Environmental Public Health KRIC

Presentation primarily for information and assurance

Advice and support also sought to address issues raised

Dr Huw Brunt and Dr Sarah J Jones

March 2025

GIG CYMRU NHS WALES
Iechyd Cyhoeddus Cymru
Public Health Wales

Environmental Public Health

Scope

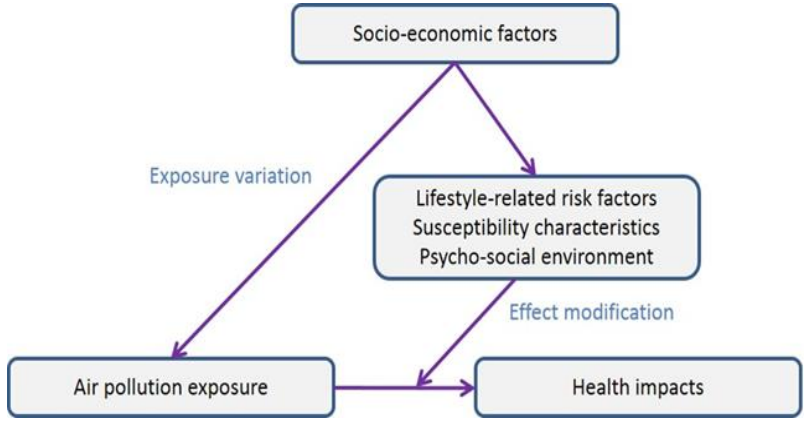
- *“Branch of public health that monitors the relationship between human health and the environment, examining aspects of both our natural and human-made environment and their effect on human well-being”*
- Broad discipline - interactions between health and environmental harms such as air pollution, water, land contamination, toxic chemicals, radiation and changing climate effects
- Also concerned with health and wellbeing benefits associated with exposure to environmental assets such as green/blue spaces and shade
- ***KRI Gap – summaries of “what works” to reduce environmental harms to health, including “who” needs to implement and “how” it is done***

See detailed slides 2 and 3

Environmental Public Health

Why?

- Assessing overall burden is a challenge in such a broad field; generally, low mortality, high morbidity
- Significant inequalities – vulnerability (exposure potential) and susceptibility (risk impact)
- Non-communicable disease health effects e.g. IHD, stroke, lung and other cancers, diabetes, COPD, asthma, dementia, LBW, stress/anxiety, GI, developmental delay, obesity, musculo-skeletal
- Outdoor air pollution largest environmental risk to health;
  long-term exposure increases health risks from heart and lung diseases, and lung cancer; also evidence of effects on dementia, LBW, diabetes.
- GBD groups Environmental and Occupational causes – difficult to unpick



Environmental Public Health

Acute incident risks – UK National Risk Register

- Civil Contingencies Act Category 1 responder
- UK National Risk Register examples include:-
  - *Natural and environmental hazards* e.g. wildfire, volcanic eruption, earthquake, storms, high temperatures and heatwaves, low temperatures, flooding, drought, air pollution.
  - *Accidents and system failures* e.g. rail accident, maritime pollution incident, accident involving dangerous goods, power outage, civil nuclear accident, radiation release overseas or transported goods, accidental fire, explosion or chemical release at a COMAH site, water infrastructure failure or loss of drinking water, food supply contamination, major fire.
  - *Terrorism* e.g. terrorist attack in venues and public spaces (explosive devices), malicious maritime and rail incidents, chemical/radiological/nuclear attacks.
- PHW leads (except for radiation / nuclear, CBRN – UKHSA lead, PHW provides support)
- OOH – Improved PHW EPRR arrangements - 46 incidents reported to PHW EPRR since April 2024 – 83% have EPH implications
- For every EPH major incident there are many more minor incidents with significant community concerns

