

NoMiracle final conference held in Aarhus, sept. 2009



Editorial

by Claire Mays,
NoMiracle Dissemination Officer

As usual during NoMiracle gatherings, a listener in the hallways at our Aarhus Conference could hear warm laughter, scientific discussions, and critical comments. Looking for feedback on our work, I asked several participants to respond to two questions:

- 1 What idea(s) did you take away from the conference?
- 2 What challenging question would you like to pose of NoMiracle researchers? (or what challenging statement would you like to make?)

Editorial



by Hans Løkke, NoMiracle Co-ordinator

It is a great pleasure to introduce this Newsletter No 16, looking back to a very successful Final Conference in Aarhus on Multiple Stressors including a session with PHIME. In this issue you will find highlights from the conference as experienced by participants, and Conclusions (pages 10-11) from the closing panel and discussions. Under the headlines MAKING CONNECTIONS ACROSS DISCIPLINES (pages 6-7) and ISSUES FOR SCIENTISTS IN INTEGRATIVE WORK (page 9), special focus is on the crosscutting issues of NoMiracle as reflected by the Final Conference. Further, the training courses held in connection with the conference are presented with profiles of a participant and a teacher. Further, the training courses held in connection with the conference are presented along with the response of a participant. The end-product of NoMiracle, an array of novel methods, launched as the "NoMiracle Tool Box" (see page 2), is now available on the web site. The coming and final issue of NoMiracle will cover this topic in more detail.

I hereby thank everybody for their active participation in the Aarhus Conference and I give special thanks to the organising staff, the Scientific Committee and all who prepared platform presentations and posters.

Conference proceedings:

http://nomiracle.jrc.ec.europa.eu/Pageslib/Conference_09_09.aspx



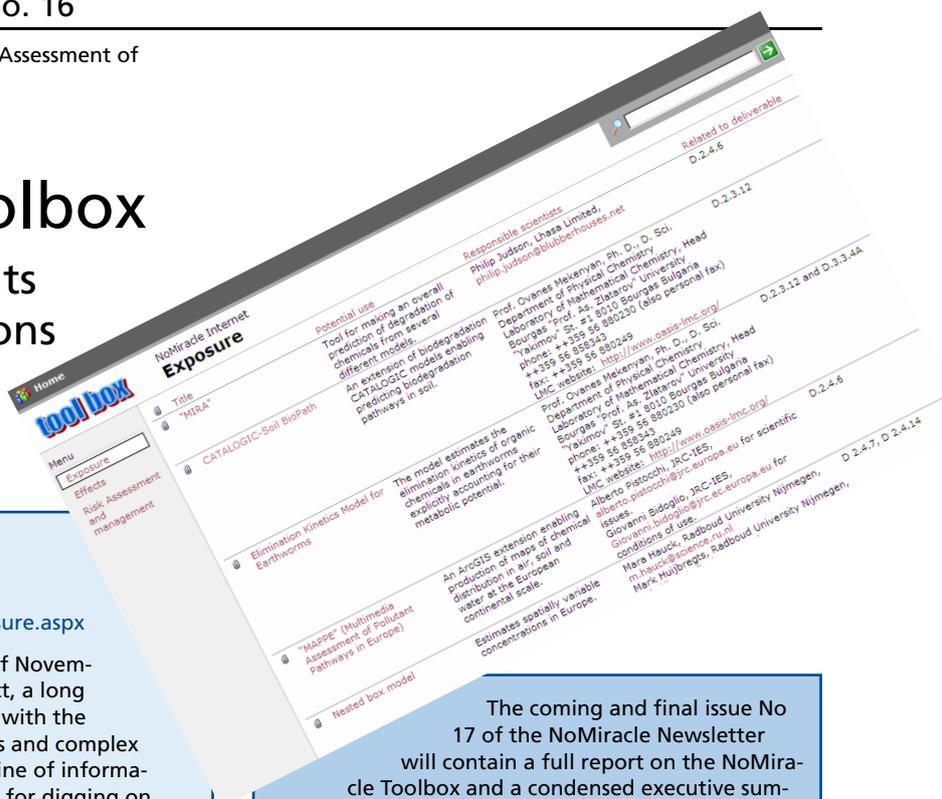
In the following pages, you can read feedback from some Advisory Board members, visitors from other projects, and stakeholders, as well as a few NoMiracle presenters. There are ideas for follow up (like the HENVINET network) and much encouragement!

