

German Environment Agency

Umwelt 
Bundesamt

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Engendering the Environment: Gender Mainstreaming in Research - Gender Analysis in Environmental Health Studies

Katrin Groth

Section II 1.2 Toxicology, Health Related Environmental Monitoring

Arn Sauer

Research Officer for Gender Mainstreaming of the UBA Gender Equality Officer

Outline

1 GENDER MAINSTREAMING IN RESEARCH – EXAMPLES

- 1.1 The UBA – an Introduction
- 1.2 Gender Dimensions of Climate Change and Adaptation/Mitigation
- 1.3 Gender Aspects of Areas of Needs in Urban Environmental Protection

2 GENDER ANALYSIS IN HUMAN BIOMONITORING (HBM)

- 2.1 Definition of HBM
- 2.2 Gender/Sex Specific Influence Factors
- 2.3 Gender Analysis in HBM Studies

3 TWO APPROACHES OF GENDER ANALYSIS

- 3.1 Development of Gender Sensible Questionnaire for Exposure Assessment
- 3.2 Retrospective Analysis of German Environmental Survey Data

For our environment (“Für Mensch und Umwelt”)

The German Environment Agency – Umweltbundesamt (UBA)

The UBA was founded in 1974 and is Germany’s federal environmental protection agency

- Our duties by law are to conduct environmental and health-based research, to give scientific, research-based policy advice to the German Ministry of the Environment and the Ministry of Health and to inform the wider public about the state of the environment.
- We are conducting state-of-the-art, applied research in our own labs and as a research funder, we are outsourcing research to scientific institutions in Germany and abroad.
- The UBA has around 1,600 employees: 60% women and 40% men, thereof approx. 40% female and 60% male managers; parity is achieved in top management and among scientific staff.
- **Gender Mainstreaming was kicked-off 2000-2004 through a research project.**
- **The UBA has the only federal research position on Gender Mainstreaming (since 2008).**
- **The UBA has a strategy for implementing Gender Mainstreaming (since 2010, renewed in 2015) regarding organizational development, staff development and research.**

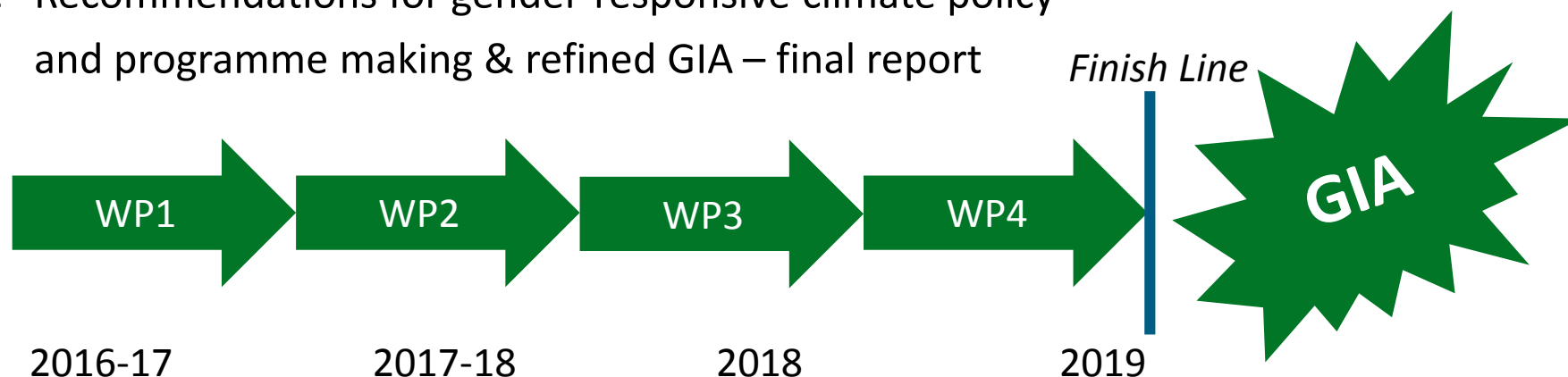
Gender Dimensions of Climate Change and Adaptation (2016-2019)

Four work packages:

1. Systematic literature review and programme analysis
2. Refining Gender Impact Assessment (GIA) as adapted to issues of climate change and adaptation and policy making
 - Comparative instrument research, instrument drafting, testing, re-design
3. Gender data gaps and requirements in climate policy making
4. Recommendations for gender-responsive climate policy and programme making & refined GIA – final report



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Gender Aspects of Mobility, Consumption, Nutrition and Housing as Areas of Needs and the Foundations of Urban Environmental Protection (2017-2019)

Prospective research project

Main research questions:

- Which gendered structures, gender specific behavioural patterns and their transformations produce explicit environmental effects in urban settings with regards to the areas of need mobility, consumption (esp. nutrition and clothing), housing and digitalisation?
- Which interactions can be detected and how can they be integrated in sustainable city and infrastructure development, traffic planning, in ecological building, energy consumption, climate protection and adaptation or food production/consumption?

