

Yorkshire & Humber modular health protection course

Emergency planning and managing environmental/chemical and radiological incidents

Session aims & learning objectives

Session aims

- Provide an overview of acute environmental, chemical and radiological hazards and incidents, multi-agency and public health preparedness, and incident management

Learning objectives

- Describe the main acute environmental hazards to public health (encompassing chemical and radiological exposures and natural hazards)
- Understand emergency preparedness and response arrangements for different acute environmental hazards and public health professionals' roles
- Identify relevant sources of information and contact points for different acute environmental hazards

What environmental hazards to public health can you think of?



Acute environmental hazards to public health

Mentimeter



Chemical hazards

- Chemical releases and fires
- Chemicals in consumer products and the natural environment



Natural hazards

- Extreme weather and consequential hazards (heat, cold, wind, flooding, wildfires)
- Volcanic activity

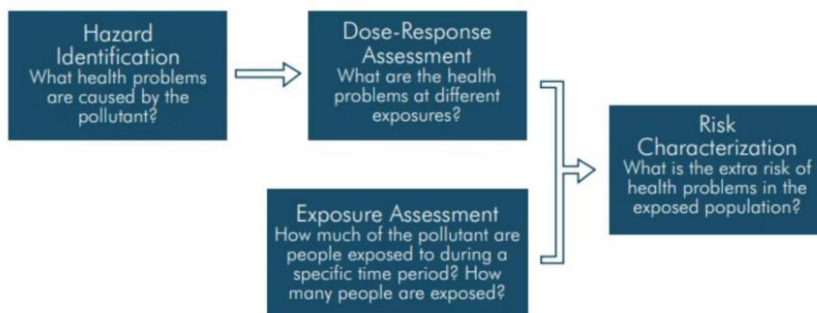


Radiological hazards

- Radiological releases
- Radionuclides in consumer products and the natural environment

Chemical and radiological health risk assessment

Mentimeter



* Text and figure adapted from the US Environmental Protection Agency (<http://www.epa.gov/risk/health-risk.htm>).

Chemical and radiological health risk assessment

Mentimeter

- The principles and process in incident response is universal
 - Seek information. Evaluate links between sources and receptors (people). Consider interventions



Department	Expertise	Role
Health Protection Teams (HPTs)	Medics, public health consultants, public health practitioners (95% work is infectious disease)	Office-based. Provide local <u>liaison</u> with other partners, and wider public health issues.
Radiation, Chemical and Environmental Hazards (RCE) specialists	Scientists with expertise in environmental and public health, chemistry and toxicology	Office-based. National expertise/experience. Support HPTs. Provide advice on <u>health effects</u> , chemical incident management and decontamination.

Chemical release: industrial setting

- Examples: toxic or flammable gas releases, spills to ground or water
- Preparedness
 - Safety Data Sheets
 - Site Accident Management Plans
 - Control of Major Accident Hazards Regulations
- Response
 - Scene: Emergency services, Environment Agency
 - Remote: healthcare services, multi-agency coordination meetings (various agencies)
- Recovery
 - Environmental remediation (may be protracted)

Essex chemical incident: Hazmat teams deployed as cloud of fumes spreads in West Thurrock

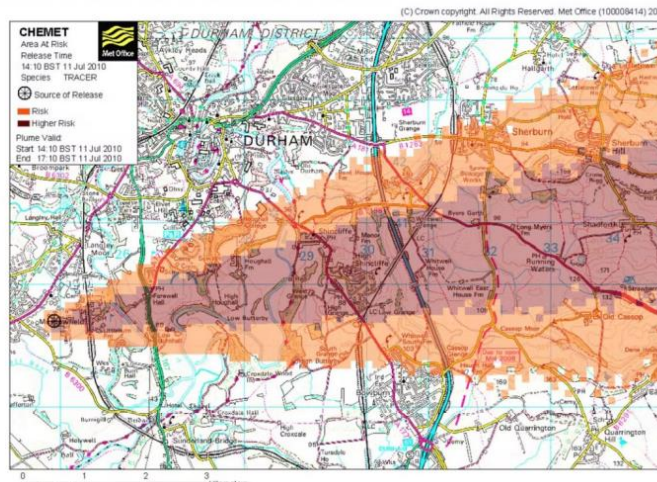
Locals told to keep doors and windows closed as gas billows from industrial cylinder