In this issue

1. Editorial
2. The NoMiracle Toolbox
– Making NoMiracle Results Available for Applications
4. The Challenge of Looking for Combination Effects – Critical Voices
6. Making Connections Across Disciplines
9. Issues for Scientists in Integrative Work
10. Conclusions of the Aarhus Conference on Multiple Stressors
11. Final Panel
12. Training Courses
12. NoMiracle co-ordination

The NoMiracle Toolbox

– Making Nomiracle Results Available for Applications



The NoMiracle Toolbox

<http://nomiracle.jrc.ec.europa.eu/Lists/Toolbox/Exposure.aspx>

The experimental work of NoMiracle ended by 1st of November 2009. Across the 5 years of the Integrated Project, a long array of novel methods has been produced, dealing with the assessment and management of cumulative stressors and complex scenarios. In a short and descriptive way, this goldmine of information now is opened as the NoMiracle Tool Box ready for digging on <http://nomiracle.jrc.ec.europa.eu>. Each method or tool is presented in a standardised way on one page, showing the tool title and describing its features, its potential use, its novelty and background. The tools are classified as "ready for use", "under development" or "more research needed". As well the references are given, and the contact address for the responsible scientists. The page contains too, if available, the link to the deliverables of NoMiracle on the basis of which the tool was developed. In some cases this is an extensive public report; in other cases the report is restricted due to ongoing publication processes.

The NoMiracle Tool Box will be further updated during the coming months, with new tools as they emerge from the publication process and become available for the use of other scientists, managers and practitioners.

The coming and final issue No 17 of the NoMiracle Newsletter will contain a full report on the NoMiracle Toolbox and a condensed executive summary of the the main results of 5 years of research.

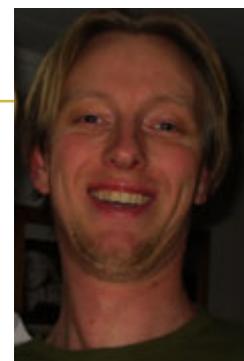
Feedback from Advisory Board, Visitors and Stakeholders

Great progress in integration – but need to synthesize

Mathijs Smit – StatoilHydro (Norway)

What I take with me from the conference is the impression that through NoMiracle large progress is made in the field of integrated risk assessment of mixtures and natural stressors. Those two very items are highly relevant for the business that I am involved in, which is oil and gas exploration and production. Risk assessment is an important part of how we manage our operations, and therefore it is important that we use state-of-the-art knowledge and techniques in our assessments.

What I missed during the conference was someone providing a synthesis of highlights and main achievements of the program. I feel that the impact from this project could be larger if results were communicated in a much more condensed way. Additionally, larger industry involvement and application of the new knowledge in several case studies would make the project even more interesting.



Development of a toxicological database to aid the risk assessment of exposure to mixtures of compounds

Dr. Richard Glass, UK Food and Environment Research Agency (FERA)
E-mail: richard.glass@fera.gsi.gov.uk

Growing out of a suggestion by NoMiracle scientist Jean-Lou Dorne and funded by the European Food Safety Agency (EFSA), a database is under development that will, when completed, contain details of toxicological references related to the effects of human exposure to mixtures of a wide range of naturally occurring and synthetic compounds. The database uses MySQL (an open-source relational database running on Debian Linux), which is hosted on the UK Food and Environment Research Agency (FERA) website. The application is developed using open standards as a three-tier Web database model using the Web application server Adobe ColdFusion; output files are compatible with EndNote. Access to the website (data updates and individual user consultations) is secured using encrypted passwords and the SSL protocol. Literature searches are being done to populate the database with relevant reports which are being reviewed by international experts, initially within FERA, based on the Cochrane Collaboration. As the literature searches are completed the database will become a key tool to allow the user to search for reported toxic effects of particular compounds of interest, such as pesticides, botanicals, mycotoxins, etc. when present in mixture with other compounds.



NoMiracle is stepping into the unknown

Richard GLASS – FERA (UK)

EFSA searched the literature for six months for evidence of synergistic or antagonistic effects of exposure to different chemicals, and found little. Possible interactions are mentioned but there is little statistically validated evidence to back up those thoughts. In the 3 days of the Aarhus Conference I heard lots of evidence to show there are interactions. I was pleasantly surprised to find sound evidence.

These are early days; it will help to focus risk assessment onto priority topics: exposures that need to be considered, mode of action and endpoints.