Environmental Public Health Service in Wales

Function and demand

- Aim: *To protect health and prevent health harms from environmental hazards and a changing climate, increase health benefits linked to environmental assets, and narrow associated inequalities by improving health for all*
- Delivery through four priority areas:
    - Priority 1: EPH emergencies and incidents – prevention and response
    - Priority 2: Data and evidence review, interpretation and action
    - Priority 3: Climate change, weather and future and emerging threats to health
    - Priority 4: Wider determinants of EPH and creating fair, sustainable communities
- Priorities are not mutually exclusive; broad categories that describe general focus of action
- Narrowing inequalities gaps by improving outcomes for all is critical

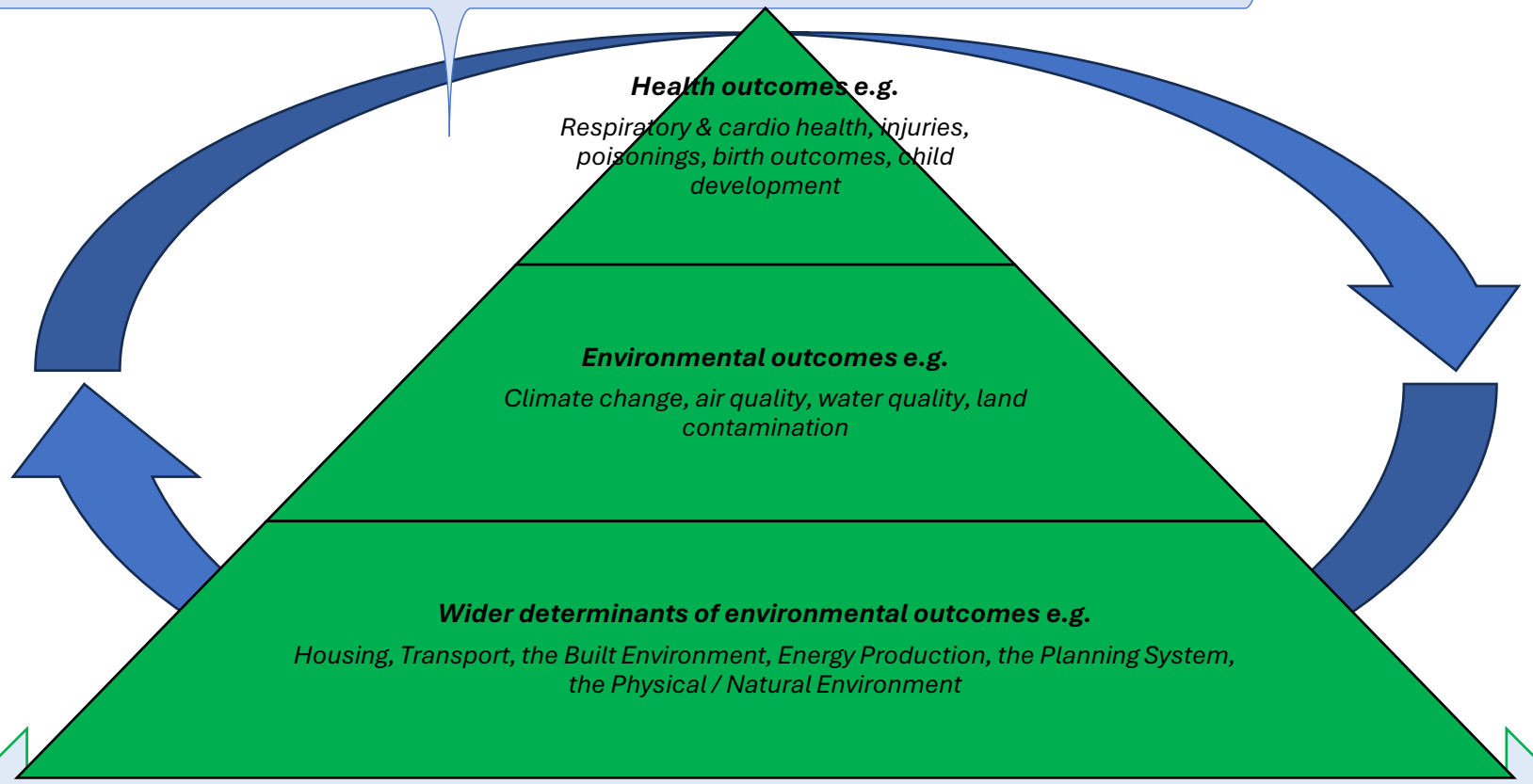
Excellent Public Health Services

EPH service quality

Domain	EPH Assessment
Safe – avoiding harm to service users and staff	Evidence based Responses are “signed off” by a manager, contentious responses by two managers
Timely – appropriate timescale to avoid harmful delays	Immediate responses to requests for attendance at multi-agency incident meetings Provide acknowledgements within 24 hours Responses always provided within appropriate timescales
