can, in

turn, affect quality of life. It should be noted that noise can affect different people and communities in different ways.

The majority of evidence reviewed came from studies undertaken outside the UK.

Evidence pointed strongly toward the visual impact of turbines as a modifying factor in annoyance. The concept of 'annoyance' is complex, subjective and difficult to impartially measure.

Public Health Wales will continue to work with local authorities (as regulators of turbine generated noise) and others, including the public, to understand and, where possible, minimise local population health concerns associated with wind turbine noise.

This statement will be reviewed periodically to reflect the evolving evidence base in this area.

Injuries

In 2013, we contributed to the production of four short interim Wales Burden of Injury reports. These covered falls, road traffic crashes (RTCs), assaults and poisonings and provided detail on trends in injuries for 2009, 2011 and 2012, including breakdowns by age, sex, deprivation fifth, by health board and by local authority.

Future direction

Late 2014 will see the next full report which will also include an update to the original evidence review. It is also hoped that more information will be available on current injury prevention activity in Wales.

Globally, injuries are the leading cause of death amongst 1 to 45 year olds.

They are an important cause of death and disability amongst all other age groups.

Many injuries have causes that are linked to environmental factors.



Case Study: Parents Pledge

In conjunction with Children in Wales and Caerphilly Local Authority Sure Start team, we have been delivering and evaluating the "Parent's Pledge" scheme.

This scheme aims to educate parents about the dangers of hot drinks scalds and confine hot drinks to designated areas of coffee mornings, playgroups and homes.

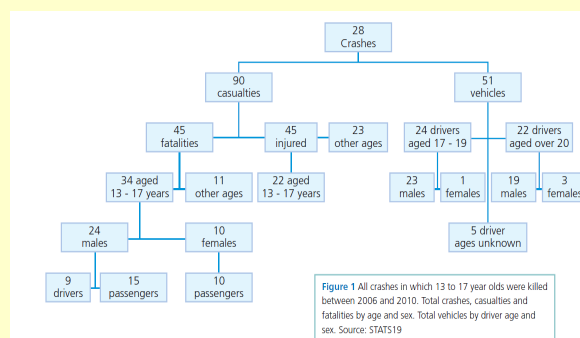
Case study: review of the deaths of 13 to 17 year olds in motor vehicles

In conjunction with the Public Health Wales Child Death Review Programme, we undertook a thematic review of the deaths of 13 to 17 year olds in motor vehicles. The review aimed to identify modifiable risk factors and suitable interventions for reducing the burden of 13 to 17 year old road traffic casualties on health and health services. The review found that (see Fig. 1):

- ◆ 34 (aged 13-17) died in motor vehicles in Wales (01/01/06-31/12/10), many driven by 17-19 year olds
- ◆ the 34 were killed in 28 crashes
- ◆ 19 of the 28 crashes occurred between 9pm and 6am
- ◆ 17 of 28 crashes were on 'A' roads and
- ◆ 19 of 28 crashes occurred in fine weather
- ◆ 11 of 14 rear seat passengers who died were not wearing seat belts.

A series of recommendations of the review were made:

- ◆ the need to improve partnership working, particularly between Public Health and the Emergency Services,
- ◆ regular, formal national review of deaths in road traffic crashes for all ages and all crash types, and
- ◆ the need for the implementation of evidence based interventions such as Graduated Driver Licensing.



Emerging issue: shale gas extraction

Shale gas is a natural gas (typically methane) found in a commonly occurring, fine grained sedimentary rock known as shale. To extract shale gas, the usual approach involves the drilling of a vertical borehole to the shale rock which can be deep underground. Horizontal drilling of the rock then takes place to target potential reserves of gas. These drillings can extend for thousands of metres from the original borehole.

Typically, water is then pumped into the rock at high pressure to create small fractures or cracks in the shale. These fractures allow the gas to escape from the shale and flow into the well bore where it is carried back to the surface for capture and processing. Once the fractures are created, small particles, typically grains of sand, are used to keep the fractures open (called proppants or propping agents). Chemicals are often added to the water to improve the efficiency of the fracturing process and these include friction reducers, surfactants, gelling agents, scale inhibitors, acids, corrosion inhibitors, antibacterial agents and clay stabilisers. This mixture is termed hydraulic fracturing fluid and the process, often called 'fracking' can involve the use of large quantities of this fluid.

Shale gas extraction is at an early exploratory stage in the UK. Despite limited activity to date, shale gas extraction is a highly emotive issue. Well publicised reports from other countries, most notably the United States, suggest that 'fracking' has the potential to adversely impact the environment and human health.

We, together with colleagues in Public Health England (PHE), have examined the evidence and co-authored a review of the public health impacts of shale gas extraction. This review focuses on the potential public health impacts of exposures to chemical and radiological pollutants and will help support risk assessment should applications to extract shale gas be made in Wales.