A wide range of work is done in NoMiracle, showing up relationships that traditionally have not been thought about. Congratulations and keep up the good work. And keep in touch – the Database like a sponge will soak up anything coming our way.

Stand up for what you have learned from your research!

Peter Pärt – JRC (Advisory Board)



The Challenge of Looking for Combination Effects – Critical Voices

Combination effects!

When $0 + 0 + 0 + 0 + 0 + 0 = 1$

Finn Bro-Rasmussen – DMU (Aarhus, Denmark)

European legislation is lagging on the issue of combination effects. There are no principles or ways to deal with it. We succeeded in the 1990s in producing guidance on pesticides in water, but a case-by-case, substance-by-substance approach is used for the environment and human health. The rationale of dealing with combinations must be argued and demonstrated. NoMiracle work will give impetus to recognition of the need for a new approach centered on combination effects. This is the most important issue in the context of REACH today.



Should policy makers be worried about mixture effects?

Brian G. Miller* – Institute of
Occupational Medicine, Edinburgh (Scotland)

There was a great deal of interesting biological science going on, in many diverse areas. It was clear that the answer to the question 'are the effects of mixtures seriously non-additive' was variable, and depended very much on context. There were a number of findings of interaction, but it's impossible to know how much publication bias would dissuade researchers from trumpeting results that showed no interactions. There certainly were some of the latter too, but was the balance representative?

NoMiracle is clearly a cluster of sub-projects; I thought it was hard to take an overview that would apply elsewhere. That was largely, of course, precisely because the sub-projects were so diverse. I think the question(s) I'd pose would be 'Is there any evidence to suggest that the effects of mixtures of low-level exposures in the environment on health might be of a greater order of magnitude than the main effects of individual exposures? Should the policy makers be worried about mixture effects?'

*This is a personal opinion and does not engage the Institute



How to bring together the diverse work on multiple exposure?

Arnout Standaert – VITO - Flemish Institute for Technological Research (Belgium)



My background is actually in human exposure and toxicology rather than ecotoxicology. The conference focused heavily on ecotox, so in part it was a scope-broadening experience for me. It was interesting to see the directions that multi-exposure ecotox is exploring, especially since this area is so young and not yet stuck in default patterns. These new ideas are often not limited for use in multi-exposure but can benefit more "classical", single-exposure problems too. In our research group at VITO, we investigate different facets of human exposure including multiple-exposure problems. A number of ideas presented on the NoMiracle conference will definitely be on my shelf, to see if we can apply or adapt them to human exposure.

Especially the discussions on the REACH legislation were very interesting: they show how much work there remains to be done regarding multiple exposure, not only on the scientific level but also on the regulatory level.

The NoMiracle project is only a start in exploring multi-exposure problems. There are a lot of different directions and ideas in all these disciplines that exposure science is based on: I've heard talks varying from chemical analytical methodologies, over risk communication & management strategies to "die-hard" mechanistic full-chain computer modelling. Also, often, the techniques are developed based on specific case studies. The work is very diverse, which makes it sometimes difficult to see the implications of these ideas on each other and on the global picture of cumulative risk assessment. So, these questions could be asked: How do the NoMiracle scientists see the future of this initiative? How will this research continue to be monitored and steered, so that a global, integrated methodological framework for cumulative risk assessment can emerge?



A new route opened to addressing multistressor effects of metals

Staffan Skerfving – Lund University (Sweden)
(PHIME Co-ordinator)

The Aarhus Conference presentations and discussions showed that there are important multistressor effects of metals:

- 1) Different toxic metals can interact/potentiate each other, e.g. in the developing brain, and the kidneys.
- 2) Nutrients (Selenium, polyunsaturated fatty acids, Iron) can attenuate the effect of toxic metals.
- 3) Toxic metals might interact with other environmentally.

Too little attention has earlier been paid to interactions, in particular "nutritox" aspects. These important issues should be addressed. This conference should mark the beginning of an important route, both theoretical and practical.



We need to focus on the bigger picture

Peter van den Hazel – Public Health Services Gelderland Midden (NL) (Advisory Board)

Lab scientists are a little too modest talking to policy makers. Listening to many presentations, I found we were still working on square centimeters, instead on the environmental territory. Researchers presented the detail of their results, often without a "so what?" conclusion: what results mean, for whom, in what circumstances. I missed reflection on whether presenters are happy with their results, if they think they can rest here, or where they think they should go.