Vicent Wood • Monday 9th January 2020 10:40 • Comments



A 100m exclusion zone has been set up near Snettiscott Road, West Thurrock. (Google maps)

Exposure assessment - CHEMET



Chemical release: residential setting

- Examples: carbon monoxide, mercury, cleaning products
- Preparedness
 - Public awareness campaigns (specific hazards) / alarms
- Response
 - Scene: householders, emergency services (sometimes)
 - Remote: healthcare services
- Recovery
 - Investigation and intervention

News
25th April 2020
Household cleaning chemicals you should NEVER mix - according to experts
By Newsquest Digital Content Team



CLEANING We've put together a list of the household cleaning chemicals you should never mix.
Picture: Pixabay

A new survey has confirmed the household chemicals that should never be mixed.

The results, published by OnBuy.com, come as the nation embarks on a spring clean in their homes during the ongoing lockdown.

Most read | **Commented**


- 1 Man fighting for his life after being stabbed in large fight in Bolton Town Centre
- 2 LIVE: Police cordon remains in place off Great Moor Street after serious incident last night
- 3 LIVE: Police cordon off large area of Bolton town centre after 'incident'
- 4 The best pub in Bolton, voted by our readers
- 5 Six arrested in dawn raids as police crackdown on organised drug and gun crime

Chemical release: public premises

- Examples: chlorine (swimming pools), white powder incidents
- Preparedness
 - Site organisational protocols and training
 - Responder alerting and notification protocols
- Response
 - Scene: public, emergency services
 - Remote: healthcare services, multi-agency coordination meetings (various agencies)
- Recovery
 - Investigation and intervention

Sheffield leisure centre fined over chemical leak

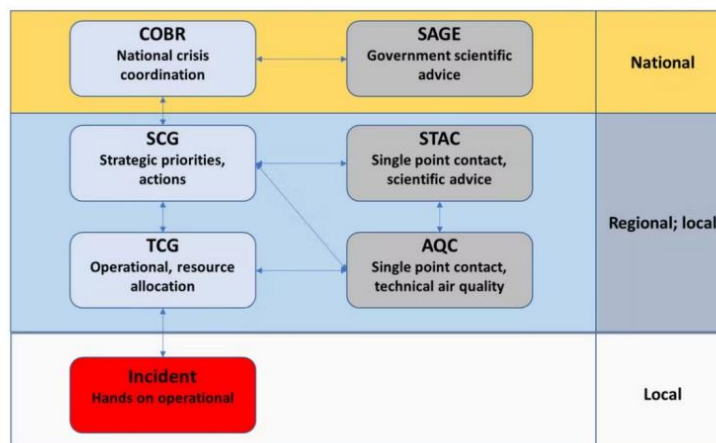
© 12 December 2017



Sheffield City Trust, which operates Springs Leisure Centre, admitted breaching health and safety regulations.

A leisure centre has been fined £7,000 after a chemical reaction at the site led to eight children and six adults being treated for minor burns.

Multi-agency response




Fires

- Examples: building fires, plastics fires, tyre fires, household waste fires
- Preparedness
 - Context dependent
- Response
 - Scene: Emergency services & Environment Agency
 - Nearby: air quality monitoring (in some cases)
 - Remote: council services, multi-agency coordination meetings (various agencies)
- Recovery (can be prolonged)
 - Environmental remediation

News
23rd November 2020
Major Bradford scrap tyre fire finally OUT, fire service confirms
By Felicity Macnamara | @FelicityM_TandA
Chief Reporter

UPDATED



The scene of the fire today

THE major scrap tyre fire which has caused disruption all week in Bradford is now out, West Yorkshire Fire and Rescue Service confirmed this afternoon.

