

Research of potential exposure to chemicals in urban exposome

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Survey on Pesticide Mixtures in Europe (SPECIMEn)



Pavel Čupr, supervisor >

Hi Tom! 🙋 How is your PhD research going?

Hi Pavel! Great, I am going to study how pesticides exposure could affect human health, especially cause oxidative stress, epigenetic changes or DNA damage. These changes plays a significant role in development of many diseases such as diabetes, CVD, respiratory diseases or endocrine disruption.

And what methods are you going to use?

Specific pesticides or their metabolites will be analyzed in urine and dust along with biomarkers of exposure. Then, statistical analysis will be used to reveal relationship between them. If you are interested in examples of specific compounds look there. 🙋

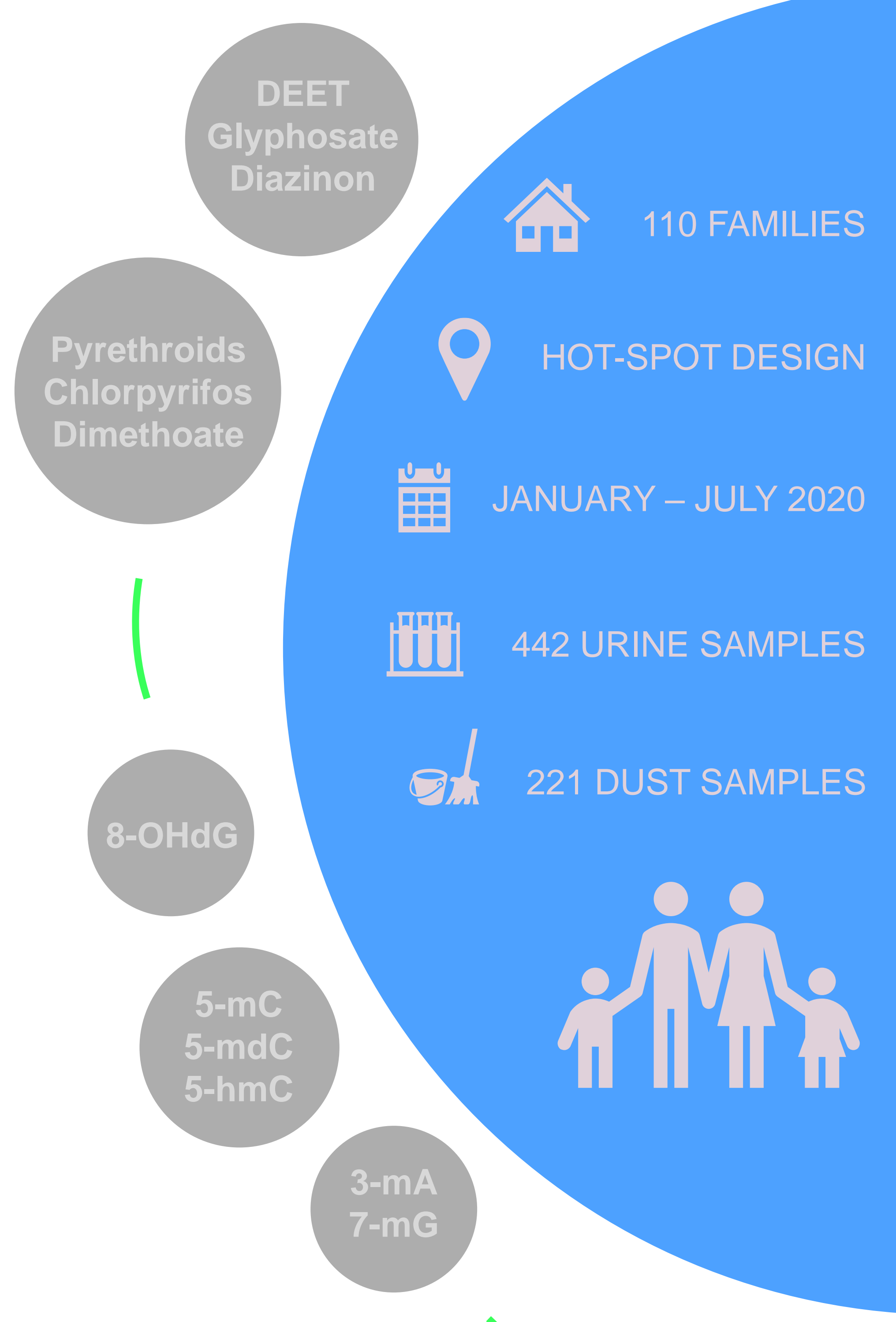
And what results do you expect?