Still looking for a holistic approach

Jürg Oliver Straub* - F. Hoffmann-La Roche Ltd (Basel, Switzerland) (Advisory Board)

NoMiracle has produced a host of reports covering a very wide span of work from overall, conceptional and theoretical considerations to very practical, down-to-earth laboratory testing; moreover, some publications link empirical data gathered to extrapolation and reliability. In all, there is a huge mass of results testifying to an astonishing amount of work that has gone into NoMiracle. However, NoMiracle still reminds me of the German saying that sometimes one cannot see the forest because of all the trees. What from my own, personal point of view is still missing, but nonetheless highly desirable, is a synopsis that genuinely joins and unites the many single results into a whole; that derives a method, so central to the acronym of NoMiracle, to investigate various kinds of multiple stressor situations; that illuminates in a holistic thinking a practical approach for tackling questions and problems, which is based on a solid philosophical, methodological and technical foundation; and that thereby allows to draw sound conclusions with an appraisal of their uncertainty in view of complex situations.



*This is a personal opinion and does not engage F. Hoffmann-La Roche Ltd

Sweden and Denmark: NoMiracle results presented for regulators

Follow-up to the Aarhus Conference

On 17 November 2009, NoMiracle co-ordinator Hans Løkke gave a keynote lecture entitled "Novel Methods for Estimation of Combination Effects – a challenge for future regulation of chemicals" at the seminar "Combination Effects in Ecotoxicology and Toxicology – Science and Regulation" in Solna, Stockholm, Sweden, held by the Toxicological Council under the Swedish Chemicals Agency in co-operation with the Swedish Research Council Formas. 140 persons attended the seminar.

Also in Denmark, the combination effects of chemical substances are of high priority to the Danish Environmental Protection Agency. On 24 November, the NoMiracle Co-ordinator presented the outcome from the NoMiracle conference in Aarhus to the Danish Pesticide Council where he is vice chairman.

Making Connections Across Disciplines

Protecting the diverse community of species is the goal of our work

Marieke De Lange - Alterra (RP 4.2)

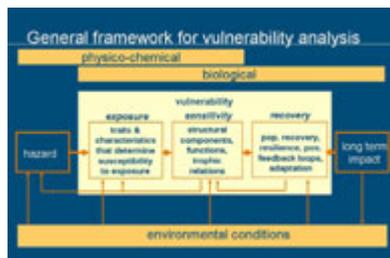


A highpoint of Marieke’s presentation “Ecological vulnerability analysis as new conceptual technique in risk assessment” was the report of her Google Images search on the keyword “vulnerability”. The search revealed that this term is a vital systemic concept under development in a broad range of fields.

There is trade of terms now among disciplines. The old familiar word in ecology is “resilience” and it is shared by those who study social and economic systems in their response to major stress. Focusing on resilience is a retrospective approach:



What allowed a system to “bounce back”? Ecology has taken up the social term of “vulnerability”, and in contrast this allows a prospective approach: What may bring a system to the point between survival and failure? And results are emerging as we speak. A year ago we would have said that we cannot predict when an ecological system will reach a tipping point; but now we are beginning to identify signals that tell us when this point is close.



I worked a long time on the graphic framework for my presentation to bring out the fact that the traditional concept of “sensitivity” is only a part of vulnerability.

The message to take away is that “vulnerability is much more than effects”. With such understanding, we can start to get the bigger picture, and extrapolate from the vulnerability of species to that of food chains and habitats. Such ecologically meaningful results will allow us to protect communities of species and ecosystems, which is the goal of our work. At least, it’s my goal.



Open the frame to include socioeconomic factors

Brooke L. Magnanti – Biophysics Group, Bristol Haematology and Oncology Centre (UK)

Looking back over my notes after the conference, the entry that has the most stars next to it reads: ‘Limiting views to some agents or factors may miss the larger scene’ - this was during a talk by Timo Assmuth. I felt that the methods presented had a lot to offer, but as with any complex systems, we are still at the very beginnings of knowledge.

The first challenge I would point out to NoMiracle researchers concerns socioeconomic factors in the models of exposure - I thought in many of the studies, this did not seem to be adequately provided for when assessing the exposed/unexposed areas. The second concerns involvement of stakeholders: seek this EARLY and OFTEN!



