OECD

Economic Valuation of Chemicals-Related Health Effects

A Practical Guide to Quantifying Morbidity Effects in Environmental Cost-Benefit Analysis



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Preface

Few things are more important than our health. We take supplements, exercise and pay attention to what we eat, all with the intention to improve our health and quality of life. Yet, our health is inextricably tied to our surroundings. Chemicals are a part of our daily life and modern society, used in everything from consumer products to manufacturing and agriculture, healthcare, construction and beyond. At the same time, if not properly managed, our exposure to them can contribute to a range of negative health effects, from non-fatal cancer to chronic kidney disease.

When setting chemicals regulations, policymakers need to be able to compare apples-to-apples, weighing the economic costs of potential chemicals regulations against their economic benefits. To understand the net benefits of a given regulation, information on both potential fatal and non-fatal health effects of chemicals exposure is needed. Unfortunately, we have historically lacked information on the latter. Without adequate data, it becomes quite difficult to correctly weigh the costs and benefits of reducing chemicals-related health effects, thus increasing the risk that regulations are not set at the appropriate level.

The OECD Surveys on Willingness-to-pay to Avoid negative Chemicals-related Health Effects bridge this gap by providing evidence on the economic benefits of avoiding or reducing non-fatal health outcomes associated with chemicals exposure. This synthesis report brings together our current body of work, offering a guidebook for policymakers and regulators, with detailed quantitative results. It maps individual's willingness-to-pay to avoid or reduce the risk of experiencing 10 health effects, collected across 28 countries and gathering insights from over 100 000 respondents. What stands out quite clearly is that people are willing to pay a significant amount to protect their health and those closest to them. Taking these findings one step further, the report provides guidance for transferring derived estimates to non-surveyed countries and health effects, as well as across policy areas.

Through the information we provide herein, regulators will be well-equipped to select and calibrate policies at their optimal level across chemicals, environment and health sectors.

Jaime de Bourbon de Parme

Environment Director

OECD



Foreword

Policymakers around the world are establishing legal frameworks to address the risks that chemicals pose to human health. The assessment of chemicals management options and environmental policies can be considerably improved through better estimation of their costs and benefits. However, the data required to quantify these benefits remain limited.

This report aims to support policymakers by providing economic valuation estimates assessing the benefits associated with avoiding ten health effects associated with chemicals exposure: IQ loss in children, chronic kidney disease, asthma in adults and children, infertility, very low birth weight, hypertension, hypothyroidism, non-fatal cancer, miscarriage and skin sensitisation.

It provides an overview of the Surveys on Willingness-to-pay to Avoid negative Chemicals-related Health Effects (SWACHE) project, which establishes internationally comparable valuations of morbidity using stated-preference studies. The project generates estimates of willingness to pay (WTP) and values of a statistical case (VSC), the latter representing the monetary value that a population assigns to avoiding one statistical case of a given health effect among its members.

This publication consolidates the OECD's existing evidence on the economic benefits associated with reducing non-fatal chemicals-related health effects for 10 health effects across the 38 OECD Member countries and South Africa. The report is intended as an overview and provides non-technical, practical guidance on how economic valuation can be used to strengthen chemicals management systems and policies.

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The SWACHE project is organised in co-operation between the OECD Working Party on Integrating Environmental and Economic Policies (WPIEEP) under the Environmental Policy Committee (EPOC) and the Working Party on Risk Management (WPRM) under the Chemicals and Biotechnology Committee (CBC), and with the support of the SWACHE advisory group set up for this project, which includes experts in chemicals regulation, toxicology and economic valuation. The Secretariat would like to thank the EPOC, WPIEEP and WPRM delegates as well as members of the advisory group for their helpful comments and valuable feedback on earlier drafts of this paper. Support is also gratefully acknowledged from the authors of the SWACHE working papers. The authors further thank Damien Dussaux for the initial co-ordination of the SWACHE project, and acknowledge Ivan Babiy for administrative support, as well as Emma DeRoy for communication support (all OECD Environment Directorate). Meral Gedik (independent consultant) prepared the report for publication.

