



Research Team

Newcastle University

Population and Health Sciences (Tanja Pless-Mulloli,
Kate Vizard, Neil Griffith, Kirsty Foster, Judith Bush)

Civil Engineering and Geosciences (David Rimmer)

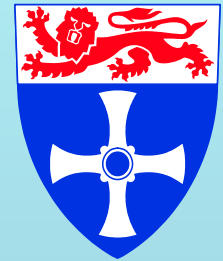
Biology (Ian Singleton, Zoe Keatinge)

Newcastle City Council

Public Health and Environmental Protection (Vivienne
Air, Phil Hartley, Stephen Savage)

Ergo Research Laboratory, Hamburg (Bernd
Schilling, Olaf Paepke, Thomas Hermann)

UNIVERSITY OF
NEWCASTLE



University of Newcastle upon Tyne

Steering Group

- Health Authority
- Allotment holders
- Environment Agency
- Health Protection Agency
- BAN Waste
- Newcastle City Council
- Newcastle University



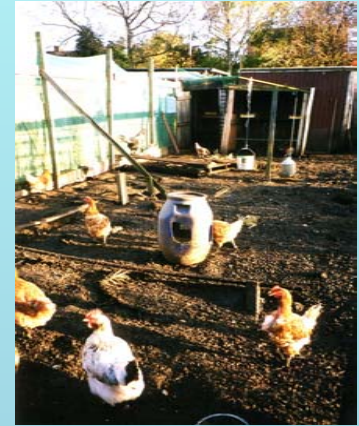
BAN Waste Group



UNIVERSITY OF
NEWCASTLE



The case 1/4



- 2,000 tons of incinerator ash used across city (1994–99)
- 44 sites (allotments and public footpaths)
- Starting point letter from member of public to Director of Public Health at local health authority Sept 1999



The case 2/4

- **Desk top study** to scope possible magnitude of issue (TPM)
- **Hazard identification:** levels of contaminants in affected sites found dioxin levels typical of fly ash (May 2000, TPM)
- **ASH REMOVAL, PRECAUTIONARY ADVICE AND LITIGATION**

HAZARD



EXPOSURE



BODY BURDEN



TARGET ORGAN



ADVERSE EFFECT



CLINICAL EFFECT



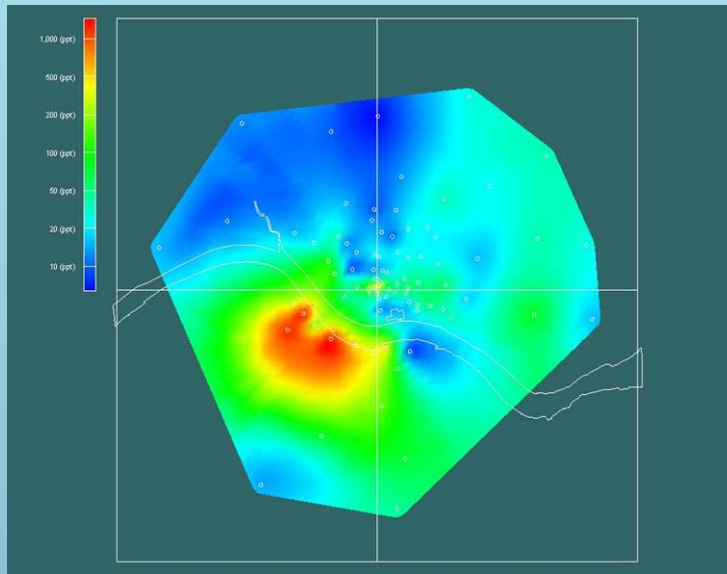
The case 3/4

- **Exposure pathways and assessment of exposure:** soil, eggs, vegetables (May and July 2001): transfer into eggs, no transfer into vegetable, some transfer into adjacent soil