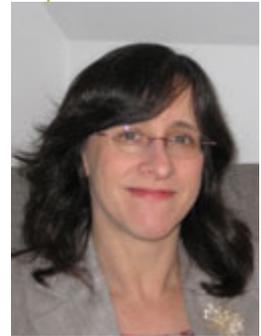
NoMiracle Newsletter No. 16

NOvel Methods for Integrated Risk Assessment of Cumulative stressors in Europe

Individual medical risk management and environmental risk governance: Vulnerability assessment as a conceptual link

Laurel Austin – Copenhagen Business School (Denmark)

Although I'd had no previous exposure to NoMiracle, attending the conference was highly rewarding, in terms of the ideas and people I encountered. I attended looking for ways that research on individual level medical risk management/governance can be informed by research on environmental risk governance; several presentations did just that. Some key concepts in this regard were: distinguishing between assessment of stressors and vulnerabilities; methods to derive assessment factors that are used to inform risk reduction policies, and ideas on how to integrate assessment of multiple stressors and vulnerabilities. I would like to continue looking for ways to apply research frameworks and methods developed for research on environmental risk governance to research related to individual-level medical risk governance. I would be very happy to hear from other researchers who might be interested in exploring this with me.



Opening an interface with policy

Alena Bartonova (NILU, Norway) and Peter van den Hazel – HENVINET

The NoMiracle Secretariat and Dissemination WP urge NoMiraclers to join the HENVINET (Health and Environment Network), as one means of follow-up to our project. Alena Bartonova and our Advisory Board member Peter van den

Hazel presented this EC-funded initiative at our Aarhus Conference. HENVINET deals with human health-related issues including environment and health, but topics in environmental sciences also are relevant.

HENVINET uses a web portal and forum and the community is growing each week – it already counts about 215 members (researchers and some policy makers). The main objective is to provide a vehicle for quick entry of research results into policymaking.

The Aarhus Conference proved that there are many results coming out of NoMiracle and that there are dynamic young researchers to carry them. HENVINET would be very good to place some of these results in view.

We encourage you to join the network at www.henvinet.eu - but moreover, contribute some comment and get a discussion going.

→ →

Pointers to Other Conferences

Arnout Standaert – VITO – Flemish Institute for Technological Research (Belgium)

Uniting expertise from different fields of technology in a pleasant and stimulating environment enhances innovation and the development of novel methods for sustainable production. Have a look at the international congress 'Innovation for Sustainable Production 2010' – 18-21 April 2010 – Bruges (Belgium)

www.i-sup2010.org

Claire Mays – Symlog – Paris (France) – NoMiracle Dissemination

To understand societal reasons for paradigms and foresee possible changes? 'Carcinogens, Mutagens, Reproductive Toxicants: the Politics of Limit Values and Low Doses in the 20th and 21st Centuries' – 29-31 March 2010 – Strasbourg (France)

http://irist.u-strasbg.fr/index.php?option=com_content&task=section&d=1&Itemid=50 ;

http://irist.u-strasbg.fr/media/CMR_anglais.pdf

NoMiracle Newsletter No. 16

NOvel Methods for Integrated Risk Assessment of
Cumulative stressors in Europe

HENVINET aims to help ensure the legacy of several EC projects and it can serve this function for NoMiracle. Some of our consortium leaders have already joined.

Below you'll find Alena's responses to our question:
Why join HENVINET?

Short answer: because it provides a vehicle for quick entry of research results into policymaking (at least, potentially). See also the brochure (in this Newsletter) for functional reasons: networking, information gathering....

Long answer: Henvinet is aiming to improve the science-policy interface, and sway the pendulum in decision making towards "science".

Some background:

1. Science competes with all the other decision parameters policymakers have to consider.
Normally, science loses, for a number of reasons, of which some are:
 - unprofessional communication patterns (we are trained in science not in communication),
 - unclear messages, for lack of available knowledge,
 - difference of scientific opinion between scientists preventing clear messages
 - difference in time horizon between policymaking and environmental health issues (most are not short-term issues, though some are), meaning the non-action today will be costly only in the distant future
2. Informed decisions are made by enlightened policymakers with help of scientific committees, in order to overcome some of the problems above. They deliberate to come up with policy advice, using more or less scientific methods including metaanalyses, expert elicitations and so forth.
3. Normally, we do not have an arena for contact with policymaking, which is damning in the long term, because policy needs drive research funding. Our first priority is often to publish in journals which are not those that have impact on policies (except perhaps Nature&co). And who of us ever makes it to a scientific committee, or to Nature?