EQUALITY

Human Biomonitoring (HBM)

Human biomonitoring (HBM) the method for assessing human exposure to chemicals or their effects by measuring these chemicals, their metabolites or reaction products in human specimens.

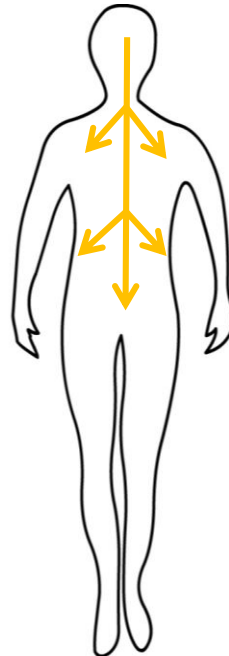
- It involves measurements of biomarkers in bodily fluids, such as blood, urine, saliva, breast milk, sweat, and others.
- Biomonitoring data directly reflect the total chemical body burden resulting from all routes of exposure, and inter-individual variability in exposure levels, metabolism and excretion rates.
- Such data are often the most relevant metric for health impact assessment, especially for bio-accumulating or persistent chemicals that are stored in the body for a long period of time.
- For chemicals that are excreted rapidly, biomonitoring data reflect recent exposure (WHO, 2015, modified).

Chemicals in the Human Body

1. Exposition

Source for chemicals:

- Drinking water and food
- Air
- Consumables, clothes, cosmetics, washing and cleansing agents



2. Toxicity

Toxicokinetic phases:

- Absorption
- Distribution
- Metabolism
- Excretion

Toxicodynamic phase:

- Toxic effect

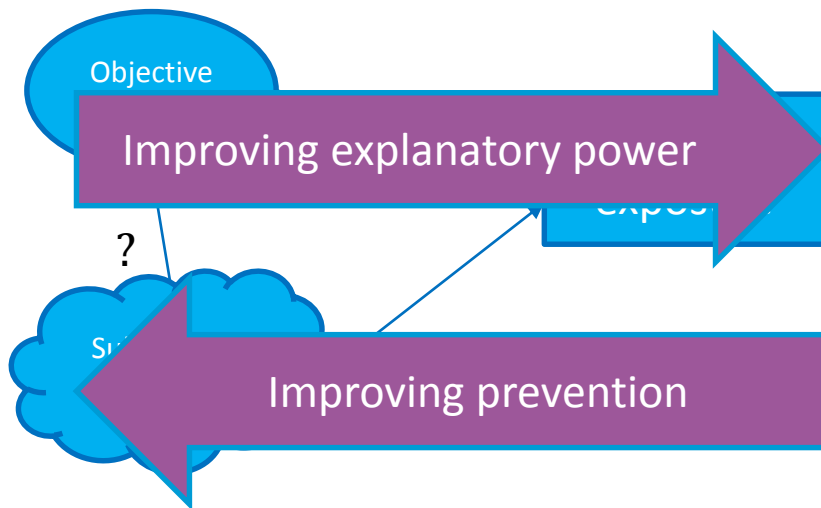
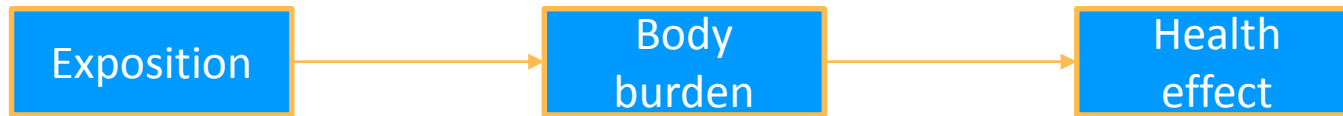
Gender specific impact factors:

- Smoking and drinking habits
- Consumer behavior
- Household chores
- Physical fitness
- Education and income

Sex based influence factors:

- Body weight
- Fat / muscle level
- Pregnancy and breast feeding
- Enzyme equipment
- Respiratory volume

Gender Analysis in HBM Studies



GOALS

Gender Sensible Exposure Assessment: Questionnaire Development



German Environmental Specimen Bank (ESB)



- 600 young adults (20-29 yrs.) in 4 cities per year since 1985
- Questionnaire on exposure-relevant behavior
- Cryo-archiving of samples for retrospective analysis

→ The questionnaire development is a part of the Joint Project INGER (Integrating gender into environmental health research), supported by the Federal Ministry of Education and Research.

