Expert Workshop on
"Valuing the Health Impacts of Chemicals"
11-12 January 2016, Helsinki, ECHA, Marie Curie Conference room
Preliminary programme

Monday, 11 January 2016	
9.30 – 9.50 Registration	
9.50 – 10.00 Welcome address by Matti Vainio, ECHA	
10.00 – 12.00 ***Session 1*** *– ECHA Study on valuing health endpoints related to chemicals exposure*	
Anna Alberini *University of Maryland*	Exposure to certain chemicals contained in products, emissions into the air, and polluted water has been linked with the onset of cancer. In this paper, we estimate two key metrics for benefit-cost analyses of toxics regulatory programs. Earlier studies have typically used surveys to estimate the willingness to pay to reduce the risk of dying from cancer. Alternatively, property values have been examined before and after the announcement of the discovery of a contaminated site and the release of risk information to the public to derive the value of a statistical case of cancer. In contrast to these earlier approaches, we break the risk of dying from cancer into the product of the risk of getting cancer, and the risk of dying from cancer conditional on getting it in the first place. We ask respondents in Italy, the Netherlands, the Czech Republic and the UK whether they would pay a specified amount of money to reduce their risk of getting cancer, or improve their chance of surviving it, under specified conditions about pain and limitations in everyday activities. We find that the value of a statistical case of cancer is about €300,000 (2014 PPP euro) and the value of a statistical life in the cancer setting is €2.8 – 3.5 million (2014 PPP euro). Surprisingly, although respondents obviously care for and are concerned about limitations in everyday activities and pain associated with cancer, these have little effect on these figures. It appears that when it comes to valuation, only the probability attributes of risk and costs truly matter to the respondents.
Milan Scasny *Charles University Prague*	Chemicals may lead to various adverse health effects, including impacts on fertility and child development. Empirical evidence on benefits of reducing risk of infertility and developmental toxicity is however very rare. Moreover, the benefits of improving fertility have been only derived under very specific scenarios (for reproduction technology) and in ex post setting, i.e. when a respondent was aware about his or her infertility. Our study is the first to elicit individual preferences for several health outcomes linked to infertility and developmental toxicity under both private and public scenario. Our survey targets two segments of people in four EU Member States. The first segment is comprised of persons who wish to have a baby. The second targets general populations of four EU countries. Using discrete choice experiments, we derive a value of statistical pregnancy of around €22,000. The WTP for reducing the risk of birth defects with various levels of severity yields a value of statistical 'healthy child' between €5,000 and €130,000. The WTP counterparts derived from the general population in the public good context are slightly larger. Last, we derive the EU-wide WTP values that can be used for benefit-cost analyses.
11.00 – 11.20 Coffee break	
Vojtec Maca *Charles University Prague*	Several contingent valuation studies of environmentally related health endpoints indicate declining marginal disutility of ill health. The estimated WTP per ill health episode avoided is lower when a respondent values avoidance of several episodes of an illness together, suggesting that the marginal value of avoiding an ill health episode decreases as the number of episodes avoided increases. So far WTP sensitivity was investigated in a context of change in duration or number of episodes of less severe illnesses. In this paper we therefore investigate the scope sensitivity of WTP for transitional profile(s) of dermatological outcomes (i.e. bordering between acute and chronic), more precisely whether WTP stated by respondent reflect the scope of the benefit valued in a logical and consistent way. Our analysis is based on valuation data including 11 profiles different in duration and frequency of the same acute dermatological episode. Based on the results of a multi-dimensional scope