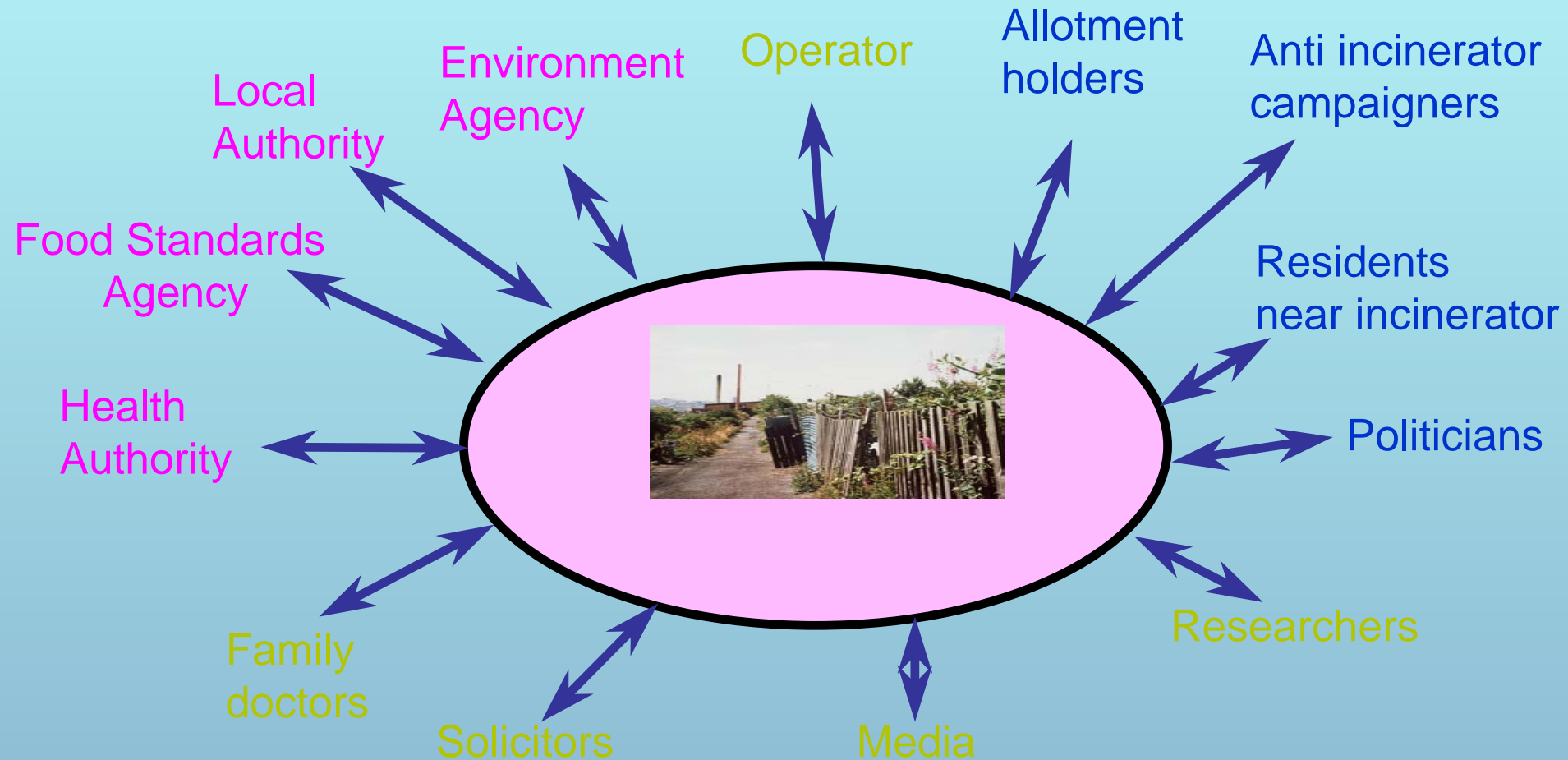


The case 4/4

- **Fugitive emissions and follow-up of eggs** (July 2002, July 2003): no detectable fugitive emissions, elevated dioxin levels in eggs persist in some allotments



The stakeholders



The public health structures in England in 1999

- The Health Authority (NHS): statutory responsibilities to protect the public health, but NHS guidance focused on communicable disease and emergency planning
- The Local Authority: enforcement powers for food issues and some environmental issues
- The Environment Agency: licensing and enforcement powers in relation to “polluting” processes
- Health Protection Agency did not yet exist (April 2003)



The Director of Public Health (DPH) role in 1999

- Health improvement
- Reducing health inequalities
- Health protection
- Commissioning services
- Clinical governance

- A huge portfolio.....
- Relationships with the local authority were important



Letter from resident to DPH 12/08/99

“I am writing on behalf of a number of residents living close to the above plant [Byker]. We are very concerned at the City Council’s proposals to sign new contracts which would.....more than doubling previous capacity.”



