

Hygiene With Numbers

exposure

Hans Kromhout

Division of Environmental Epidemiology
Institute for Risk Assessment Sciences (IRAS)
Utrecht University, Utrecht, NL



Take home message prEN 689 2016

- Too little, too late
- Misguided
- Outdated
- Not for the future, but for the past
- Occupational Hygienists should (could) know better, Exposure Scientists already do

Let's start with some quotes

Ann. Occup. Hyg., 2016, Vol. 60, No. 4, 403–404
doi:10.1093/annhyg/mev096
Advance Access publication 11 January 2016



COMMENTARY

Hygiene Without Numbers

HANS KROMHOUT*

Department of Environmental Epidemiology, Institute for Risk Assessment Sciences, Utrecht University, Yalelaan 2, 3584 CM Utrecht,
The Netherlands

*Author to whom correspondence should be addressed. Tel: +31 30 253 9440; e-mail: h.kromhout@uu.nl

Submitted 1 December 2015

From presentation “Hygiene with(out) Numbers”
by Dr. P. Griffin HSE Manchester 15/10/2015

Institute for Risk Assessment Sciences



Let's start with some quotes

“Measuring exposure does not in itself decrease it, and it can be an expensive distraction,....”

From article “Progress on the European Standard on testing compliance with OELs.” by Dr. T. Ogden sent around early April 2016 for OH2016 Glasgow



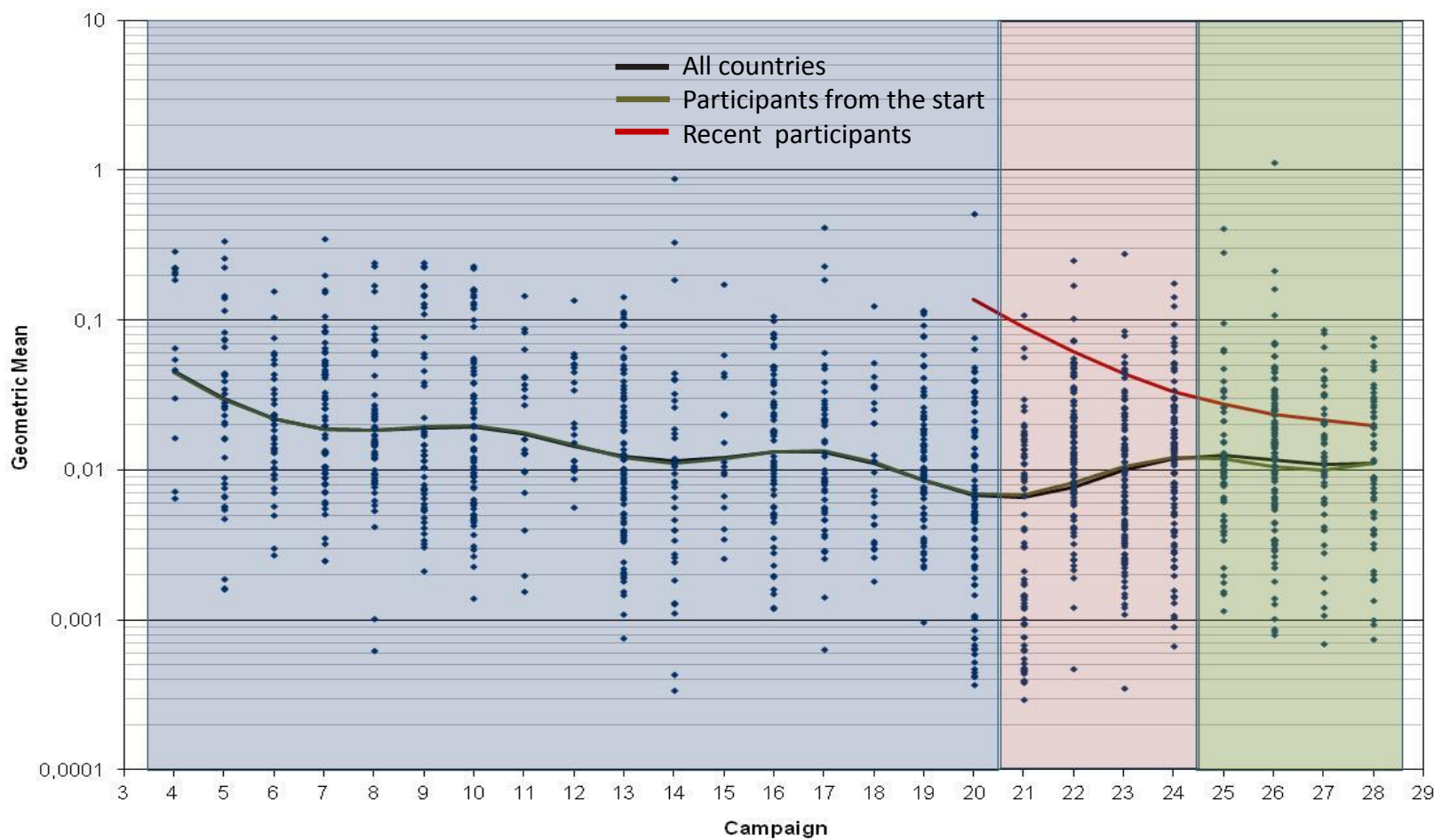
Regular measurements do lower exposure concentrations