→ The basis is the gender bundle by Tate (Tate et al. 2014: 304):

INCLUDING THE 6 DIMENSIONS

- Birth-assigned gender category, current gender identity, gender roles and expectations, gender social presentation, gender evaluations

→ The Questionnaire will be Tested in 2019

INGER



Institut für Public Health
und Pflegeforschung
Universität Bremen

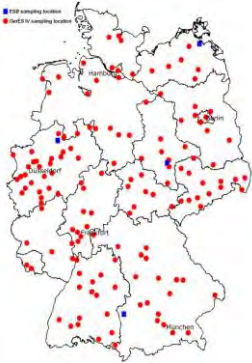
HelmholtzZentrum münchen
Deutsches Forschungszentrum für Gesundheit und Umwelt

Umwelt
Bundesamt



Source: INGER Study Group supported by the Federal Ministry of Education and Research (Grant 01GL1713C)
<https://www.uni-bremen.de/inger>

Retrospective Analysis of German Environmental Survey data



German Environmental Survey (GerES)

- Cross-sectional study on general population
- Pollutant monitoring at home
- Interviews on exposure-relevant behaviors



→ Examining the existing Data:

- Identifying sex- and gender based variables
- Analyzing distribution
- Searching for correlations
- Looking for intersections
- Creating of a gender-index
- Finding the right model (Multivariate Analysis (GLM, mediation and moderation model, Logistic regression, CART-Analysis,...))
- Telling the gender story

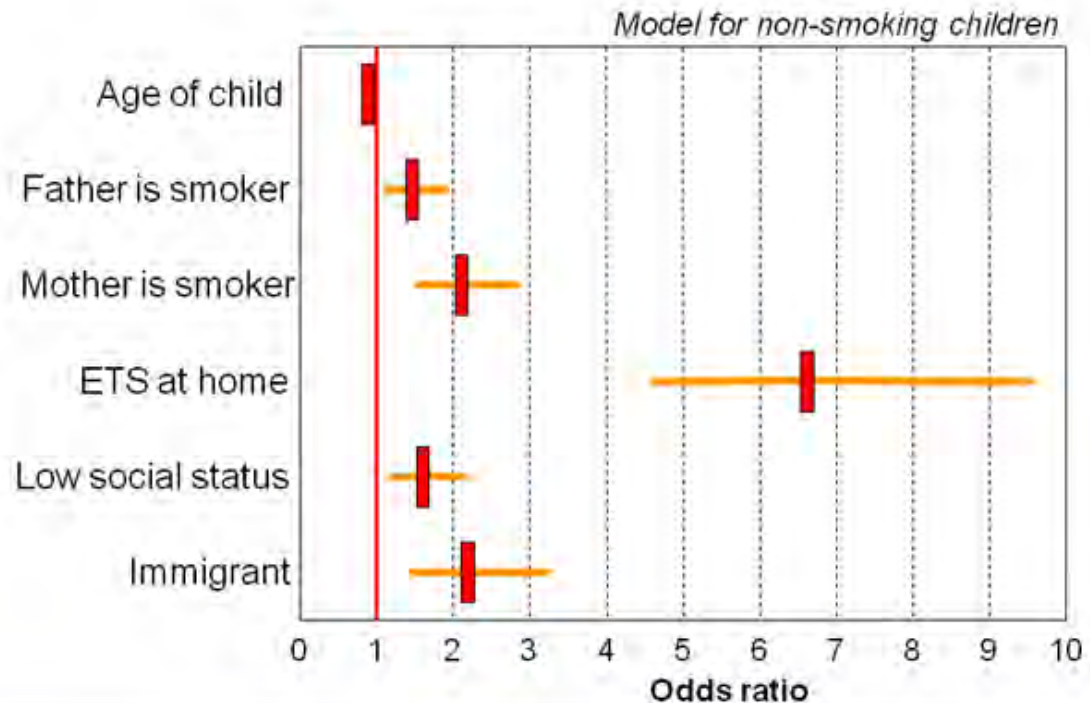
Children with a Smoking Mother Have a Higher Cotinine Concentration in the Urine

Gender aspects in GerES 2003-06

Children with a smoking mother have higher concentration compared to a smoking father

➤ Do mothers spend more time with their children?