Letter from resident to DPH 12/08/99

“.....recent enquiries of the Environment Agency have confirmed that potentially very toxic fly ash has been mixed with ground ash.....ash had been spread on the footpaths of allotments throughout the City.”



Some policy context

- Food contamination (2001)
- Tolerable daily intakes
- Contaminated Land regulation April 2000
- Hazardous waste directive
- Planning system reform/brown field site development
- Shifting the balance of power in the NHS (White paper 2001)
- Getting ahead of the curve, CMO (January 2002)
- Contaminated land: ICRCL → CLEA → CLEA review
- IPC → IPPC (2000)
- UK National Dioxin Strategy

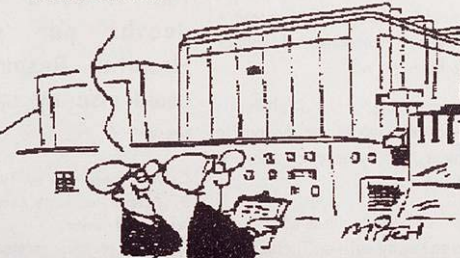
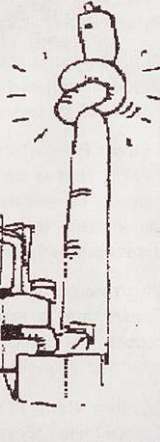


Wider context

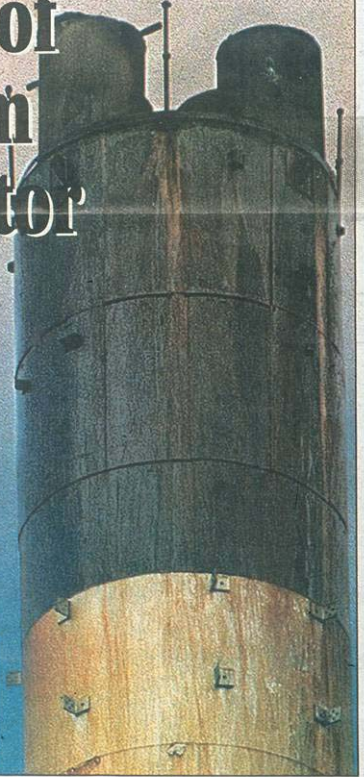


Public Inquiry Now!

At last we've cracked it - we finally attained zero emissions....



2,000 tonnes of toxic ash from this incinerator has polluted this city. And they want to build more



TOXIC ash spread across Newcastle by the city council was laden with pollutants 800 times higher than recommended safety guidelines, a report revealed yesterday.

Family doctors last night renewed their calls for a full public inquiry into the possible health risks,

although all 2,000 tonnes of ash has now been removed. But as the Newcastle University study into the Byker Incinerator was published, the Government unveiled a shake-up in waste management that could mean up to nine more incinerators being built across the North-East.

Full story: Pages 6,7 and 8

www.the-jou

Poison ash danger 'may be worst in UK'

Growing concern over 'toxic' ash



Gardeners beset by toxic fears face a waiting game. Environment Editor Tony Henderson reports.



FOR pentester James Wolf, 28 years of a lifetime of gardening is now a waiting game. His garden is healthy looking. Now she is not so sure.

The allotment site in Parkside, Newcastle, is one of 26 in the city where ash from the Byker incinerator has been spread on footpaths.

Protesters against plans to double the tonnage of waste burned at Byker claim that the ash could be

taking samples from paths and soil soon, with results due in April.