It has recently been proven

Provisionally accepted paper by *Basinas et al. 2016*:
In a randomized intervention study 40 farmers who got measurements results reported back to them together with instructions on basic measures of prevention showed an overall **reduction of 23%** in personal dust exposures as a result of the intervention ($p = 0.02$) compared to 40 farmers who never saw the results. For individuals (including farmworkers) who actually saw the results a **reduction of 48%** was seen.

Industrial Minerals Association Dust Monitoring Programme

Temporal trends in respirable quartz concentration in mg/m^3



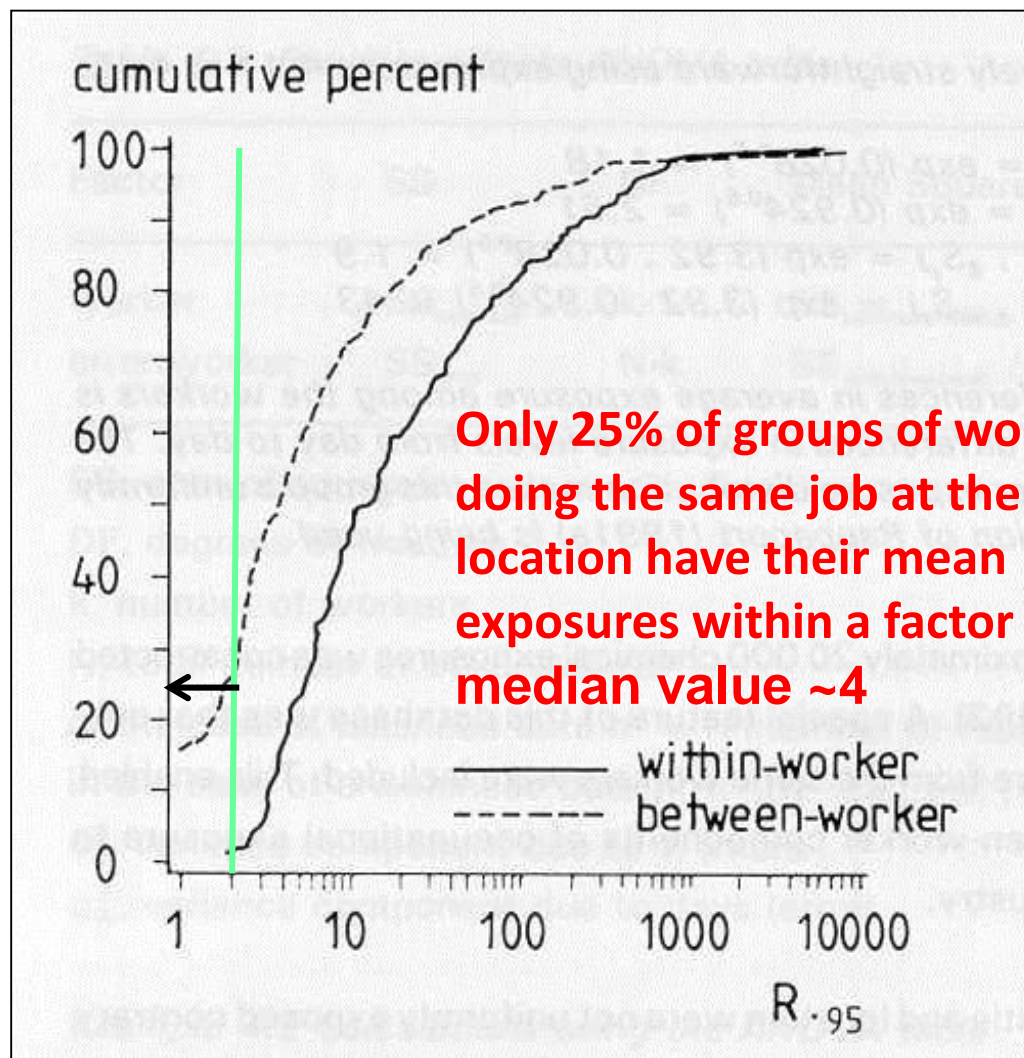


Similar Exposure Groups

- We all know that HEG/SEG were already outdated when they were introduced
- It is a fantasy, why do we stay with it?
- SEGs should be quantitatively defined and for every group of workers it should be checked that they actually form a SEG
- In this day and age where personalized/precision medicine is becoming the norm rather than the exception we need **Individual Compliance Testing**

Similar Exposure Groups a Fantasy?

(Kromhout et al. 1993)





Similar Exposure Groups a Fantasy?

(updated by Symanski 2006)