Effective – providing services or treatment based on scientific evidence	Evidence based Aims to identify when developments that would cause demonstrable harm by responding to planning / permitting consultations – e.g. HAZREM, Baglan Bay Power Station, Newport Data Centre
Equitable	All responses and prevention activities are mindful of inequalities in terms of age, sex, deprivation, rurality and protected characteristics e.g. Private Water Supplies, air quality, 20mph
Efficient – avoiding waste and adding value	Evidence based, centralised, expert. Able to easily translate learning from one area to another. Team can “flex” between reactive and preventive work, avoiding waste
Person centred – responsive to needs	Service available to public and professionals Work with members of the public to access other professional expertise as needed

Service aim - *to protect health and prevent health harms from environmental hazards and a changing climate, increase health benefits linked to environmental assets, and narrow associated inequalities, by improving health for all.*

See detailed slides 4 to 6



Reactive
Assessing and managing acute and chronic exposures and concerns
Priority 1

Supported by surveillance, research & training & informed by the Prevention Paradox

Prevention
Preventing and minimising exposures; helping develop fair, healthy, sustainable environments
Priorities 2, 3, 4

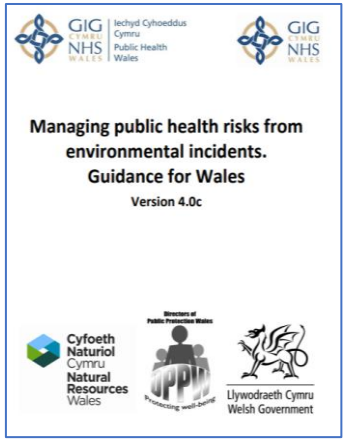
Service workload

Health gain

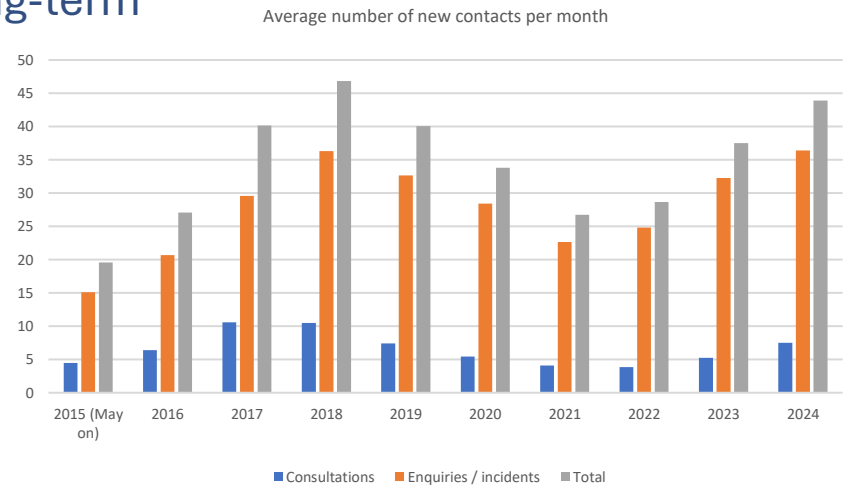
See detailed slides 7 to 21, 23 to 24, 26, 28, 30, 33