Cotinine concentration in urine



Quellen:

Conrad et al. (2010): German Environmental Survey IV: Children's exposure to environmental tobacco smoke, *Toxicology Letters* 192, 79 - 83

Conrad et al. (2008): German Environmental Survey IV: environmental tobacco smoke exposure of German children, *International Journal of Environment and Health* (2) 3-4, 397 - 409

Summary

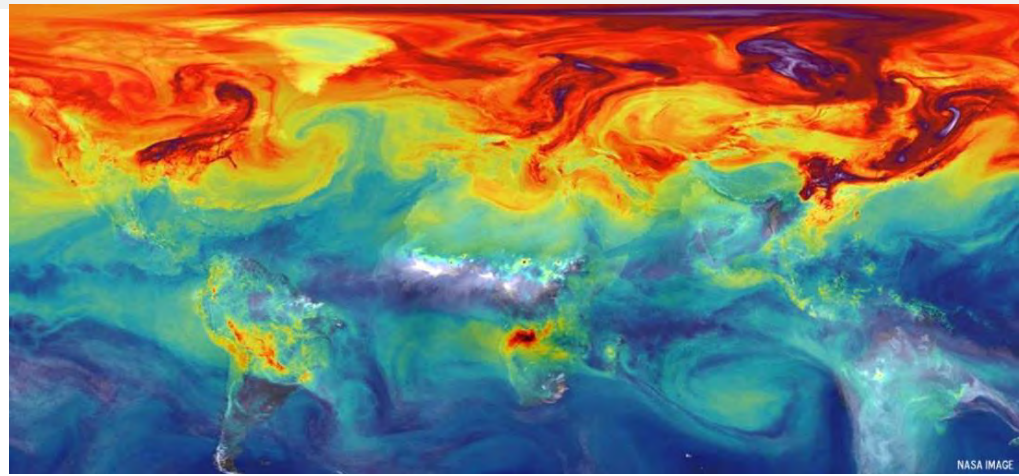


Photo: NASA IMAGE | U.S. Embassy in Cambodia
US Embassy in Cambodia Secretary Kerry to Join World Leaders in Signing of the Paris Agreement to Address Climate Change, CC

Several examples demonstrate relevant gender-aspects in environmental and health research

- The UBA will strengthen sex- and gender-related research in future studies
- The UBA will be providing adequate policy recommendations (i.e. in toxicology, climate protection, sustainability, chemical management, information of the general public, programming and regulation)



Graphic: pixabay.com, cc

Thank you for your attention

Katrin Groth

katrin.groth@uba.de

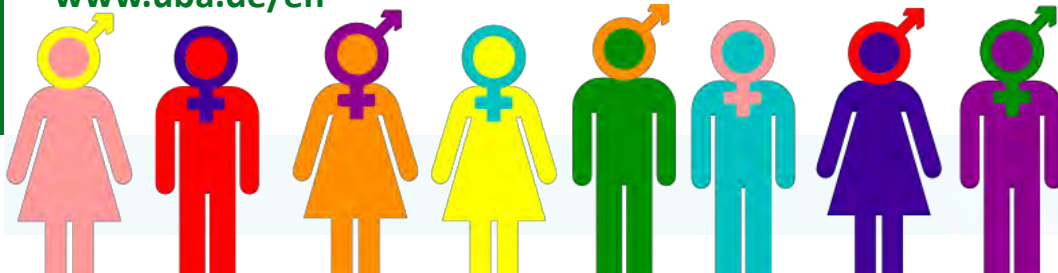
Arn Sauer

arn.sauer@uba.de

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Gender-related questions in Human Biomonitoring

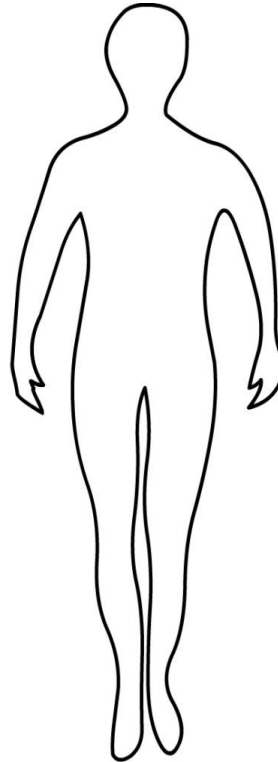
1. Exposition

Source for chemicals in the environment:

- Water and groceries (food?)
- Indoor and outdoor air
- Consumables, clothes, cosmetics, washing and cleansing agents

Known **gender specific** impact factors:

- Smoking and drinking habits
- Nutrition
- Consumer behavior
- Household chores
- Education and income