But Mrs Wolf also wants tests on allotment vegetables to see if they have absorbed any contamination because of fears that ash will have leached or been blown or hidden on to soil.

According to Mrs Wolf, ash was delivered three years ago and, while she was not on the site, well-meaning gardeners spread the material on paths in

incinerator ash has been spread on allotment paths and other pathways, birdlandings across the city since 1994.

Previously power station ash was used but when supplies became difficult to obtain the switch was made to the incinerator.

City council services manager said that tests had indicated that the incinerator material was comparable to the power station coal ash.

Public meeting demands inquiry into incinerator

School of Population and Health Sciences



Expansion plans go on backburner as experts uncover new health risks

Tests spark call for incinerator to close

By **PETER YOUNG**
Political Editor

A NEW health scare blew up today at a problem-plagued Tyneside incinerator.

Experts have revealed soil samples from allotments next to the plant show signs of contamination from the air.

Increased levels of dioxins have been found and further tests will now be carried out.

Early tests have already revealed raised levels of dioxins and heavy metals in ash from the incinerator.

But campaigners say the new evidence that soil is also contaminated shows there is a health risk from emissions into the atmosphere as well as from ash.

The row is over Newcastle's Byker incinerator. Newcastle Council's plans to double the capacity of the plant have run into fierce protests.

Scare

The plan has been put on hold until a working group has investigated the issues raised and a health impact and environmental assessment have been carried out.

Council workmen are now removing 2,000 tonnes of incinerator ash from allotment paths and bridleways across the city.

The new scare follows a working group meeting at which Tricia Cresswell, director of public health for Newcastle & North Tyneside, revealed four samples of soil at Walker Road permanent allotments, next to the incinerator, show raised levels of dioxins.

She said: "They form a different pattern, more consistent with emissions. We need to carry out further testing."

Val Barton, of the Campaign against Incinerated Refuse, said: "This serves to demonstrate that it is not only ash spread on footpaths which poses a risk to public health but also emissions from the chimney."



"When are councillors going to have the courage to say enough is enough and close this incinerator? We need cleaner and healthier ways to deal with waste in Newcastle."

Dr Cresswell said today: "Any risk to health would be small. The levels in the soil were marginally raised in a small number of cases. This is why we need further testing of a larger number of samples."

Cityworks director Barry Rowland said: "A very small sampling of soil taken from the Walker Road allotment revealed above background levels of dioxin and we are in the process of commissioning further tests."



CONTROVERSIAL — the city council wants to expand the incinerator's capacity but protesters would rather it closed

MOVING ASH — workmen shift ash from allotments across the city

WORLDWIDE
flight
FROM NEWCASTLE
AUSTRALIA



And then....

- **Risk communication**

(Aug 99- April 2002)

- 118 items direct correspondence
- 11 meetings of the steering group
- 4 public meetings
- Local and National media
- Individual telephone discussions

- **Follow-up reports:**

- Soil near ash paths 2001
- Vegetables 2001
- Eggs 2002, follow-up 2003
- Wider soil studies: Walker Road allotment 2002, Newcastle and Gateshead 2003
- Risk communication study 2004
- Risk assessment studies allotments 2004-2006
- Saltmeadows Gateshead
- Allotment risk assessments 2003-2006



But....



Study reveals huge contamination levels in waste spread from incinerator

Gran's fury at health fears in allotments

By PETER YOUNG and PETER DICKINSON

FURIOUS protesters disrupted a meeting to announce the results of tests into incinerator ash spread at Tyneside allotments.

Grandmother June Wolf showered scientists and council officials with vegetables grown in her allotment and shouted angrily at them.

Mrs Wolf, 74, said: "We do not believe it is safe to eat and they do not know that it is safe to eat but they tell us to eat it."