Priority 1

Environmental Incident Management



- *An environmental incident, in public health terms, is an acute or chronic event where there are, or could be, people exposed to chemicals and/or other environmental hazards, which cause, or could cause, health harms.*
  - Different agencies work to different definitions (according to remit)
- Effects - potential/actual, acute/chronic, specific/non-specific, short/long-term
- Acute incident management, chronic events, general queries
- Operated through COVID-19 pandemic e.g. Synthite, Bryn Cowlyd, Withyhedge, elevated blood lead, CO exposure
- Unpredictable service burden
- Aim to prevent incidents, rather than manage them

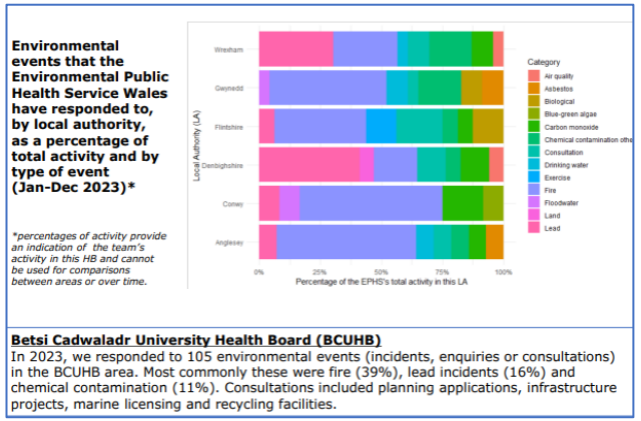


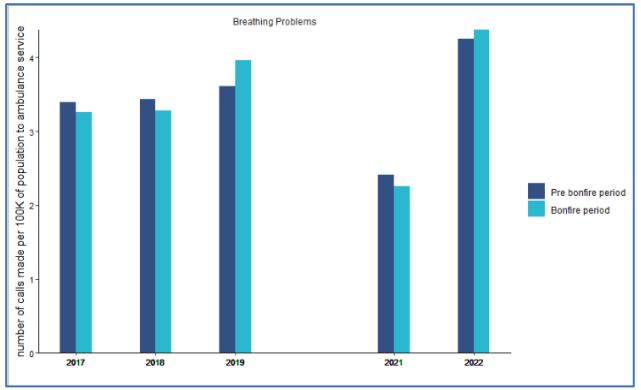
See detailed slides 13 to 24, 26, 28 to 33

Priority 2

Data and evidence review, interpretation and action

- Health Board profiles – summarise incidents, key issues and reports
- Assessment and surveillance reports e.g.
  - Lead – 2023 completed, 2024 to follow
  - Bonfire Night – review NHS contact; inform AQ incident service use
  - Private Water Supplies – Quality and Sufficiency
  - Climate change and inclusion health
- Published papers
  - Air quality – HAPRAP, inequalities
  - Transport and health policy – including 20mph, Road Safety inequalities
- Data collection and review e.g. Blood lead exposures
- Guidance development e.g. Swimmer's itch, Blue Green Algae
- ***KRI Gap – dedicated analytical support for e.g. analysis of Bonfire Night effects using ED data***





See detailed slides 19, 21 to 25, 27, 33

Priority 3

Climate change, weather, future and emerging threats

- Private water supplies
  - Larger proportion of homes in Wales use PWS than any other part of the UK
  - ? Lack access to other utilities
  - Quality (comm dis and chemical contamination) and sufficiency concerns in a changing climate
  - Planning considerations
- Risk assessment tools to support climate adaptation planning
  - Prisons
  - Looking to adapt tool to other settings
- Risk communication before and during adverse weather
  - All adverse weather events
  - Media / social media landscape now very different
  - How do people want and need us to provide them with information?
    - Research with policy division (Heat / flooding)
- ***KRI Gap – Access to PWS data set (WG holds), would enable linkage for policy dev and HP***