And here we come to why one should join the HENVINET community:

1. HENVINET provides ways for individual researchers to initiate a debate on important issues. Such a debate is necessary before we can credibly claim that an issue should be taken into account for action, and HENVINET provides both tools (knowledge evaluation methodology) and means (portal with its fora ++) to support such discussion.
2. HENVINET provides researchers access to policymakers (at least, it will if we succeed).
3. Students on all levels of professional development, certainly from PhD candidates upwards, should think of their results in terms of what consequences they may have for E&H policy.
4. Of course, policymakers also need to know what is going on in research, and where to find persons with expertise that may be of use to them, so HENVINET is potentially a win-win situation.

From the HENVINET brochure

The HENVINET portal provides environment and health professionals and stakeholders throughout the world with the ability to:

Network with peers:

Engage with a community of scientists, policymakers and other stakeholders to share expertise, views and information.

Access the experts:

Search for and pinpoint specific expertise, and efficiently communicate and discuss concerns and specific topics with experts worldwide.

Tackle global challenges:

Collaborate within stakeholder communities via online forums that bring together a relevant portfolio of experts and stakeholders to address global challenges.

Set the agenda:

Shape the agenda of the Environment and Health community via participation in forums that discuss the key topics of today and tomorrow.

Share opportunities:

Advertise conferences, symposia, research calls, employment offers and similar opportunities to a wide range of professionals.

HENVINET PORTAL PARTICIPATION

- Register as a user
- Add your profile information
- Join relevant groups
- Find relevant contacts
- Initiate and discuss issues via the various forums

Join the HENVINET networking community in three easy steps:

- 1) Register at www.henvinet.eu
- 2) Create your profile
- 3) Participate and network

Issues for Scientists in Integrative Work



Where's the biology?

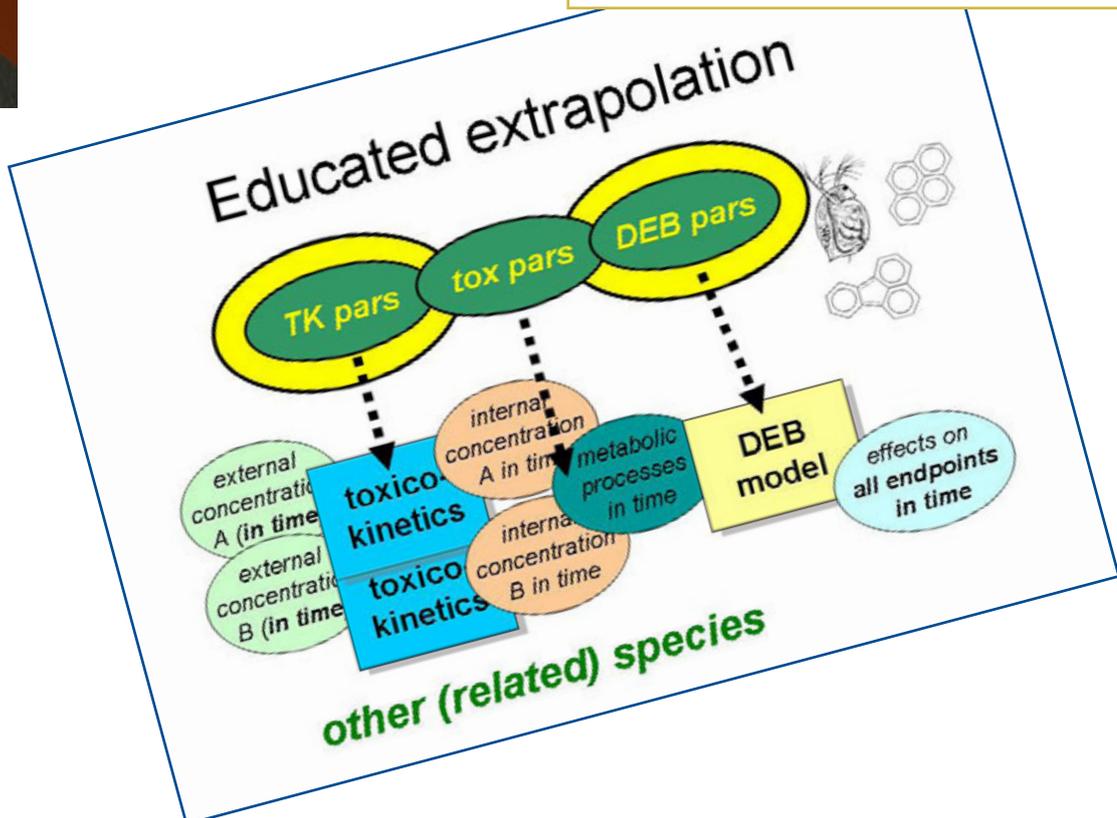
Jan Baas – Vrije Universiteit (RP 3 - 4)