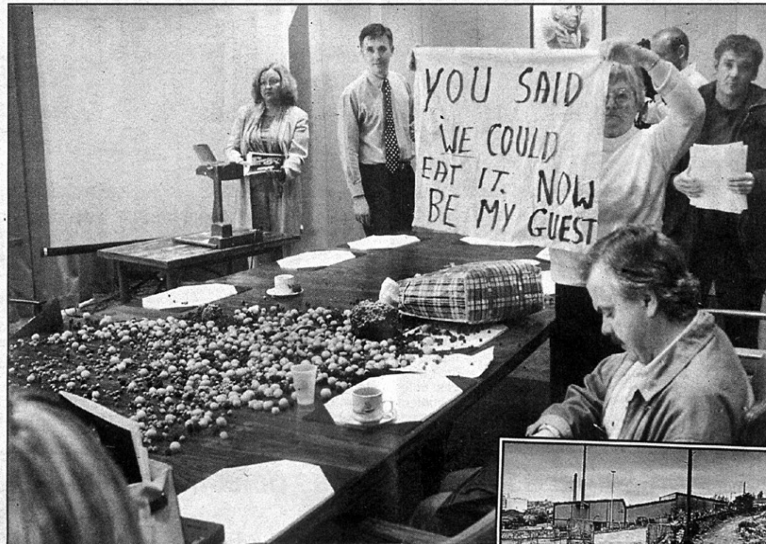
Mrs Wolf, of Fenham said she has regularly fed the vegetables to her grandchildren Alex, six and Tom eight when they visit her home.

The protest came after scientist Dr Tanja Pless-Mulloli of Newcastle University who led testing of samples appeared to change her mind over the safety of eating the vegetables.

Findings

The scientific report recommended the council consider advising allotment gardeners not to eat the vegetables until the results of further tests. But at today's meeting she said: "I think they should eat the vegetables until we have further findings."

Newcastle and North Tyneside Health Authority and Newcastle City Council recommended the vegetables were safe to eat if they were thoroughly washed and peeled after, consulta-



ANGER — June Wolf makes her protest at the meeting revealing the results of health tests on ash from Byker incinerator, inset



Methods of risk communication used 1

| Stage | Communication method | Month Year |
|-----------------------|--|------------|
| Desktop scoping study | Consultation with statutory agencies | Oct 1999 |
| | First Public meeting to explain strategy | Jan 2000 |
| Hazard identification | •Letter to individual allotment holders, press release, precautionary advice, letter to all family doctors | April 2000 |
| | •Press conference | May 2000 |
| | •public meetings | |
| | •report on website | |
| | •steering group 1 st meeting | June 2000 |
| | •Board papers at HA and Council | |
| | •Dioxin conference | Aug 2000 |



Methods of risk communication used 2

| Stage | Communication method | Month Year |
|---|---|------------|
| Prosecution announced | | Dec 2000 |
| Exposure pathways and exposure assessment | 2 nd Report (soil/eggs) leaked workshop including experts from National bodies, letters to individual allotment gardeners and family doctors, press conference, steering group, public meeting, meeting with campaign group, conference, report on website, meeting with allotment working group | Feb 2001 |



Methods of risk communication used 3

| Stage of case | Communication method | Month Year |
|----------------------|--|-------------|
| Fugitive emissions 1 | Letter to individual allotment holders, | July 2002 |
| | meeting in local social club Remediation | June 2005 |
| Egg-follow-up | Expert workshop including National bodies | July 2003 |
| | report on website, local newspaper exclusive | Aug 2002 |
| | Conference | Not |
| | Surgeries | implemented |
| Fugitive emissions 2 | Expert workshop including National bodies, | May 2003 |
| | report on website, local newspaper exclusive | July 2003 |