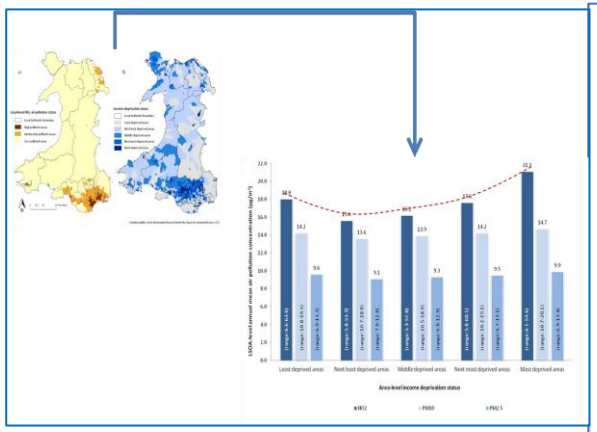
Risk	Yes Measures already in place effective now and future? Reference evidence	No Needs more assessment. Proposed actions
Vulnerable Prisoners: Know who the high risk prisoners are and conduct regular welfare checks		
Able to monitor temperature across estate? And act on identified problems		
Able to monitor humidity across estate? And act on identified problems		
Social or civil unrest surge capacity?		
Capacity for increased migrants / refugees holding?		
Plans in place to manage disruptions to transport and other critical infrastructure?		
Heat		
Cells with curtains / blinds / ability to shade window?		
Single cells, cells on lower levels or cool spaces available for vulnerable?		
Fans, air conditioning / ventilation in areas with high traffic?		
Portable handheld fans available for vulnerable?		
Holding Cells & Waiting Rooms: Review capacity to reduce overcrowding and overheating?		
Drinking water available in all areas?		
Gym: Review and revise gym schedule to cooler times of day		
Sun cream and hats available during outdoor activity / exercise?		
Shaded areas in outdoor spaces		
Able to open windows?		

See detailed slides 17 to 19, 26 to 33

Priority 4

Wider determinants of EPH, incl. equity

- Preventing carbon monoxide exposures
- Air Quality
  - Triple Jeopardy – informing Local Air Quality Management policy
  - HAP-RAP
- 20mph, other transport issues
- ***KRI Gap – Analytical support, evidence review support***



Air pollution and public health vulnerabilities, susceptibilities and inequalities in Wales, UK

Amber Horton, Sarah J. Jones, Huw Brunt

ABSTRACT

Background Outdoor air pollution is the largest environmental risk to health. Air pollution, deprivation and poor health status are inextricably linked; highlighting issues of environmental injustice, social and health inequalities.

Methods Air pollution (nitrogen dioxide, NO_2 and fine particulate matter, $PM_{2.5}$), population and deprivation data were identified at Lower Super Output Area level in Wales, UK, for 2012–18. Air pollution data were categorized according to different air pollution concentrations. Population and deprivation data were considered simultaneously to describe population vulnerabilities, susceptibilities and inequalities. Simple statistical analyses were performed using a difference in proportions method with 95% confidence intervals.

Results Over time, the majority of Welsh people transitioned to living in areas of lower NO_2 and $PM_{2.5}$ pollution. Areas of worse air pollution comprised more young people than people aged 65+; both populations are known to be susceptible to air pollution exposure. By 2018, significant socioeconomic inequality gaps were found where 'most deprived' population groups for both pollutants experienced greater disadvantage.

Conclusion Air quality in Wales is improving. However, local-level variations in exposure risk still exist. System-wide action must ensure that air quality improvement-related benefits are equitable and acknowledge current evidence about the harms that even low levels of air pollution can have on health.