Jan Baas urged us to keep one foot in the lab, and one foot in the complex outdoor world in which exposure takes place – to ask not just a rigorous scientific question about a small slice of reality, but also “Where’s the biology?”. We want to go beyond the experiment – in which we look at a certain chemical mixture, a certain endpoint, at a given time - to gain understanding about the organism, with its different endpoints at different times.

I’m a chemist, not a biologist, so I don’t have the same perspective or knowledge as many others working in NoMiracle. I arrive in this environment and say: “What am I trying to understand? How do I move closer to that?”. The opportunity to ask such questions is one of the reasons that I am so glad to have worked in NoMiracle.

Remember: the work of scientists is asking questions, not producing answers!

Francesc Giralt – U. Rovira i Virgili (NoMiracle Environmental crosscutting co-ordination)



Conclusions of the Aarhus Conference on Multiple Stressors

Twinning Debate

Mikael Hildén in action at the blackboard.

A “twinning debate” guided by Prof. Mikael Hildén involved the audience in extracting the most important issues in risk management related to uncertainty and ambiguity. The twinning debate is based on a discussion in pairs or small groups after a brief session of personal reflection. The small groups then present their findings to everyone. In this way impressions and views are collected from the whole audience. Aarhus findings are reproduced below.

Interestingly, in challenges seen by the Aarhus audience the lack of perspective, transparency and adequate information were predominant along

with lack of data and proper tools to deal with uncertainty and ambiguity. In particular there is a lack of high quality exposure data obtained by monitoring. Subsequently, the audience was asked to suggest what to do to improve the situation. Out of 14 recommendations, 8 dealt with better or more targeted communication and social learning processes along with better planning in terms of scenario analysis, ranking risk factors, and optimising the use of resources. Only two suggestions dealt with natural sciences, namely broadening the scope of assessment by including multiple stressors, and providing more and better standardised data.

The challenges

The lack of basic data

- Lack of data in exposure assessment
- Lack of info on the distribution of vulnerability
- Lack of info on health effect
- Inadequate environmental monitoring (lack of data)

The lack of specific studies

- Lack of exposure assessments
- Knowledge of performance of measures to reduce risks
- Lack of realistic scenarios – quality of model output

Broad epistemological issues

- Lack of broader perspectives of risks
- Not knowing what is “normal” – or what is dangerous
- Representativeness of data
- Quantity of information
- Fundamentally flawed data
 - > Short term for long term problems
 - > Poor statistics
 - > From testing in vitro to humans
 - > Overconfidence in available info
 - > Framing the problem
 - > Confusing info

Stumbling stones in management process

- Visibility and transparency
- Choice of safety factors
- Extrapolation problems
- Lack of tools to deal with uncertainties/ambiguity

What to do?

Improving the knowledge base

- Broaden scope of assessment – examine multistressors
- Plan better test/optimize use of resources
- More experiments, more data generation
- Better use of available data: better standardisation

Developing approaches

- Use of scenario analysis to guide evaluation of measures
- Qualitative mapping of risk factors -> rank critically based on evidence
- Learn what to do when you don't know what to do (adaptive approaches)

Improving communication and enhancing social learning in dealing with risks

- Developing and understanding the communication problem context
- Considering timelines of communication with the public: not too early or too late
- Early involvement of stakeholders
- Improving skills of communication
- Making assumptions explicit
- Applying the Aarhus Convention (access to information, right to participate in environmental decision-making, right to environmental justice)
- Involving stakeholders in discussions on benefits, acceptable levels of protection
- Training, learning of everyone involved
 - > inclusion vs. exclusion; social learning (clear argumentation)
 - > understanding the limits of research (clear argumentation)
 - > understanding vested interests

Final Panel

by Hans Løkke, NoMiracle Co-ordinator

In the final panel the discussion dealt with the implementation of novel tools developed by scientists under the headline: Strategies for testing and risk assessment of multiple stressors: Are a shift of paradigm and change of test guidelines possible? The discussion was introduced by Dr. Jan Baas who stressed that testing should start with the organism rather than with the “chemical”, following



effects as processes, and allowing for extrapolation to other parameters or compounds where no data are available (see page 9 of this Newsletter). In his opening presentation, Prof. Philipp Mayer suggested coupling risk assessment and pollution management. He asked if we should move from “remediation for the removal of contaminants” to “remediation for the reduction of risk”.

