



Biodiversity and Health Workshop Helsinki

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Biodiversity and Health – Switzerland

Swiss Biodiversity Strategy – Action plan

Swiss Biodiversity Strategy - action plan passed by the Swiss government in September, 2017

“State of Biodiversity in Switzerland

The state of biodiversity in Switzerland is unsatisfactory.^{1,2}

The expansion of settlements and transport infrastructure, the increase in tourism and leisure activities in previously undisturbed regions, the development of renewable energy sources, the increasing intensity of agriculture in mountain regions, the fragmentation of natural habitats, the direct and indirect impacts of climate change, and the spread of invasive alien species will add to the already significant pressure on biodiversity in Switzerland “

Biodiversity and Health – Switzerland

Biodiversity under the auspices of the Federal Office for the Environment

“The measures contained in the Biodiversity Action Plan

- promote biodiversity directly (creation of ecological infrastructure, support for species)
- build bridges between federal biodiversity policy and other policy areas (e.g. agriculture, spatial planning, transport, economic development)
- raise awareness among decision makers and the public about the importance of biodiversity as a central pillar of life”

Biodiversity under the auspices of the Federal Office for the Environment (not Federal Office of Public Health)

=> Focus of actions not explicitly aimed at health

Questions

- ...
- ...
- What is needed ... in terms of research?

Biodiversity and (immunological) tolerance

Experimental model



Schweizer Familie, 2003

⁶ Kabesch, Lauener, J Leuk Biol, 2004

Biodiversity and Health - Switzerland

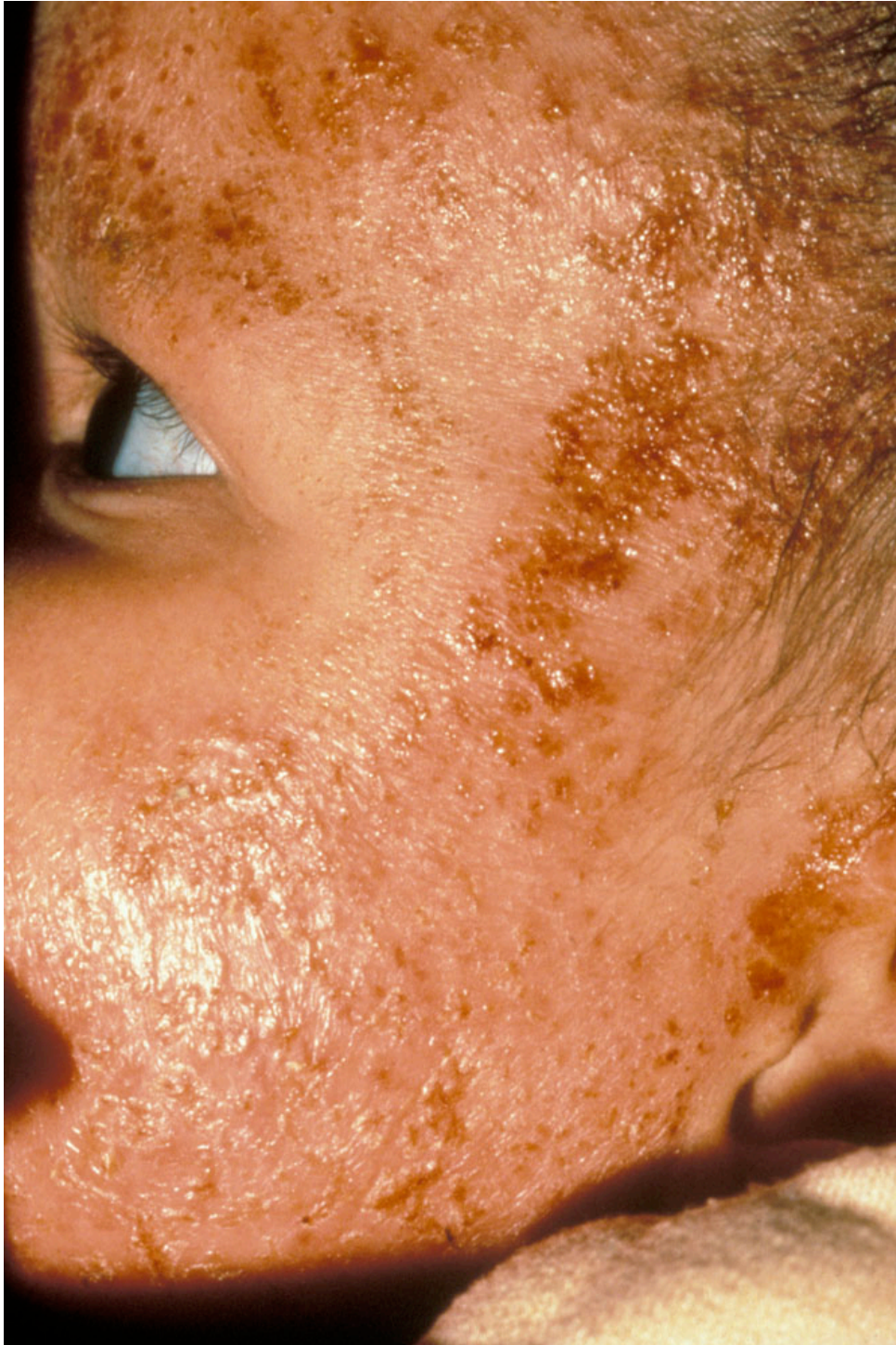
Biodiversity and (immunological) tolerance - Study