Source-pathway-receptor model

HAZARD

EXPOSURE

BODY BURDEN

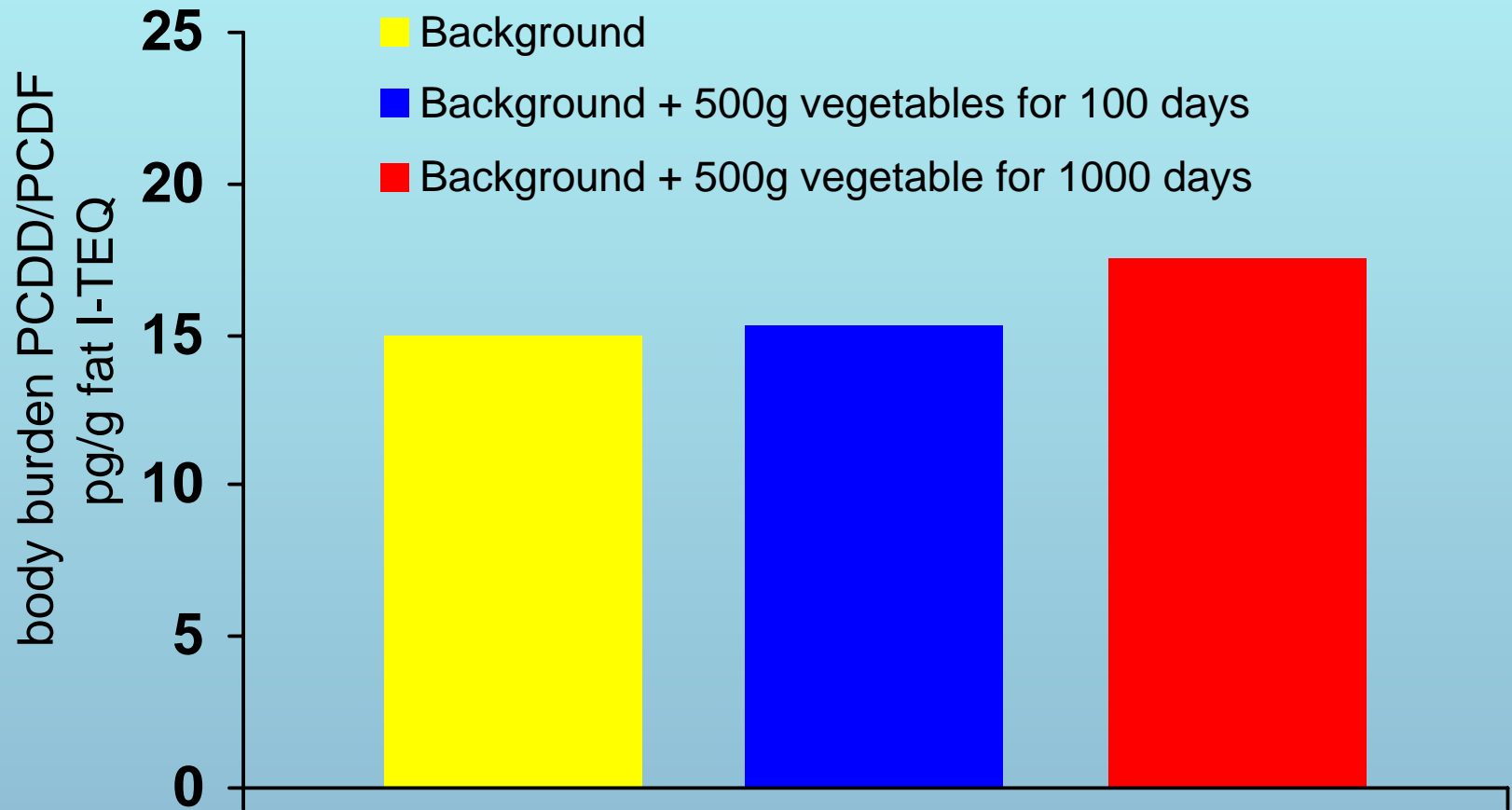
TARGET ORGAN

ADVERSE EFFECT

**CLINICAL
EFFECT**



Impact of consumption of vegetables on human body burden of PCDD/PCDF



Total daily intake of dioxins/furans by varying Byker egg consumption

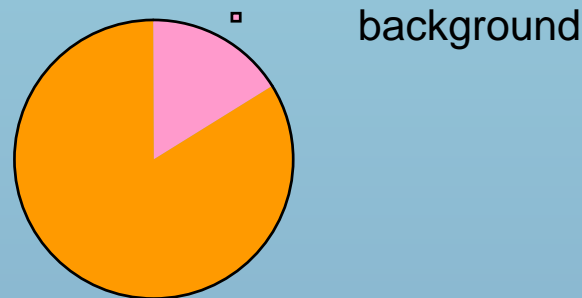
0.5 Byker egg per day (70 pg background + 90 pg Byker egg)



1 Byker egg per day (70 pg background + 180 pg Byker egg)



2 Byker eggs per day (70 pg background + 360 pg Byker egg)



Experts recommend limiting use of some allotments and replacing soil in others

Health risk is played down in ash report

A THIRD report into the Tyneside toxic ash scandal has rubbished two earlier inquiries by ruling out a major health risk.