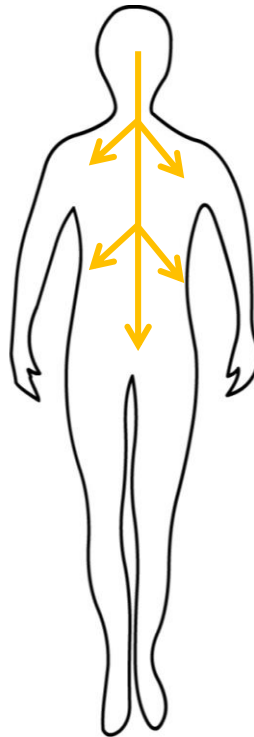
QUESTIONS:

1. What are the behavioral patterns that lead to different expositions?
2. Could these patterns be assigned to sex?
3. Is the dichotomous classification of sex in the society today enough to capture the differences in the exposition (unsteady classic stereotypes of men/women)?

Sex-related questions in Human Biomonitoring

QUESTIONS:

1. How are the biological differences shown between men and women in toxicological studies?
2. At which organs, substance groups, or impacts where differences found by sex?
3. Are biological parameters that are relevant in the toxicology influenced by behavior patterns, which are associated with different expositions?
4. Are sex differences in regulatory toxicology enough accounted for?



2. Effect

Toxico-kinetic phases:

- Absorption
- Distribution
- Metabolism
- Excretion

Toxico-dynamic phase

Known **sex-based** factors of influence:

- Body weight
- Fat-/muscle level
- Pregnancy and breast feeding
- Enzyme equipment

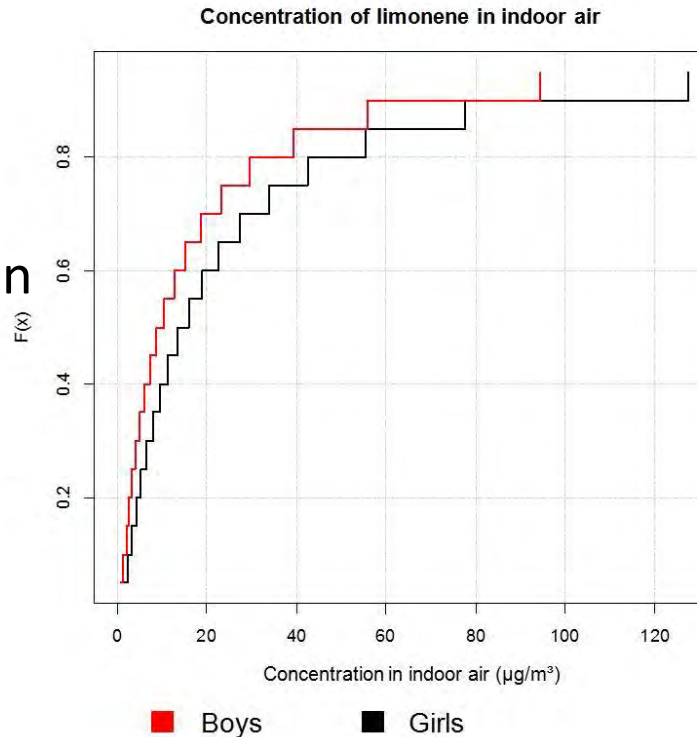
2. Example (4): Gender Differences in Children Room's Indoor Air Quality

Differences of limonene concentration in indoor air

→ girl's rooms show higher concentrations of limonene in indoor air compared to boys rooms

Gender-related behavior?

Hypothesis: girls more often use scented candles, fragrances or cleaning agents



Percentile	Girls	Boys
0.05	1.4	0.8
0.1	2.3	1.4
0.15	3.3	2.0
0.2	4.2	2.6
0.25	5.3	3.3
0.3	6.6	4.1
0.35	7.9	5.0
0.4	9.5	6.1
0.45	11.3	7.3
0.5	13.4	8.8
0.55	15.9	10.5
0.6	19.0	12.6
0.65	22.7	15.3
0.7	27.5	18.7
0.75	33.8	23.2
0.8	42.4	29.6
0.85	55.4	39.2
0.9	77.5	55.8
0.95	127.4	94.3

Tobollik M, Hornberg C, Plaß D, Steckling N, Claßen T, Wintermeyer D (2015) Genderaspekte bei der Quantifizierung umweltbedingter Krankheitslasten - Möglich? Sinnvoll? Erforderlich? Presentation at the conference: Gender, Environment and Health, 12. 06.2015; Bremen