From the panel Dr. Jean Lou Dorne pointed at the new OECD Guidelines for Toxicological Testing which allows for the use of cell lines or historical data for the assessment. Dr. Bruno Hubesch, manager of the CEFIC Long-range Research Initiative (LRI) urged scientists to focus on exposure data collection sampling methods, looking to obtain

anthropological consumer behavior data, and understanding habits and practice for realistic exposure studies. “We should identify plausible scenarios using common sense. By selecting highest probabilities we can come up with some 10 key exposure scenarios. This will point us to where the detector should be placed, where we should invest our limited measurement effort”. Dr. Peter Pärt found that environmental toxicology has been too much in the hands of chemists. He asked for more mechanistic understanding in the ecotoxicology area. Dr. Magnus Löfstedt from the Danish Environmental Protection Agency perceives no need for a shift of paradigm. He found that the NoMiracle methods can fit into the existing regulatory system as supplements. The regulatory frameworks are not static; they develop all the time, although slowly. From the audience, Dr. Ad Ragas claimed that a paradigm shift would take place if we were to look no more at single stressors, but at how together they impact health or economy. Shifting attention to receptors has implications for the regulator.

With this panel discussion a fruitful and intensive conference ended. The PHIME project will continue its work, while NoMiracle is wrapping up a large body of knowledge, novel methods and new concepts to be given to the regulators and other stakeholders. Most of the results are published or in press in the open literature, and a compilation of the novel methods will be found in the “NoMiracle Tool Box” which is launched on the NoMiracle web site (see page 2 of this Newsletter).



Training Courses

Communication with regulators and with the exposed public

Deborah Watt* – Health Canada / Santé Canada,
Ottawa (Canada)

It was an enjoyable conference on a scale that I felt permitted me to get to know a few people at breaks and meals, and along with other trainees I felt very well hosted by the conference organizers.

The course which I attended prior to the start of the conference as well as a number of presentations at the conference gave me a better appreciation of methods to quantify different types of uncertainty in risk assessment and the onus on risk assessors to clearly communicate the bounds of uncertainty to regulators. It was interesting to learn the scope of activity that has taken place within NoMiracle on this subject and that is continuing in other fora in Europe.

Given the complexities of assessing human health risks of exposure to multiple stressors, what risk communication strategies for the public should be followed for populations with multiple exposures that may be a health concern?

*This is a personal opinion and does not engage Health Canada.

*The training courses were announced in
NoMiracle Newsletter No. 15.*

NoMiracle co-ordination

Visit NoMiracle and subscribe to
the Newsletter at: <http://nomiracle.jrc.it>

For further information contact

NoMiracle Secretariat
E-mail: nomiracle@dmu.dk

- Project co-ordinator and Editor responsible under the press law*:

Dr. Hans Løkke
National Environmental Research Institute,
Aarhus University
Vejlshøjvej 25, P.O. Box 314,
DK-8600 Silkeborg, Denmark
Phone +45 8920 1482
Fax +45 8920 1414
E-mail: hlo@dmu.dk

- Databases and selection of scenarios:

Dr. Peter Borgen Sørensen
National Environmental Research Institute,
Aarhus University, Denmark
E-mail: pbs@dmu.dk

- Exposure assessment:

Professor Gerrit Schüürmann
UFZ, Umweltforschungszentrum Leipzig,
Germany
E-mail: gerrit.schuurmann@ufz.de

- Effects assessment:

Dr. Dave Spurgeon
NERC, Centre for Ecology and Hydrology,
United Kingdom
E-mail: dasp@ceh.ac.uk

- Risk Assessment:

Dr. Ad Ragas
Radboud Universiteit Nijmegen,
The Netherlands
E-mail: A.Ragas@science.ru.nl

The integrated project NoMiracle
is funded by the European Commissions
Sixth Framework Programme.

EC Scientific Officer for the project:
Dr. Georges Deschamps

*Articles in the NoMiracle Newsletter do not necessarily
reflect the attitude of the NoMiracle Newsletter.

The NoMiracle Newsletter is published by
National Environmental Research Institute,
Aarhus University
ISSN: 1902-6226