These reports stated that people could die as a result of contamination from the Byker incinerator in Newcastle.

But Dr Tricia Cresswell, of Newcastle and North Tyneside Health Authority, said the independent investigation by Newcastle University ruled that out.

By **OWEN McATEER**

on soil and eggs from chickens, but the results on vegetables are still to be published.

The report's author, Dr Tanja Pless Mulloli, said the ash was not responsible for the high levels of 'heavy metals' such as lead, and arsenic in the allotments.

Evidence

But it was responsible for high levels of dioxins in the soil and eggs from chickens, raising concerns about cancer.

about the lead than the dioxins."

The investigation found that although there were high levels of heavy metals in the soil there was very little evidence to suggest it had come from the Byker ash.

There was evidence that dioxins in the soil in 18 out of 32 allotments had come from the ash and also clear evidence of a transfer of dioxins in the ash to eggs.

The report recommended that the level of contamination was high enough so that the limitation of agricultural use should be considered in nine allotments and in five the existing soil taken away



Risk communication: a (very) brief introduction

- Fischhoff B “Risk perception and communication unplugged: Twenty years of process.
Risk Analysis 15 (2) 137-145(1995)
- Bennett P & Calman K “Risk Communication and Public Health” OUP, 1999
<http://www.doh.gov.uk/pub/docs/doh/pointers.pdf>
- O’Neill O A question of trust Reith lecture 2002
<http://www.bbc.co.uk/radio4/reith2002/onora.shtml>
and Cambridge University Press 2002



Development stages in risk management

(Fischhoff 1995)

ALL WE HAVE TO DO IS TO.....

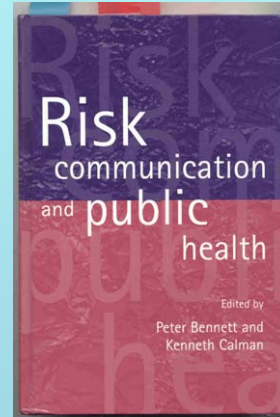
- Get the numbers right
- Tell them the numbers
- Explain what we mean by the numbers
- Show them that they have accepted similar risks in the past
- Show them that it's a good deal for them
- Treat them nice
- Make them partners

ALL OF THE ABOVE



Policy and practice in the UK

- **Department of Health advice 1999:**
from 'top-down' towards two-way (dialogical) approaches ("expert" and 'lay' perspectives should inform each other as part of a two way process"
- **Backdrop: policy pressures for risk regulators**
to involve public in decision making
provide public access to information (Aarhus Convention 98)
BSE crisis
US approaches actively involving community
- **Empirical research finds that:**
top-down approaches inappropriate
public are not passive absorbers of information
communication does not take place in a social vacuum



A question of trust



So is there other evidence for a crisis of trust? Do we trust less today, or are we just more inclined to spread suspicion?

Adequate evidence for a new crisis of trust must do more than point to *some* un-trustworthy doctors and scientists

Some sociologists have suggested that the crisis of trust is real and new because we live in a *risk society*..... It's true that *individuals* can do little or nothing to avert environmental risks, or nuclear accidents, or terrorist attacks.

So is the current supposed crisis of trust just a public mood or attitude of suspicion, rather than a proper and justified response to growing untrustworthiness? ...Unless we take account of the good news of trustworthiness as well as the bad news of untrustworthiness, we won't know whether we have a crisis of trust or only a culture of suspicion.