	sensitivity analysis we tend to conclude that WTP (values) for mild dermatological illness is sensitive both to the number of episodes per year and length of the period in which the illness episodes occur. The effect of increase in length of health impairment is highest when only 1 episode per year is valued and lowest when 4 episodes per year are valued. We therefore conclude that the marginal disutility of ill health is diminishing.
Richard Dubourg *Economics Interface ldt.*	Discussant
12.30 – 13.30 Lunch in ECHA cafeteria	
13.30 – 15.30 ***Session 2*** *– Valuation: welfare theory vs empirical research*	
Shelby Gerking *Tilburg University*	Most estimates of total health benefits of public programs assume that marginal willingness to pay for health risk reduction is independent of the amount of risk an individual originally faces (i.e., baseline risk). This paper examines this assumption both theoretically and empirically and as a natural extension also considers the role played by income and other factors such as health status, gender, and years of age in determining marginal willingness to pay for health risk reduction. The conceptual framework contrasts implications of expected utility models with exogenous and endogenous risks. The empirical approach makes use of unique individualized quantitative information on parents' risk perceptions of heart disease for themselves and their children. Heart disease risk may be exacerbated by exposure to environmental toxins including airborne particulates. Empirical estimates, which favor the endogenous risk model, suggest that marginal willingness to pay for a reduction in heart disease risk declines with baseline risk both for themselves and their children. An important policy implication of this result is that the standard practice of assuming marginal willingness to pay is independent of baseline risk may lead to a substantial overestimate of total health benefits. Additional results suggest that the marginal utility of consumption falls with onset of illness and that public policies aiming to reduce risk may be at least partly offset by reductions in private risk-reducing efforts. I can present something on either mortality or morbidity risk.
Rebecca McDonald *Warwick University*	Discounting of future outcomes is central to the valuation of future health and mortality risks in public sector allocative decision-making, particularly for policies regulating the risks of exposure to hazardous chemicals with delayed health impacts. While the study of time discounting in finance is well-established, the same cannot be said for risks to life and to health. Using a Risk-Risk trade-off survey, we elicit discount rates and establish discounting functions on both a sample and an individual level. We find wide variation in implicit discount rates and discounting functions between individuals, and show that in aggregate, the sample is best characterised by subadditive discounting. A thought experiment cautions against the standard practice of assuming a single, exponential discount rate characterises all individuals. The broader literature also indicates wide variation in elicited health and safety discount rates, with choice experiments typically producing lower estimates. A followup study proposes one potential explanation for this: that cross-modal discounting (where the outcomes differ as well as their timing) is lower than uni-modal discounting (where the outcomes are the same, apart from their timing). The implications of this finding for the discounting of health and mortality risks are discussed.
James Hammitt *Harvard University*	Quantitative evaluation of environmental, health, and safety policies requires a metric for the value of changes in health risk. This metric should be consistent with both the preferences of the affected individuals and social preferences for distribution of health risks in the population. There are two classes of metrics widely used in practice: monetary measures (e.g., compensating and equivalent variations, willingness to pay and willingness to accept compensation) and health-utility measures (e.g., quality-adjusted life years (QALYs), disability-adjusted life years (DALYs)), both of which are summed across the population. Health-utility measures impose more structure on individual preferences than monetary measures, with the result that individuals' preferences often appear inconsistent with these measures; for the same reason, health-utility measures help protect against cognitive errors and other sources of incoherence in estimates of the values of monetary measures obtained from revealed- and stated-preference studies. This paper presents theoretical and empirical evidence comparing these metrics and examining how they co-vary.

Christoph Rheinberger *ECHA*	Discussant
15.30 – 16.00 Coffee break	
16.00 – 17.00 ***Session 3*** *– Research on valuing health endpoints: past, present and future*	
Nils-Axel Braathen *OECD*	OECD research agenda 2016-2018
Arnd Hoeveler *European Commission, DG Research*	EU research agenda 2015 onward
Group discussion	Topics to be discussed: (i) identifying research gaps, (ii) international replication/corrobation of results, (iii) efficient research projects – what funding parties could do better,…
17.00 End of first Workshop day	
19.00 – 22.00 Dinner at Mamma Rosa (www.mammarosa.fi)	