Most read | **Commented**

- 1 What is the maximum Frankie Smith's sentence could be increased to?
- 2 What is going on? Why are dogs falling ill after visit to popular beaches?
- 3 'I have never experienced anything like this' - Councillor shocked by gun shot in 'quiet' area
- 4 Plans by billionaire brothers to build Europe's biggest Muslim cemetery meet opposition

Air quality monitoring: examples

- Local Authority ambient air quality monitoring sites
- National ambient air quality monitoring sites
- Fire Service “DIM” (Detection, Identification, Monitoring) capabilities
- Air Quality Cell arrangements



Poisonings

- Examples: natural toxins, pharmaceuticals, chemical exposures
- Preparedness
 - Toxbase
 - Alerting agreements
- Response
 - Scene: medical professionals
 - Remote: context dependent
- Recovery
 - Clinical management



National Poisons Information Service
Report 2020/21



The National Poisons Information Service is commissioned by Public Health England on behalf of the UK health departments

Hot and cold weather

Mentimeter

- Examples: heatwaves, prolonged cold conditions
- Preparedness
 - Health-sector plans
 - Forecast and alerting agreements
- Response
 - Scene: regional or national scale
 - Remote: organisational cascades, national multi-agency coordination meetings
- Recovery
 - Organisational learning



The Cold Weather Plan for England
Protecting health and reducing harm from cold weather



Flooding

Mentimeter

- Examples: coastal flooding, river flooding, surface water flooding
- Preparedness
 - Site-specific and local plans and arrangements
 - Forecast and alerting agreements
- Response
 - Scene: from local to multi-regional scale
 - Remote: organisational cascades, local and national multi-agency coordination meetings
- Recovery
 - Environmental remediation



Radiological release: industrial setting

Mentimeter

- Examples: nuclear power stations and waste processing sites
- Preparedness
 - LRF assessments
 - Off-Site Plans
 - REPIR Regulations and national arrangements
- Response
 - Scene: Emergency services
 - Remote: healthcare settings, multi-agency coordination meetings (various agencies)
- Recovery (long-term)
 - Relocation (eg, Chernobyl & Fukushima)
 - Environmental remediation (eg, removing top soil)



Radiological source: any setting

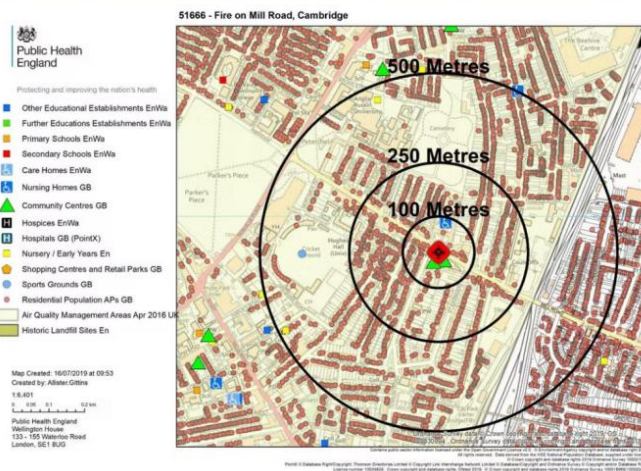
- Examples: medical sources, industrial sources
- Preparedness
 - Workplace H&S
 - Radiation Protection Advisors
- Response
 - Scene: Emergency services
 - Remote: specialist organisational or national advice
 - NAIR (National Arrangements for Incidents involving Radioactivity)
 - Provides 24 hour advice & assistance to the police
- Recovery
 - Organisational learning



Sources of information and contact points

The screenshot shows the UKHSA Pulse website interface. At the top, there is a navigation bar with 'My UKHSA', 'People', 'How to', and 'Documents'. A user profile for James Stewart-Evans, Principal Environmental Public Health Scientist, is visible. The main content area is titled 'Environmental hazards' and includes an introduction to Health Protection Teams (HPTs) and the Radiation, Chemical and Environmental Hazards (RCE) team. It features a section for the 'Environmental hazards resource pack' and a 'Contents' list on the right side. The contents list includes: Environmental hazards resource pack, Air quality in emergencies, Asbestos, Carbon monoxide, Chemical fatalities, Chemical incidents, Chlorine, Cold weather, Fires, Flooding, Heatwave, Lead, Long-running enquiries, Mercury, Odour, Polystyrene in aquarium coral, Petroleum products including heating oil (kerosene), petrol and diesel, Recovery, remediation and environmental decontamination, Refrigerant, Sheltering or evacuation, and Water.