My hypothesis is, that people living close to agricultural fields are more exposed to pesticides and that affects level of oxidative stress and epigenetic changes.

Cool, good luck! 🙌

And what about external exposome?

Look bellow at EMERTOX and BIO Health projects! 🙋



EMERTOX indoor project

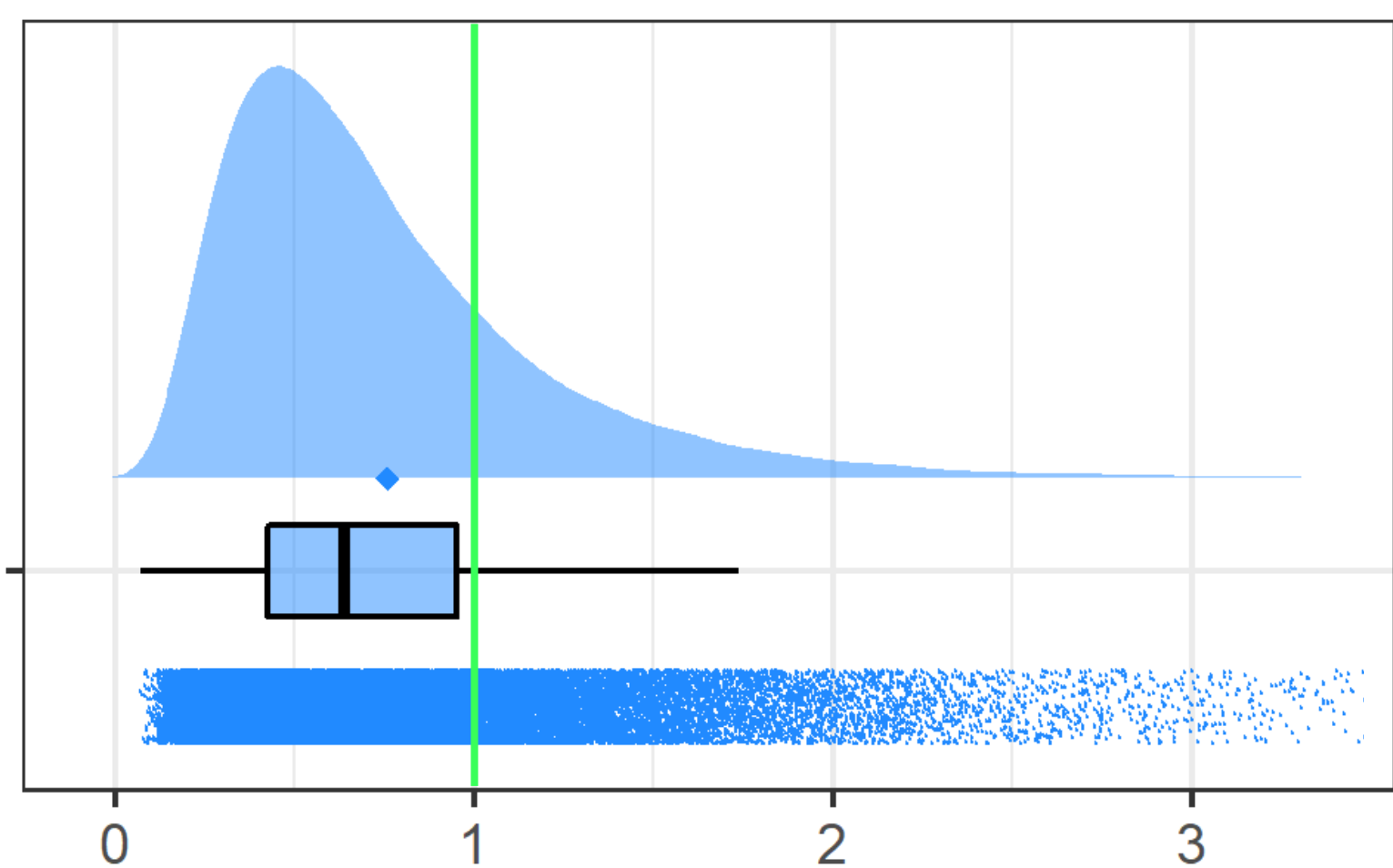
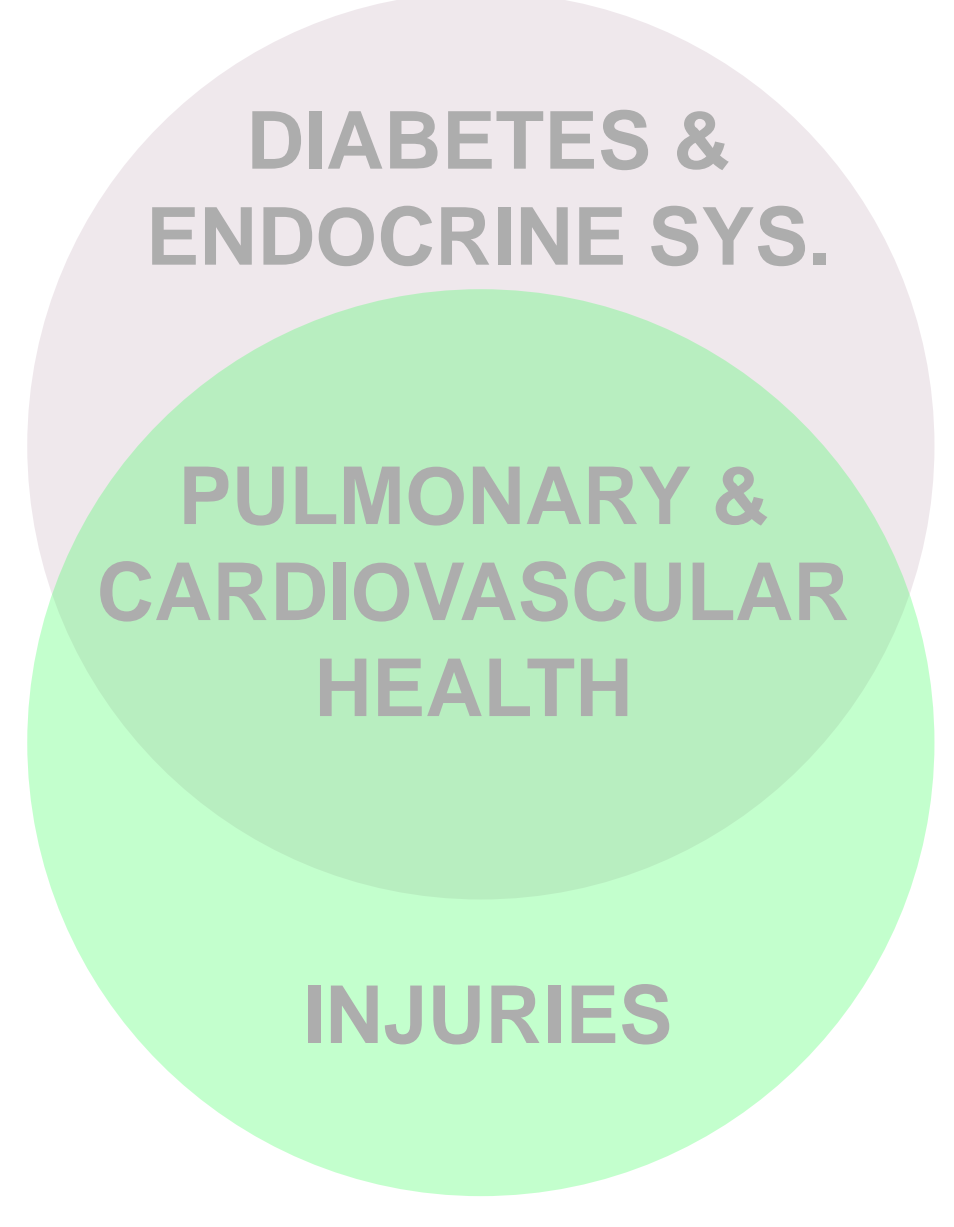


Figure 1 Distribution of risk based on probabilistic health risk assessment for infants in home in Brno. Value 1 shows safety threshold.

Within external exposome I am also focused especially on vulnerable population groups. 🙋 177 compounds were measured in dust and air in rooms in Brno region. Daily intakes of chemicals were reconstructed and probabilistic health risks assessment was carried out.

And do you already have any results? 🙋

Of course, look on Figure 1. It shows distribution of risk (based on hazard index) for infants in the most hazardous location. And phthalates are responsible for 83 % of the risk! 🙋



BIO Health study

What does BIO Health study mean? 🙋

BIO Health study is focused on influence of biometeorological conditions and air quality on human health measured as ambulance dispatches and mortality. All data on daily basis! Evaluated exposures as well as health outcomes you can see on right. 🙋 That's because hot summers with heat waves appear much often than earlier also in the Czech Republic, most noticeably in cities and more than half of the world population lives in urbanized areas, and the size of the urban population is continuously increasing. 🌞

And how would you like to connect exposure and health outcomes?

Using time trend analysis based on Poisson regression allow us to investigate whether some of the short-term variation in the outcome can be explained by changes in the main exposure. And results could for example help policy makers with smart cities concept application.