PASTURE:

Protection against Allergy: Study in Rural Environments

- Longitudinal: Germany, Austria, Finland, France, Switzerland
- 500 pregnant farmer / 500 pregnant non-farmer women
- Environmental samples (dust; breast milk, farm milk)
- Cord-blood, 1 year; 4 year; ...
- Questionnaires, clinical control; IgE; feces; leucocyte stimulation, DNA; RNA from all children

Prenatal and early life exposures and atopic dermatitis?



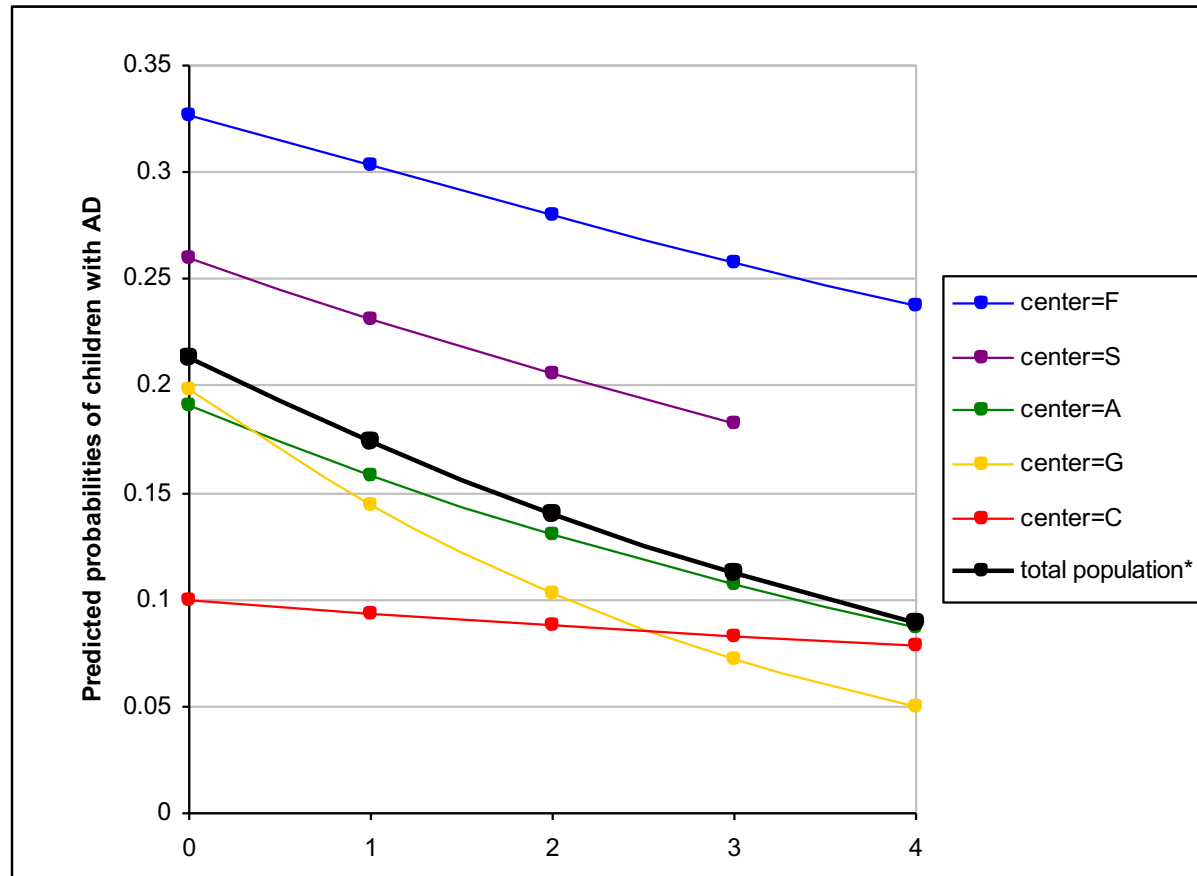
Atopic Dermatitis

Biodiversity and Health - Switzerland

Biodiversity and (immunological) tolerance

Atopic dermatitis

(predicted probability)