GIS (organisational)



Public sources of information

Collection

Chemical hazards compendium

From: Public Health England
Part of: Chemical hazards
Published: 1 April 2013
Last updated: 24 August 2015, see all updates

Resource for the public and those professionals responding to chemical incidents, including emergency services and public health professionals.

Contents

— Chemicals A to C
— Chemicals D to F
— Chemicals G to I
— Chemicals J to L
— Chemicals M to O
— Chemicals P to R
— Chemicals S to V
— Chemicals W to Z

The compendium of chemical hazards has 3 sections:

1. general information on the chemical
2. toxicological overview of the compound
3. incident management focusing on information needed during chemical incidents, such as physicochemical properties, health effects and decontamination

For some chemicals all 3 sections are available and are also compiled into 1 document.

Guidance

Benzene: health effects, incident management, and toxicology

From: Public Health England
Part of: Chemical hazards compendium and health emergency planning
Published: 1 July 2014
Last updated: 18 October 2016, see all updates

Information on benzene, for use in responding to chemical incidents.

Documents

Benzene: general information
Ref: PHE publications gateway number: 204790
PDF, 102KB, 4 pages
This file may not be suitable for users of assistive technology. [Request an accessible format.](#)

Benzene: incident management
Ref: PHE publications gateway number: 204790
PDF, 304KB, 15 pages
This file may not be suitable for users of assistive technology. [Request an accessible format.](#)

Benzene: toxicological overview
Ref: PHE publications gateway number: 204790
PDF, 574KB, 14 pages
This file may not be suitable for users of assistive technology. [Request an accessible format.](#)

Links to resources

- WHO manual for the public health management of chemical incidents https://apps.who.int/iris/bitstream/handle/10665/44127/9789241598149_eng.pdf?sequence=1
- UKHSA environmental hazards resource pack (UKHSA intranet) <https://intranet.ukhsa.gov.uk/sites/duty-doctors-resource-pack/sitepagemodern/3186/environmental-hazards>
- UKHSA chemical compendium <https://www.gov.uk/health-and-social-care/health-protection-chemical-and-environmental-hazards>
- Toxbase <https://www.toxbase.org/> (account required)
- UKHSA guidance on investigation of non-infectious disease clusters from potential environmental causes https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/781573/INIDC_guidance_v1.0.pdf
- UKHSA Chemical Hazards and Poisons Report <https://www.gov.uk/government/collections/chemical-hazards-and-poisons-reports>

Links to resources

- UKHSA Flooding: health guidance and advice <https://www.gov.uk/government/collections/flooding-health-guidance-and-advice>
- UKHSA Heatwave plan for England <https://www.gov.uk/government/publications/heatwave-plan-for-england>
- UKHSA Cold weather plan for England (includes links to e-module on cold homes and health) <https://www.gov.uk/government/collections/cold-weather-plan-for-england>
- NHS Hazardous Materials (HAZMAT) and Chemical, Biological, Radiological and Nuclear (CBRN) <https://www.england.nhs.uk/ourwork/epr/hm/>
- PHE Basic concepts of radiation [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/467205/Basic concepts of radiation October 2015.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/467205/Basic_concepts_of_radiation_October_2015.pdf)
- Further information about specific hazards can also be found on the NHS, HSE and gov.uk websites

- [JESIP](#) – Joint Emergency Services Interoperability Protocol
 - METHANE report template (initial sitreps) via SMS/email
 - Hazardous substance: first responder prompts
- [Met Office Weather Forecast](#)
 - Forecasts and weather alerts
- [ERG 2020](#) – Emergency Response Guidebook
 - Hazardous substance information and advice
- [WISER Response](#) – Wireless Information System for Emergency Responders
 - Hazardous substance information and advice