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Abbreviations and acronyms

BT	Benefit Transfer
CBA	Cost-Benefit Analysis
CV	Contingent Valuation
DALY	Disability-Adjusted Life Year
DBDC	Double-Bounded Dichotomous Choice
DCE	Discrete Choice Experiment
GDP	Gross Domestic Product
PPP	Purchasing Power Parity
RP	Revealed Preference
SWACHE	Surveys on Willingness-to-pay to Avoid negative Chemicals-related Health Effects
USD	US Dollars
USD PPP	Purchasing Power Parity-adjusted US Dollars
VSC	Value of a Statistical Case
VSL	Value of Statistical Life
WTP	Willingness-To-Pay

Executive summary

Chemicals play an important role in our daily life and are an essential part of modern society. While offering numerous advantages, they must be soundly managed to protect human health and the environment. The assessment of chemicals management options often relies on cost-benefit analyses that compare the societal benefits of regulating chemicals against the costs of policy implementation. To adequately assess such benefits, information on both mortality and morbidity effects is needed. However, assessments of the latter have historically been lacking given the challenge of valuing morbidity profiles across disease and illness states, while capturing the physical and psychological experience of suffering.

The OECD project on Surveys on Willingness-to-pay to Avoid negative Chemicals-related Health Effects (SWACHE) attempts to fill this gap by establishing internationally comparable values of individuals' willingness-to-pay to reduce their risk of developing or worsening a specific health outcome. Where possible, these estimates are converted into corresponding values of a statistical case to derive the monetary value that a population assigns to avoiding one statistical case of a given health condition among its members. In turn, values of a statistical case can be used in cost-benefit analyses to enhance the quality of policy impact assessments to quantify the intangible welfare benefits associated with chemicals regulation.

This report provides harmonised estimates for ten health effects studied in the SWACHE project so far: asthma risk and severity in adults and children, IQ loss in children, chronic kidney disease, infertility, very low birth weight, hypertension, miscarriage, underactive thyroid, non-fatal cancer and skin sensitisation. To derive willingness-to-pay estimates, two rounds of surveys (96 in total) were implemented between 2022 and 2025 across 28 countries with over 116 000 respondents. The surveyed countries are Australia, Austria, Belgium, Canada, Chile, Czech Republic (hereafter 'Czechia'), Denmark, Estonia, Finland, France, Germany, Greece, Italy, Japan, Korea, Mexico, the Netherlands, Norway, Poland, Portugal, Slovenia, South Africa, Spain, Sweden, Switzerland, Türkiye, the United Kingdom, and the United States. In each country, between 1 and 10 surveys were implemented, collecting a minimum of 1 200 responses per health effect.

Key findings

- Individuals are willing to pay a significant amount to reduce their risk of developing various negative health effects linked to chemicals. The average value of a statistical case pooled across the surveyed countries ranges from USD 5 000 for skin sensitisation to USD 1 273 000 for very low birth weight.
- An individual's willingness-to-pay to reduce their risk of negative health effects associated with chemicals generally increases with the size of the risk reduction, decreases as costs of the reduced risk option increase and is positively correlated with income. However, at the country level, the correlation between gross domestic product (GDP) per capita and willingness-to-pay is inconsistent across endpoints, suggesting that preferences for health risk reductions are significantly impacted by personal or household income, but they cannot be straightforwardly attributed to a country's national wealth.

- A survey respondent's initial risk of developing a given health outcome does not systematically influence their valuation of avoiding the outcome across the ten health endpoints. For example, baseline risk is significantly positively associated with willingness-to-pay to avoid infertility and IQ loss in children, and also to reduce asthma severity in both adults and children. However, it is negatively associated with willingness-to-pay to avoid hypertension and is not significant for other endpoints.
- No apparent relationship was found between disease prevalence in each surveyed country and willingness-to-pay estimates. Differences most likely reflect a combination of factors operating within each country, such as the reliability of healthcare systems, greater awareness of a given disease and available treatment options, the burden of healthcare costs, and perception of chemicals-related risks and regulation.