Keywords air pollution, air quality, health protection, inequalities

Background

Outdoor air pollution (AP) is the largest environmental risk to health.[1] Exposure to AP such as nitrogen dioxide (NO_2) and fine particulate matter ($PM_{2.5}$) can increase risks of heart disease, stroke, respiratory diseases, lung cancer and other health conditions.[2,3] The health burden of AP in the UK is substantial; 28 000–36 000 deaths per year and life expectancy reduced by an average of 6–8 months,[4] at a cost to health and social care services of £3bn–£18bn per year.[5]

Headline figures mask local-level variations in AP exposures, risks and impacts.[6] AP can vary considerably over short distances because of differences in traffic, industry, agriculture and housing.[7] This means that some people live with higher concentrations of AP and therefore risk to health than others cope and adapt (population susceptibility). This, combined with local AP and deprivation in a 'triple jeopardy', creates disproportionate effects for the 'most deprived'.[10–12]

The unequal distribution of risks across society highlights environmental injustice and social and health inequalities, with differences in the determinants of health and health status across population groups.[13,14] So to reduce existing inequalities, and avoid creating new ones, AP problems and solutions should be considered in the broadest possible public health context.[15] Not doing so could actually increase problems through ill-informed decision-making and ineffective or poorly targeted actions.[16]

This paper aims to show how AP-related population risk varies by age and deprivation, and how this has changed over

Research report

Twenty miles per hour speed limits: a sustainable solution to public health problems in Wales

Sarah J Jones, Huw Brunt

ABSTRACT

Background Prevention, rather than treatment, is the key to longer healthier lives. Identifying interventions that will impact positively on road traffic injuries, air quality and encourage active travel is a significant public health challenge. This paper aimed to explore whether 20 mph limits could be useful in achieving this.

Methods Research evidence was reviewed to identify the effect of 20 mph zones and limits on health and well-being. The evidence was then used to estimate the effect of a change to a 20 mph limit on road traffic casualties and air pollution. It was then mapped against the seven goals of the Well-being of Future Generations Act (2015).

Results If all current 30 mph limit roads in Wales became 20 mph limits, it is estimated that 6–10 lives would be saved and 1200–2000 casualties avoided each year, at a value of prevention of £58M–£94M. In terms of air pollution, deaths attributed to nitrogen dioxide (NO_2) may increase by 63, and years of life lost by 753. However, deaths attributed to particulates ($PM_{2.5}$) may decrease by 117 and years of life lost by 1400. Evidence review suggests benefits in terms of road traffic casualties, air quality, active travel, noise pollution, greater social inclusion, greater community cohesion and local business viability.

Conclusions Road traffic injuries, air pollution and obesity are an inter-related, interdependent triad. The challenge facing public health today is identifying robust interventions that will have positive effects on all three as a minimum; default 20 mph limits is the solution to increasing public health problems in Wales.

INTRODUCTION

Prevention, rather than treatment, is the key to healthier, happier and longer lives. At the population level, collaborative action is needed across public bodies and communities to protect and improve health. This is recognised by the Well-being of Future Generations (Wales) Act 2015 (WFGA),[1] which calls for collaboration to achieve sustainable health and well-being improvements.

The act lists seven well-being goals, one of which is 'a healthier Wales', and requires a broad, inclusive view to be taken to tackle identified problems (figure 1). It encourages the proposal and imple-

distances outside schools. Zones include traffic calming which is intended to force vehicles to slow down. Limits, however, are usually only noted by signs posted on poles at the road side and roundels painted onto the road surface. A default 20 mph limit has been argued to just 'make sense'.[2] Road safety charity Brake is actively campaigning for a 20 mph default, Royal Society for the Prevention of Accidents (RoSPA) for wider use of 20 mph zones. National Institute for Health and Care Excellence (NICE) and the British Medical Association (BMA) have recommended that city-wide or town-wide 20 mph limits should be introduced.[3,4] The Faculty of Public Health believes that 20 mph zones and limits are important to mitigate the health impacts of cars.[5] Royal College of Paediatrics and Child Health (RCPCH) Wales are also calling for 20 mph limits to encourage children in Wales to be healthy and physically active.[6]