Environmental Hazards and Emergencies Department

Acronyms, abbreviations and glossary of terms

Acronyms, abbreviations and glossary of terms

ADI	<p>Acceptable Daily Intake</p> <p>Estimated maximum amount of an agent, expressed on a body mass basis, to which an individual in a (sub) population may be exposed daily over its lifetime without appreciable health risk. Related terms: Reference Dose, Tolerable Daily Intake, Tolerable Weekly Intake, Provisional Tolerable Daily/Weekly Intake</p>
AEGL	Acute Exposure Guideline Level
AQC	<p>Air Quality Cell</p> <p>Members of the AQC (EA, CRCE, MO) assess the air pollution from incidents involving fires or chemical releases and determine the extent of risks to public health and environment pose by pollutants to air. This may include air quality monitoring. The AQC provides technical advice to the multi-agency response.</p>
AQPH	<p>Air Quality in Public Health</p> <p>Part of the Environmental Hazards and Emergencies Department (CRCE) who are specialists in air quality and public health.</p>
AQS	Air Quality Standards
AURN	<p>Automatic Urban and Rural Network</p> <p>UK's largest automatic monitoring network and is the main network used for compliance reporting against the Ambient Air Quality Directives. It includes automatic air quality monitoring stations measuring oxides of nitrogen (NO_x), sulphur dioxide (SO₂), ozone (O₃), carbon monoxide (CO) and particles (PM₁₀, PM_{2.5}). These sites provide high resolution hourly information which is communicated rapidly to the public, using a wide range of electronic, media and web platforms.</p>
CAS	Chemical Abstracts Service
CBRN	<p>Chemical, Biological, Radiological, Nuclear</p> <p>May also be CBRNE – E for Explosive materials</p>
CHEMET	<p>Chemical meteorology Service</p> <p>Emergency Services, EA and CRCE are able to request from the Met Office plume prediction and modelling for chemical incidents.</p>
Chemical incident	An uncontrolled release of a chemical from its containment. Note: a public-health chemical incident is defined as where two or more members of the public are exposed to a chemical or threatened to be exposed to a chemical.
Chemical warfare agents	Any toxic chemical or its precursor that can cause death, injury, temporary incapacitation, or sensory irritation through its chemical

	action. (Source: Organisation for the Prohibition of Chemical Weapons)
Chronic	An event or occurrence that persists over a long period of time.
CIEH	Chartered Institute of Environmental Health
CIRIS	CRCE Incident Reporting and Information System
COBR	Cabinet Office Briefing Room
COMAH	Control of Major Accident Hazards
CRCE	Centre for Radiation, Chemical and Environmental Hazards
Decontamination	A procedure whereby health measures are taken to eliminate an infectious or toxic agent or matter present on a human or animal body surface, in or on a product prepared for consumption, or on other inanimate objects, including conveyances, which may constitute a public health risk. To make safe by eliminating poisonous or otherwise harmful substances, such as noxious chemicals or radioactive material, from people, buildings, equipment and the landscape.
DAQI	Defra Air Quality Index
DEFRA	Department of Environment, Food & Rural Affairs
DIM	Detection, Identification and Monitoring
DWI	Drinking Water Inspectorate
EA	Environment Agency
ECOSA	Emergency Co-ordination of Scientific Advice Multi-agency co-ordination of scientific advice for CBRN events prior to STAC being set up
EHE	Environmental Hazards and Emergencies Department (within CRCE)
EHO	Environmental Health Officer
EMF	Electro-magnetic fields
EPRR	Emergency Preparedness, Resilience and Response
FRS	Fire & Rescue Services
FSA	Food Standards Agency
HART	Hazardous Area Response Team (Ambulance Service personnel)
HAZMAT	Hazardous Materials (Fire Officer)
HAZMED	Hazardous Materials Medical (Officer) (Ambulance Service)
HPT	Health Protection Team