50% between
worker fold range

By job/location

4.8

By job/across locations

10.2

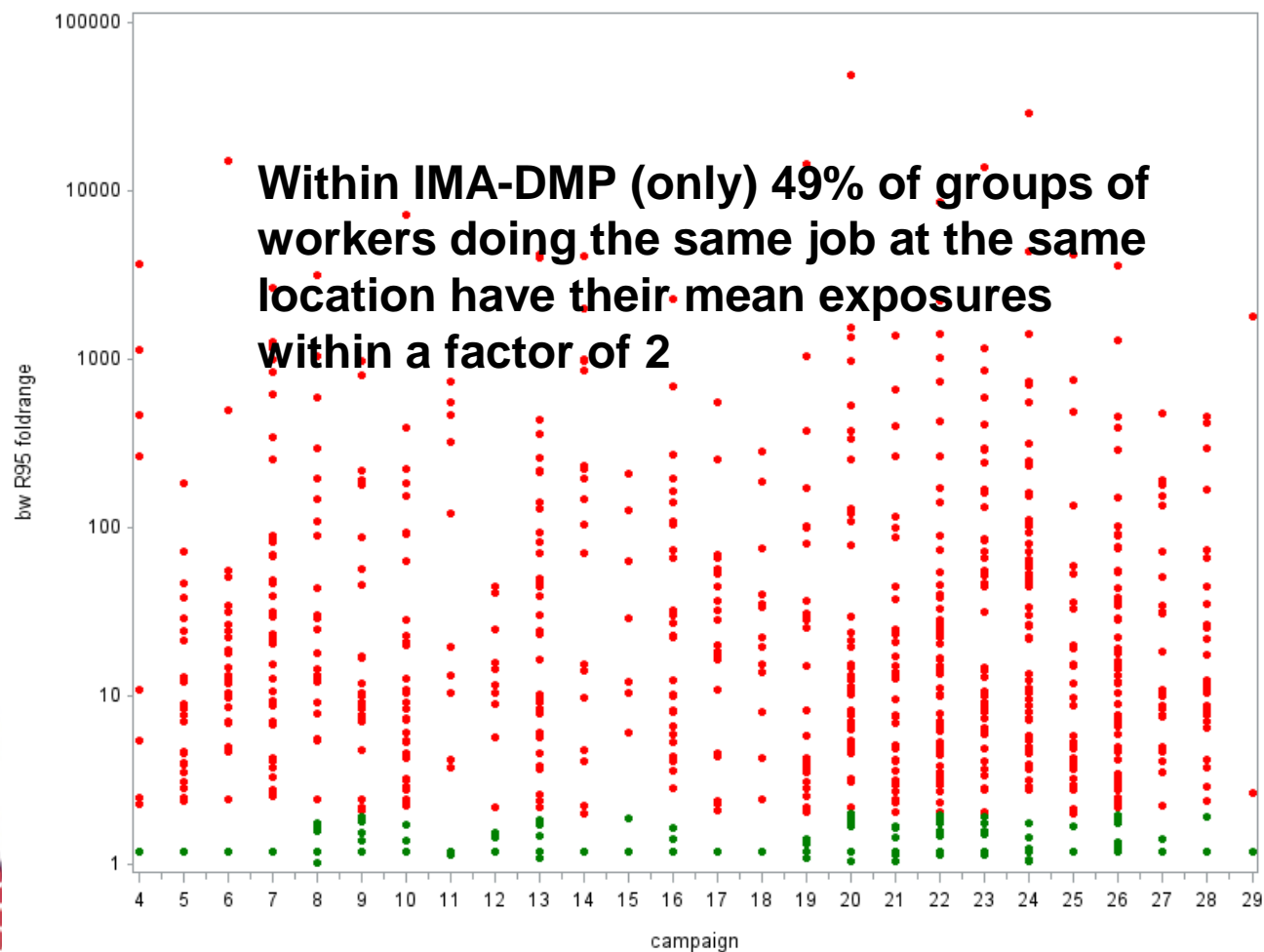
Across jobs/by location

23.6

Across jobs/across locations

65.0

Similar Exposure Groups a Fantasy? IMA-DMP (1457 groups; 2002-2015)





Ignoring differences in (long-term) exposure between workers

Results in:

Declaring more situations (unnecessary) non-compliant when evaluating exposures with health effects developing after long-term exposure

IMA-DMP (Respirable Quartz)

(OEL 100 or 50 $\mu\text{g}/\text{m}^3$)

Exceedance >5%; 37% or 57%)

Overexposure >5%; 26% or 47%)



Ignoring differences in exposure between workers

Results in:

Declaring a few more situations
(unnecessary) non-compliant when
evaluating exposure with health effects
developing after acute exposure since part
of the total variability will be due to
differences between workers



But we are erring on the side of caution!

In principle that's fine!

But it will lead to more costs (RMM are expensive)

That could have spent more effectively in measuring the exposure pattern more precisely and with fewer assumptions

Reducing the exposure is more than best practices and often needs detailed measurement results in order to be effective

Timeline

- 1993 Variance component paper published
- 1995 EN689 published
- 1995 Rappaport et al. published strategy accounting for within- and between-worker sources of variability.
- 2000 Contacted Roger Grosjean, response was negative
- 2007 Keynote at BOHS, Glasgow (installation of BOHS/NVvA group)
- 2010 BOHS/NVvA guideline
- 2016 prEN689 Back to where we started
- Steve was right (and wrong) when he told me in 1993 that it would take 25 years before our work would be taken serious and incorporated in standards. No wonder we do not see him in the workplace arena anymore and that he ventured into the exposome.

The future

MyExposome²/precision occupational

We will know our genetic make-up

We will have

Will we (as
based exposure
enough?

If so, we will have a
toolbox, because workers will go DIY



It is not too late

To come up and show the scientific basis for what is being proposed based on real exposure data and not another set of simulations

To define SEG's quantitatively and to test them;
Individual Compliance Testing is a necessity

To propose repeated sampling of individuals to be part of the European Norm

To register worker-IDs to allow merging of data from different sets of periodic measurements