Number of species of farm animals the child is exposed to during pregnancy

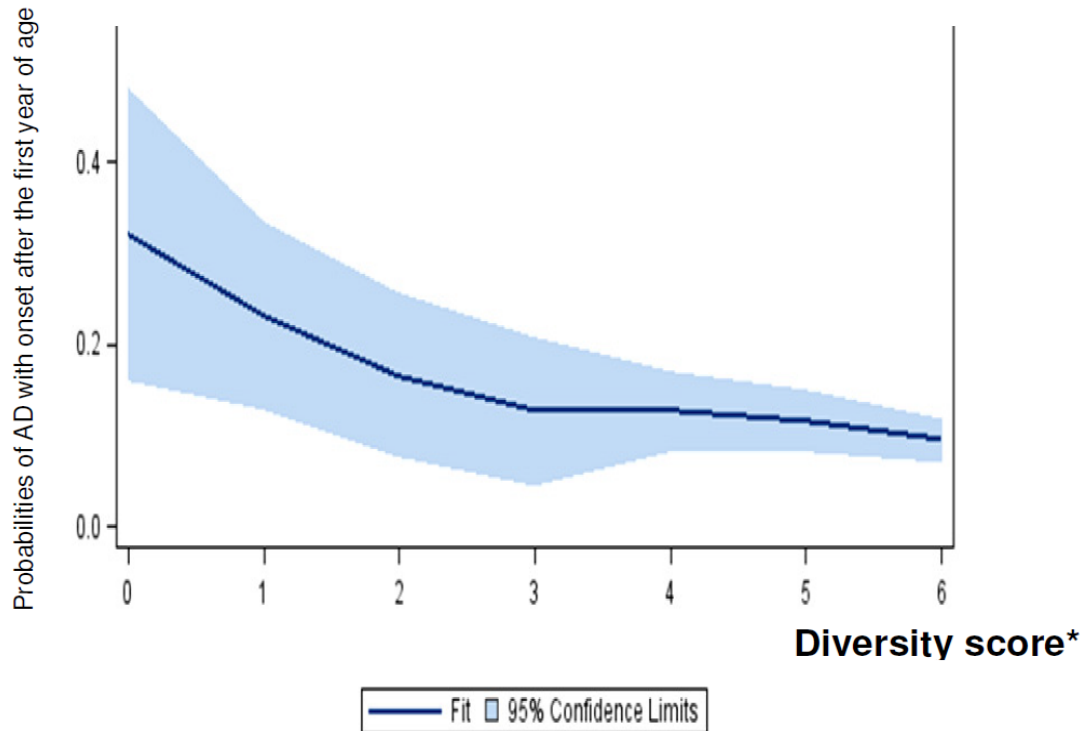
Roduit et al,
JACI 2011

Diversity in prenatal exposure (different animal species) reduces the risk for atopic dermatitis

Biodiversity and health

Infant nutrition and atopic disease

Fig. 3 Association between the increasing number of different major food items (n=6) in the 1st year of life and atopic dermatitis with late onset.



*Diversity score with major food items: vegetables or fruits, any cereals, meat, bread, cake and yogurt

Roduit et al, JACI, 2012, 2014

The diversity of foods introduced during the first year of life is associated with protection against atopic dermatitis with onset after the 1st year of life

Biodiversity and health

To be addressed: ...

- **When giving recommendations:**
cave putting at danger advances achieved
(vaccinations...)
- **Research:**
Prospective, longitudinal population-based
(birth-cohort) studies,
focusing on maintaining health / developing
disease, in relation to biodiversity

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ALEX, PARSIFAL,PASTURE study groups

Munich: E. von Mutius,

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Regensburg: M. Kabesch

Schwarzach: J. Riedler

Marburg: H. Renz

Borstel: O. Holst

Bochum: A. Bufe

Kuopio/Helsinki: J. Pekkanen

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Remember the hygiene hypothesis?