HSE	Health and Safety Executive
ICE	Individual Chemical Exposure (self harm)
IOR	Initial Operational Response
JESIP	Joint Emergency Services Interoperability Principles
LA	Local Authority
LPG	Liquid Petroleum Gas
LRF	Local Resilience Forum
MAHP	Major Accident Hazard Pipelines
MO	Meteorological Office
NOAEL	No Observed Adverse Effect Level
NPIS	National Poisons Information Service
NSIP	Nationally Significant Infrastructure Projects
OOH	Out of Hours
PHOC	Public Health On-Call
PPE	Personal Protective Equipment Includes all clothing and other work accessories designed to create a barrier against workplace hazards. Examples include safety goggles, blast shields, hard hats, hearing protectors, gloves, respirators, aprons and work boots.
PWTAG	Pool Water Treatment Advisory Group
RCG	Recovery Co-ordination Group
REPIIR	Radiation (Emergency Preparedness and Public Information) Regulations 2001
SAGE	Scientific Advisory Group for Emergencies
SCG	Strategic Co-ordinating Group (Gold Command)
Secondary contamination	The transfer of a chemical from a contaminated person (usually from their clothing, skin, hair, or vomitus) to personnel or equipment, directly or by emission from a contaminated surface.
SITREP	Situation Report
Source – Pathway – Receptor	A simplified model for assessing risks. Information about a substance or hazard (source) and the route or routes (pathway) by which an individual or population (receptor or target) is exposed is gathered, analysed and assessed (adapted from Essentials of Environmental Public Health Science, 2014)
STAC	Scientific and Technical Advice Cell
TCG	Tactical Command Group (Silver Command)

TDI	Tolerable Daily Intake Analogous to Acceptable Daily Intake The term Tolerable is used for agents which are not deliberately added such as contaminants in food
WEL	Workplace Exposure Limit
WHO	World Health Organization

Additional links and guidance documents

Acute Exposure Guideline Levels for Airborne Chemicals <https://www.epa.gov/aegl>

HSE EH40 <https://www.hse.gov.uk/pubns/books/eh40.htm>

Recovery handbook: <https://www.gov.uk/government/publications/uk-recovery-handbook-for-chemical-incidents-and-associated-publications>

Also from us - case studies: <https://www.gov.uk/government/collections/chemical-hazards-and-poisons-reports>

The Control of Major Accident Hazards Regulations 2015
<https://www.hse.gov.uk/comah/background/index.htm>

Seveso 1976 <https://www.hse.gov.uk/comah/sragtech/caseseveso76.htm>

Met Office Hazard Manager
<https://register.metoffice.gov.uk/WaveRegistrationClient/public/newaccount.do?service=hazardmanager>

To note UKHSA role is for Public health and emergency advice rather than occupational advice.
These can be mixed

WHO Air Quality Guidelines: <https://apps.who.int/iris/handle/10665/345329>

Quick, early decon if needed e.g. for powders: https://www.iesip.org.uk/uploads/media/pdf/CBRN%20JOPs/IOR_Guidance_V2_July_2015.pdf

Daily Air Quality Index <https://uk-air.defra.gov.uk/air-pollution/daq>

Fixed Monitoring: <https://uk-air.defra.gov.uk/interactive-map> <https://www.airqualityengland.co.uk/>

Air Quality Cell page on Resilience Direct:
<https://collaborate.resilience.gov.uk/RDSservice/home/99840/Air-Quality-Cell>

FRS Detection Identification and Monitoring (DIM)
<https://www.ukfrs.com/guidance/search/request-national-resilience-resources-detection-identification-and-monitoring-dim>

For COMAH sites – they can have specific substance monitoring

Cold weather alerts:

<https://public.govdelivery.com/accounts/UKMETOFFICE/subscriber/new?gsp=PHE>

Cold weather health risks and Covid-19 actions to prevent harm:

<https://khub.net/documents/135939561/174099487/Cold+weather+and+COVID-19+slideset.pdf/a0730074-802f-833b-f9d2-8dcd07918da1>

Heat-Health Alert Service:

<https://www.metoffice.gov.uk/public/weather/heat-health/?tab=heatHealth&season=normal#?tab=heatHealth>

Flood forecasting Centre <https://www.gov.uk/government/organisations/flood-forecasting-centre>

NAIR: <https://www.gov.uk/guidance/national-arrangements-for-incidents-involving-radioactivity-nair>

Chemical hazards compendium <https://www.gov.uk/government/collections/chemical-hazards-compendium>

National Poisons Information Service NPIS Toxbase (free with NHS email)

https://www.toxbase.org/Application_for_TOXBASE_registration/

METHANE stands for:

Major Incident Declared

Exact location

Type of incident

Hazards

Access

Number and type of casualties

Emergency services present and required