Tuesday, 12 January 2016	
9.00 – 10.30 ***Session 4*** *– Regulatory impact assessments*	
Leo Trasande *New York University*	Rapidly increasing evidence has documented that endocrine-disrupting chemicals (EDCs) contribute substantially to disease and disability. The objective of this study is to quantify a range of health and economic costs that can be reasonably attributed to EDC exposures in the European Union (EU). For this purpose, a Steering Committee of scientists adapted the Intergovernmental Panel on Climate Change weight-of-evidence characterization for probability of causation based upon levels of available epidemiological and toxicological evidence for one or more chemicals contributing to disease by an endocrine disruptor mechanism. To evaluate the epidemiological evidence, the Steering Committee adapted the World Health Organization Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group criteria, whereas the Steering Committee adapted definitions recently promulgated by the Danish Environmental Protection Agency for evaluating laboratory and animal evidence of endocrine disruption. Expert panelsusedthe Delphimethodtomakedecisionsonthe strength of the data. Expert panels achieved consensus for probable (_20%) EDC causation for IQ loss and associated intellectual disability, autism, attention-deficit hyperactivity disorder, childhood obesity, adult obesity, adult diabetes, cryptorchidism, male infertility, and mortality associated with reduced T. Accounting for probability of causation and using the midpoint of each range for probability of causation, Monte Carlo simulations produced a median cost of €157 billion (1.23% of EU gross domestic product) annually across 1000simulations. Notably, using the lowest end of the probabilityrange for each relationship in the Monte Carlo simulations produced a median range of €119 billion that differed modestly from base case probability inputs.
Lars Drake *Swedish University of Agricultural Sciences*	Calculations on economic costs of exposure to chemicals in Sweden. 1. Bone fractures caused by cadmium in food (~4 bln SEK/year) and 2. Diabetes caused by increased levels of a few chemicals in blood samples (~1- bln SEK/year depending om substance and ~10 bln SEK/year for a sum of the substances).
Jukka Peltola *ECHA*	Discussant
10.30 – 11.00 Coffee break	

11.00 – 13.00 ***Session 5*** *– Risk, perception and valuation*	
Henrik Andersson *Toulouse School of Economics*	There is a large stated preference literature estimating willingness to pay (WTP) for health risk reductions. Among earlier studies the contingent valuation (CV) approach dominated, whereas more recently the choice experiment (CE) approach has gained ground. Irrespectively of method, studies often fail to show adequate sensitivity to scope, i.e. WTP does not increase proportionality to the size of the risk reduction. In this study we elicit respondents' WTP to reduce mortality and morbidity risk reductions based on a food- and water-risk context, using both the CV and CE approach. We test for scope sensitivity in both approaches using the strict between-sample scope sensitivity test, which has not been done previously in a CE study on this topic. Whilst we find strong and statistically significant within-sample scope sensitivity, we reject scope sensitivity in the external test for both CE and CV. The magnitude of the insensitivity is very similar in both approaches, i.e. both the CV and CE approach fail in a similar magnitude.
Joel Atherton *London School of Economics*	Even at very low-levels of exposure, lead can impair young children's neurobehavioural functions resulting in reduced learning abilities, behavioural problems and even antisocial behaviour in later life. Yet the economic benefits of reducing children's exposure to lead are only partially understood. The purpose of this research was to estimate the non-market economic value of reducing children's blood lead levels (BLLs), using a stated preference technique. Compared with current practice, this new approach offers a more theoretically correct measure of the value of reducing lead exposure in young children for use in policy analysis. An online survey of over 3,000 UK households applied contingent valuation (CV) methods to determine public willingness to pay (WTP) for reducing children's exposure to lead, specified as a corresponding improvement in children's Intelligence Quotient (IQ), using a consumer-product payment vehicle. A double-bound dichotomous choice model was employed to estimate WTP for probabilistic IQ increases. A statistically significant ($p<0.001$) conservative mean household WTP of £892 IQ-point-1 child-1 yr-1 was estimated, equivalent to a mean household WTP for reduced BLL of £458 µg/dL-1 child-1 yr-1. This is the first time that the non-market benefit of reducing children's exposure to lead has been quantified and the first time that CV has been used to estimate the value of improving children's IQ in Europe. The results are highly relevant to future public policy management options, especially those regarding adolescent heavy metal exposure.
Sue Chilton *Newcastle University*	This paper presents the results of a recently completed study in the UK (HSE Contract No. ND2484). In it, we propose a structural relationship between the value of preventing a statistical cancer fatality and the value of statistical life (VSL) for risks of an instantaneous road accident fatality. This relationship incorporates a context effect reflecting both the illness or 'morbidity' associated with cancer fatality and the 'dread' or horror associated with the prospect of eventual death from cancer, as well as a latency effect that captures the discounting likely to arise because the onset of the symptoms of cancer typically occurs after some delay. We use a Risk-Risk trade-off study to validate this model by directly estimating the influence of context and latency effects upon the relative size of the VSL for cancer and for road accidents, confirming that both effects are significant and estimating their size using regression analysis. We show that morbidity accounts for the majority of the context premium. We use the elicited coefficients to reconstruct VSL estimates for a range of cancers characterised by their latency and morbidity periods.
Anna Alberini *University of Maryland*	Discussant
13.00 – 13.30 Wrap up and closing words	