Key themes from qualitative interviews

- 1. Trust**
- 2. Differing understandings of risk**
- 3. Knowledge and expertise**
- 4. Confidentiality and secrecy**
- 5. Roles and relationships**
- 6. Communication**



Theme 1/6 from qualitative study: Trust

- Transparency does not necessarily lead to trust
- Wider local concerns (e.g. stigma)
- Hierarchies of trust
- Trust changed over time
- Trust influenced by previous events and pre-existing relationships



Theme 2/6 from qualitative study: Differing understandings of risk

Community

- qualitative, socially, economically and politically embedded
- ‘imposed’ risks (i.e. additional risks subjected to because they live near a disposal site)
- personalised
- want proof against a link

Officials

- quantitative, detached from wider context
- ‘voluntary’ risks (i.e. risks from smoking, drinking outweigh other risks)
- generalised to whole populations
- reject causal links for which there is no positive evidence



Theme 3/6 from qualitative study: Confidentiality vs. secrecy

- Differing understanding of the concept of ‘confidentiality’ and the reasons for confidentiality exacerbated feelings of mistrust and suspicion between members of the steering group:

“holding information until it was in a fit state to be made public”

VS

“holding back vital information that would protect the public’s health”



Theme 4/6 from qualitative study: Roles and relationships

- Lack of definition of roles and responsibilities (what is the role of public health or university epidemiologists – independent, medical or advocate?)
- Anger and personalised attacks
- Personalities
- Representativeness of steering group
- Two way risk communication with whom?



Theme 5/6 from qualitative study: Knowledge and expertise

- Often lack of relevant and committed expertise
- Steep learning curve for all involved
- Campaign group members felt they could advise experts
- Differences in 'expert opinions'
- Debate between experts as to the significance and interpretation of results and risks to health and the environment



Theme 6/6 from qualitative study: Communication



Theme 6/6 from qualitative study: Communication



Themes from qualitative study: Barriers to communication



Learning points 1/4

- **Trust**
 - Transparency did not guarantee trust
 - Trust relationships influenced by many complex factors
 - Confidentiality vs. secrecy
- **Barriers to good risk communication**
 - Debate between experts
 - Problem of engaging with non-activist public
 - Who should represent public concerns?
 - Roles and responsibilities not clearly defined
 - Understanding of risk varies



Learning points 2/4

- **Institutional barriers**
 - Local and national sources of expertise scarce
 - National responses slow
 - Steep learning curve in crisis setting
- **What worked well?**
 - Staged approach to investigations
 - lay members on steering group allowed local knowledge to be considered
 - Later diversified communication methods
 - Later trust between institutional stakeholders



Learning points 3/4

- **Communication**

- ‘The public’ are not a homogenous group: many ‘publics’ who may have different needs/agendas
- Good risk communication strategies need to consider multiple publics
- Need for agencies to work together to build trust before crisis situation
- Steering group allowed lay and local knowledge to be incorporated but meetings were often heated



Learning points 4/4

- **Risk communication: theory and practice**
 - Communication of risk = social process: context, timing, presentation important
 - Need to understand underlying factors and wider social context
 - Risk researchers usually have no experience of doing risk communication
 - Risk communicators often have little knowledge of empirical or theoretical work on risk
 - Theory' around risk communication isn't being tested and isn't getting through to people at the front line
 - Need to identify and reduce interdisciplinary obstacles for learning



Costs and Benefits

- Locally (and nationally) other things did not get done at LA, DHA, EA
- Better working relationships between local agencies
- Better working relationships between local and national agencies
- Newcastle City Council cutting edge in dealing with contaminated land in UK
- Allotment remediation



Some policy context

- Food contamination (2001)
- Tolerable daily intakes
- Contaminated Land regulation April 2000
- Hazardous waste directive
- Planning system reform/brown field site development
- Shifting the balance of power in the NHS (White paper 2001)
- Getting ahead of the curve, CMO (January 2002)
- Contaminated land: ICRCL CLEA CLEA review
- IPC IPPC (2000)
- UK National Dioxin strategy



Case Study: The Byker Episode

Thank you for
your attention



From Science to Decision Making: Understanding, Communicating and Integrating Environmental Complexity and Uncertainty into Policy, 3rd Seminar Meeting of NERC Knowledge Transfer Network on POPs, November 9, 2005