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**Another point of
view:
Environmental
effects on the
developing child's
immune system**

Biodiversity and Health - Switzerland

Biodiversity and (immunological) tolerance

- „Tolerantia“: acceptance, enduring injustice, suffering
 - Up to the 18th century: acceptance, especially of other religions
- Ignorance
 - Is ignorance tolerance?
- Tolerance ⇔ active acceptance

“Tolerance should, in fact, only be a transient state of mind; it should lead to a acceptance. Tolerance means Beledigung (J.W. von Goethe)

How is immunological tolerance reached?

Central tolerance:

- Elimination of unwanted reactions
 - Deletion of (auto)reactive cells (thymic education)

Peripheral tolerance

- antigen-specific tolerance
 - (regulatory T cells)
- non antigen-specific tolerance
 - reduced reaction upon repeated exposure (LPS tolerance)
 - Dampening of a reaction (IL10, ...)

“Non-reactivity”, ignorance

How is immunological tolerance reached?

“Tolerance” in the following:

- Exposure to an allergenic substance does not lead to allergic reaction



Exposure to Environmental Microorganisms and Childhood Asthma

Markus J. Ege, M.D., Melanie Mayer, Ph.D., Anne-Cécile Normand, Ph.D., Jon Genuneit, M.D., William O.C.M. Cookson, M.D., D.Phil., Charlotte Braun-Fahrländer, M.D., Dick Heederik, Ph.D., Renaud Piarroux, M.D., Ph.D., and Erika von Mutius, M.D., for the GABRIELA Transregio 22 Study Group