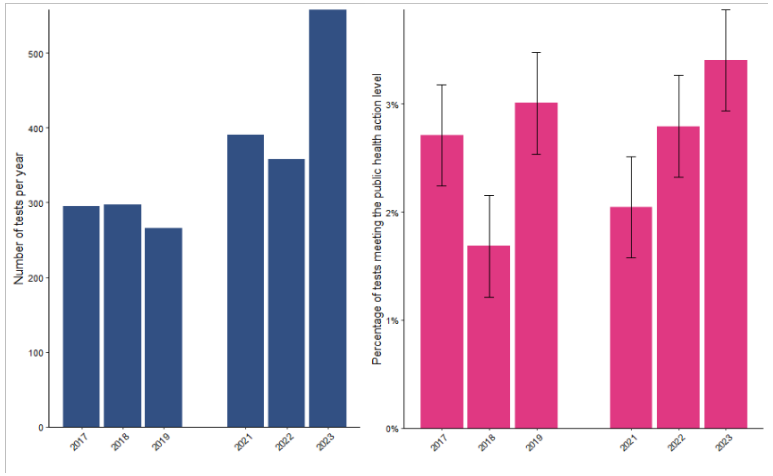
Much of the focus to date has been on road safety, but the suggested benefits extend beyond this to improved air quality,[7–9] increased active travel,[2 10] narrowing of inequalities,[2 4 11] greater social inclusion,[2 11] reduced noise pollution[9 11 12] and greater community cohesion,[2 11] including viability of local businesses[2] (table 1[7 9 11–13]).

24 European OECD countries (EU24) estimates that 50% of air pollution deaths are due to road transport[13] and there is evidence that changes in driver behaviour linked with lower speed limits could reduce emissions.[9] For example, nitrogen oxides (NO_x) emissions under hard acceleration are two to four times higher than those of constant speed.[14] In Sweden, 20 mph limits have been associated with lower fuel use because of less starting and stopping, compared with 30 mph limits.[10] Lowered speed limits, rather than speed humps, also have a positive effect on emissions.[10] While not all of the available evidence suggests that 20 mph limits decrease all forms of air pollution, it is generally accepted that they do not increase air pollution relative to 30 mph limits.[15]

In the UK, high vehicle speeds are often cited as preventing people from walking or cycling.[10] Reducing speeds should therefore encourage walking and cycling. Public Health England has suggested that default 20 mph limits may be the most effective evidence-based approach available to

Brunt H, Barnes, J, Jones SJ *et al*. (2017). Air pollution, deprivation and health: understanding relationships to add value to local air quality management policy and practice in Wales, UK. *J Public Health*; 39 (3): 485-497.

Case study - lead



- Cases of elevated blood lead have routinely been dealt with by EPH for many years.
- Previous EPH efforts to increase physician awareness that lead is still a problem
- Wales reduced the PH action level to 5ug/dL for children in around 2018/9 (before rest of UK)
  - Supported by the evidence base – no safe level of lead
  - Developed a “direct” lab reporting system in partnership with biochemistry labs across Wales
  - Early contact with physicians (evaluated)
  - Developed information leaflets for parents and adults with elevated blood lead
  - Developed clear SoPs for managing cases
  - Worked with Dwr Cymru Welsh Water and Hafren Dyfrydwy to provide water testing (and support ambition for a Lead Free Wales)
- Increase in testing for children from 350 cases pa 2017 to 550 in 2023 (early data suggest ~700 in 2024)
- EPH supported the identification of possible sources of lead for 19 children in 2023, compared with 9 in 2017
- In 2024, worked with Clinical Tox colleagues to develop All Wales Clinical Pathway
- In addition, work with DCWW / HD when they identify lead in drinking water supplies – after we’ve requested a test (PH does not access data on all tests)

•**Figure a:** Number and rate of initial blood tests taken for lead, per year in children. 2017 -2023. 2020 excluded because of restrictions on testing due to COVID-19.
•**Figure b:** Proportion of tests per 100,000 of the population meeting or exceeding the threshold for elevated blood lead in children at the threshold of 0.24umol/L in Wales. 2017 - 2023.