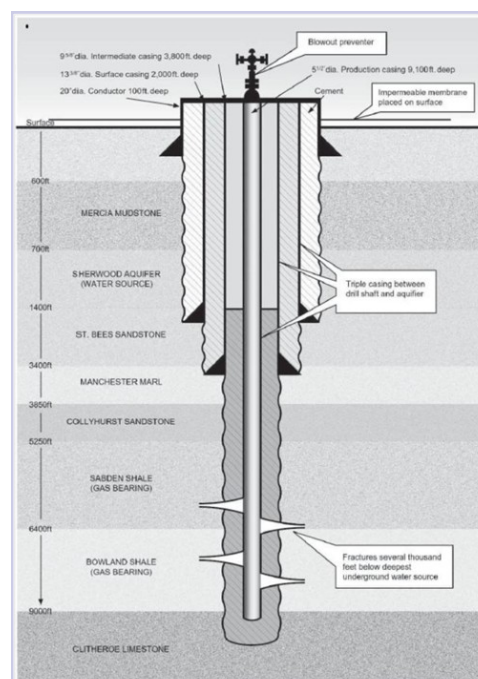
The review concludes that the potential risks to public health from shale gas extraction are low if operations are properly run and regulated. Where potential risks have been identified, problems are typically a result of operational failure and a poor regulatory environment. Good on-site management and appropriate regulation of all aspects including exploratory drilling, gas capture, use and storage of hydraulic fracturing fluid, and post operations decommissioning are essential to minimise the risk to the environment and public health. The review recommends: baseline monitoring, regulation of potential cumulative impacts from many wells within a given area, and the need ensure appropriate decommissioning of wells, to protect public health.

In response to PHE's report, we have prepared a position statement on shale gas which outlines the position in Wales. This statement concurs with the findings on PHE and supports the need for good on-site management and appropriate transparent regulation of all aspects of shale gas extraction.

Shale gas wells, whether for exploration or commercial production, require planning permission at each phase from the Local Planning Authority who will assess whether they are likely to have any significant effects on the environment and local community. In Wales, Health Boards are expected to be consulted on any application for shale gas extraction and Public Health Wales will work collaboratively with Public Health England (on behalf of Health Boards in Wales) to provide a response to related consultations.

We will also support Welsh Government, Health Boards, regulators and members of the public by responding to requests to assess the impact of shale gas activities on a case by case basis. We will provide support and advice to those agencies involved in other aspects of shale gas regulations such as the Health and Safety Executive (well development and integrity) and Local Authorities (local air quality management).

Tools such as health impact assessment and strategic environmental assessment are important to fully assess the public health impacts of shale gas extraction and we will work with others in Wales to consider how such tools can be effectively used to help risk assess activities such as shale gas.



Forward look 2014/15

2014-15 promises to be a busy year.

NATO summit



In September South Wales is hosting the NATO summit on the 4th and 5th September. We are working with emergency planning and health colleagues to plan and prepare for the summit and will be providing 24 hour response during the event. During the event staff will be supporting NATO Gold Command, Senior Management Team meetings and local and national Incident Coordinating Centres.

Business planning

Both Public Health Wales and CRCE Wales are currently developing strategic business plans for the next 3 years. The plans will set out our priorities which will drive our integrated work programme, both strategically and operationally. These strategic programmes will help deliver our work across Wales and with our key partners in Health Boards, Welsh Government, Public Health England, World Health Organisation, National Poisons Information Service, Natural Resources Wales and Local Authorities and also with academic partners.

Air quality



In addition to ongoing research to describe the health burden of air quality at the local level and improve the integration of public health in the Local Air Quality Management regime, other air quality work will be undertaken. The air alert system, AirAware, will be reporting its findings during 2014-15. The system aims to alert people at times of poor air quality enabling vulnerable residents, such as those with heart or lung problems, to proactively manage their health. The system monitors real-time levels of particulate matter and ozone to forecast potential breaches of health based standards. The study is funded by the European Social Fund and will be evaluated in terms of reductions in medical interventions with consideration for application across all of Wales. <http://www.airaware.co.uk/>

Radon in schools

In 2014/15, we will be supporting the delivery of the Welsh Government Radon in Schools programme in Wales by undertaking work to risk prioritise the potential impact of radon in all schools in Wales and developing public health information materials and providing advice.

Multi-agency environmental incident training

As outlined in the new *Managing public risks from environmental incidents* guidance, we will be establishing a rolling programme of training events for environmental and public health specialists (from Public Health, Health Boards, Local Authorities, Natural Resources Wales and emergency services) that will aim to cover a broad range of incident planning and management topics.

Private water supplies

We will also be assessing the public health impact of contaminated private drinking water supplies in Wales by: mapping the number and nature of private drinking water supplies in Wales, reviewing patterns and trends in drinking water measurements in Wales and developing a methodology for providing evidence of the health burden of contaminated drinking water.

Environmental Public Health in Wales: meet the Team

The Wales Environmental Public Health service is delivered through a small team in Public Health Wales:



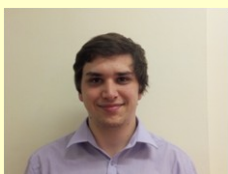
Huw Brunt
Lead Consultant in Environmental Health Protection, Public Health Wales



Dr Sarah Jones
Consultant in Environmental Health Protection, Public Health Wales



Kristian James
Principal Environmental Public Health Specialist, Public Health Wales



Daniel Rixon
Emergency Response Support Officer, Public Health Wales

(all team members employed by Public Health Wales work in the Health Protection Division and are based at the Temple of Peace and Health, Cardiff).

And Public Health England CRCE-Wales:



Prof David Russell
Unit Head, Public Health England CRCE-Wales



Andrew Kibble
Operations Manager,
Public Health Wales and Public Health England CRCE-Wales



Ed Huckle
Senior Environmental Public Health Scientist, Public Health England CRCE-Wales



Paul Callow
Environmental Public Health Scientist, Public Health England CRCE-Wales



Paul Harold
Environmental Public Health Scientist, Public Health England CRCE-Wales

Further support is provided by epidemiology, toxicology and other experts from across both organisations, and beyond, as appropriate.

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