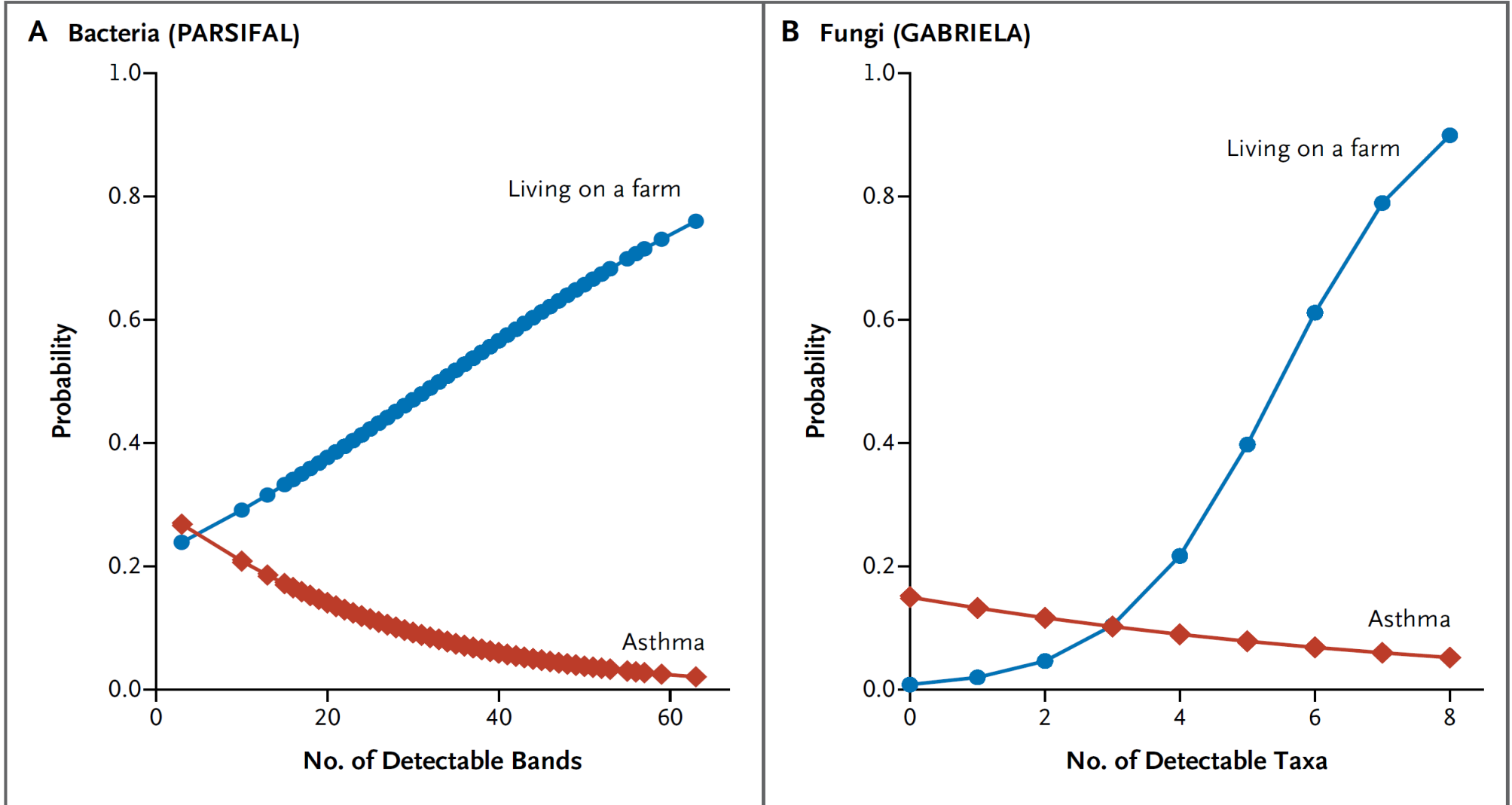
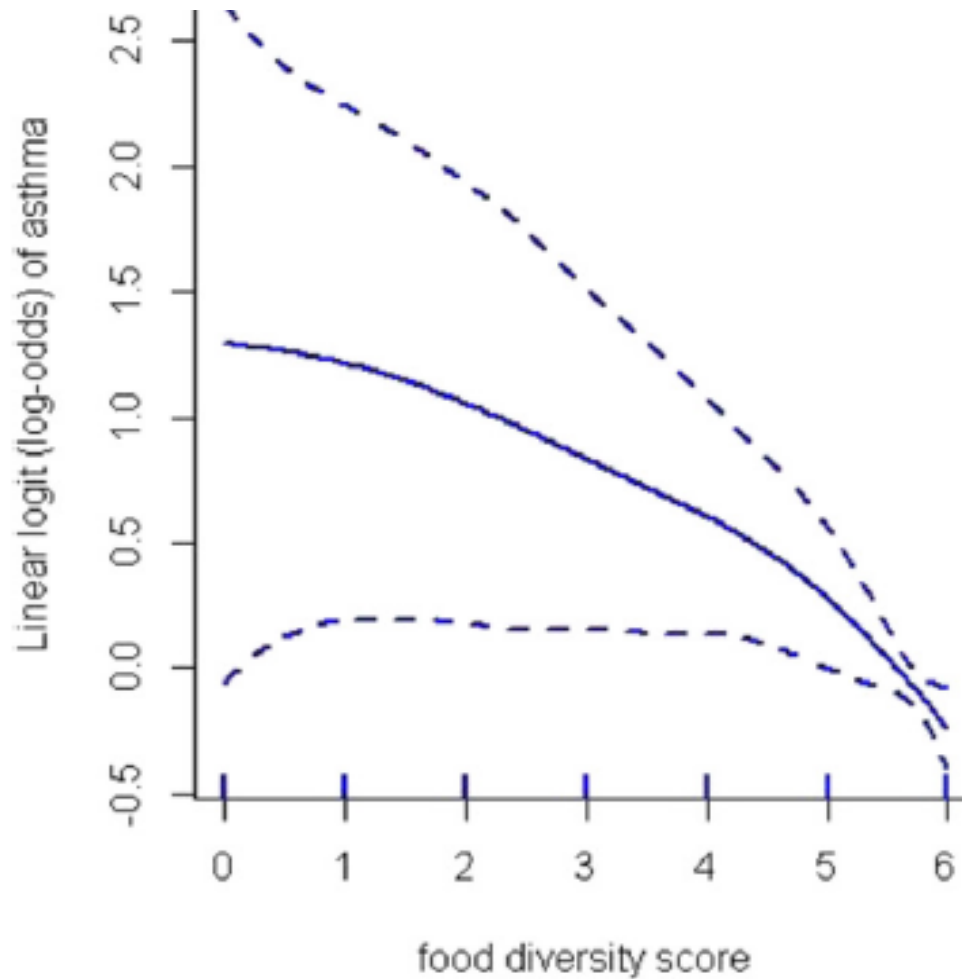


Figure 3. Relationship between Microbial Exposure and the Probability of Asthma.

In both the PARSIFAL study and GABRIELA, the range of microbial exposure was inversely associated with the probability of asthma.

Toleranz – Epidemiologie: Was schützt wann wen ?

Nahrungsmittel-Vielfalt im 1. Jahr schützt vor Asthma mit 6 Jahren



*Diversity score with major food items: vegetables or fruits, any cereals, meat, bread, cake and yogurt

Bridging research findings and wishes to practical applications



Bridging research findings to practical applications