EPH Service
Current resource

- Joint service model - historic collaborative arrangement PHW-UKHSA
- In-hours – joint Duty Desk; OOH – PHW outsourced EPH advice to UKHSA
- Change incoming!

Role	PHW		RCCE-Wales*		Total	
	Feb 2020	Feb 2025	Feb 2020	Feb 2025	Feb 2020	Feb 2025
Consultants	2.0	2.0 *(1.0 in post, second 1.0 joining the team April 2025)*	1.0	0	3.0	2.0 *(1.0 in post, second 1.0 joining the team April 2025)*
Senior manager (band 8c)	0	0	1.0	1.0	1.0	1.0
Principals (band 8a)**	1.0	2.0	1.0	1.0	2.0	3.0
Scientists (band 7)**	1.0	3.0	2.0	2.6	3.0	5.6
Scientists (band 6)	0	0	0	1.0	0	1.0
Administrative support	1.0	1.0	1.0	0	2.0	1.0
TOTAL	5.0	8.0	6.0	5.6	11	14.0

*UKHSA pay bands assumed.
**roles similar across each organisation.

Comparison with other service models

Consistent with CDC and RIVM

- Assessed against 10 components of CDC EPH service model specification, e.g.
  - Monitor environmental & health status to identify & solve community environmental health problems
  - Inform, educate & empower people and communities about environmental health issues
  - Develop policies & plans that support individual & community environmental health efforts
  - Link people to needed environmental health services & assure the provision of environmental health services when otherwise unavailable
  - Evaluate the effectiveness, accessibility and quality of personnel and population based environmental health services
- Assessed against 8 components delivered by RIVM, e.g.
  - Risk or health impact assessments
  - Epidemiological research
  - Healthy Living Environments
  - Analysis and input for policy making
- Identified additional functions that we deliver on
  - Developing and advocating for national policies and plans
  - Advocacy at all levels – individual, community, local and national
  - Consultation, Planning and Permitting responses
  - Explicit communication with the public about extreme weather risks to health

Comparison against other service delivery models

England vs Wales

- Local Health Protection teams deliver service, supported by specialist advice from central teams
- EPH in Wales is both local/regional **and** central/national
- Efficient - expertise is concentrated and maintained and that learning from one area can be easily translated to another
- But… a long running incident in one area can significantly reduce capacity for prevention or reactive work in any other area or nationally
- Limited resilience currently… and incoming change will compound issues

Forward look

Threats and ***opportunities***

- UKHSA collaboration - MOU/SLA re-negotiation; UKHSA in Wales to step away from ‘front-line’ service delivery
- Investment needed to ‘plug gap’ and strengthen resource… 80+% major incidents are EPH; team are at full-stretch just re-acting to these and many more 'minor' incidents/enquiries; significant morbidity burden of env harms needs prevention focus too but limited capacity currently to deliver
- Small, specialist service - easily ‘overwhelmed’ when incidents are resource-intensive, complex, protracted – such reactive activity reduces capacity for prevention to near zero
- Little to no 'local' EPH expertise in evolving HB health protection teams to support 'central' delivery
- Increasing confusion and governance issues OOH; historic arrangement to ‘outsource’ OOH EPH to UKHSA;
- ***National / local approach means expertise is concentrated and can easily transfer/apply learning***
- ***Team working to a common purpose (“mission”)***
- ***Can “flex” between reactive and prevention activity when time allows***
- ***Learning from reactive work can inform prevention***
- ***Collective belief that the most effective approach to the reactive demands is prevention of incidents***
- ***Discussion document in development – issues and solutions for in/out-of-hours resource/arrangements***
- ***Opportunity to strengthen foundation and future-proof service – welcome opportunity to discuss further***