Policy applications and considerations

- The willingness-to-pay and value of a statistical case estimates provided herein can be readily combined with estimated policy impacts, which are typically expressed as the number of cases avoided or increased by the introduction or removal of a given policy under consideration. In the context of a policy aiming at improving quality of life and reducing negative health outcomes, the associated economic benefits can be calculated by multiplying the number of cases avoided by the corresponding willingness-to-pay or value of a statistical case estimate.
- While the estimates provided in this report are developed in the context of chemicals exposure, they can also be applied to the economic analysis of other health and environmental policies, including air pollution or water regulations, preventive care programmes, or the setting of health and environmental standards. Willingness-to-pay and value of a statistical case estimates described herein can be used in cost-benefit analyses addressing any of the ten health effects, provided that the endpoint targeted by the policy matches the project endpoint definition.
- The SWACHE project offers a unique basis for applying benefit transfer methodologies to provide willingness-to-pay and value of a statistical case estimates for non-surveyed countries. Leveraging a newly developed benefit transfer methodology unique for the SWACHE project, willingness-to-pay and value of a statistical case estimates are also provided for each of the 10 health effects for all 38 OECD Member countries and South Africa.
- Future research could focus on developing more robust valuations for comorbidities for the endpoints covered in the SWACHE project, combining expertise in epidemiology and economic analysis. Additional research could also explore how respondents' attitudes toward chemicals and cultural and traditional factors shape how individuals perceive and value different health effects. Finally, as highlighted in this report, there are thousands of health outcomes related to exposure to chemicals. Future research could therefore also continue to uncover economic valuations for additional health effects.

1 Introduction

This chapter introduces the OECD's work on valuing non-fatal health effects associated with chemicals exposure. It explains the project background, the selection of the health effects covered and its geographic extent as well as key concepts in economic valuation of Willingness-To-Pay (WTP) and Value of a Statistical Case (VSC). Finally, the chapter sets out the objectives and contributions of this report, which notably include providing ready-to-use values for policy analysis and practical guidance for their application in cost-benefit analysis.

1.1. The importance of valuing non-fatal health effects

Chemicals are the building blocks of countless processes and products. They are used or released across all industrial, commercial and consumer sectors – from production processes and emissions at industrial sites, to commercial products used in construction and manufacturing, and to consumer products such as clothing, paints and cleaning supplies. Chemicals enable the functioning of our society – they form the components in our transportation and heating, they protect our food, they enable touch screens on our mobile phones and computers. Humans are constantly exposed to chemicals in workplaces, outdoor environments and homes. While chemicals are necessary, some can also cause negative health impacts, if not properly managed. At one extreme, exposure to highly acutely toxic chemicals can lead to sudden death but exposures can also result in cancer, reproductive toxicity, or impacts on organs and organ systems. This report is focused on the valuation of such morbidity effects.

Governments in many countries have introduced national or regional chemicals management frameworks that industry must comply with to commercialise their chemicals or safely operate their facilities. This involves implementing regulatory frameworks and specific regulations to reduce and prevent the risk posed by hazardous chemicals to human health and the environment. Such policies may take the form of bans, restrictions on uses and emissions, requirements for end-of-life treatment, use of protective equipment as well as information and reporting requirements. While consumers weigh the costs of safer products when choosing between various purchase options, policymakers face not only human health considerations but also large-scale economic trade-offs between costs and benefits when assessing chemicals management options and environmental policies.

As part of introducing new policies, most governments are required to carry out a regulatory impact assessment weighing the costs and benefits of the action. In countries where chemicals management frameworks are lacking or perhaps do not exist, it is often argued that there are not enough resources to develop and implement such schemes and protections. Often the costs of administration and implementation are considered for the industry and for administrators, while the benefits in terms of improved human health are not.

This report is intended to help provide updated, state-of-the-art valuations for assessing the benefits of reduced or avoided chemicals-related health effects. The values presented here are unique not only because they represent the latest science in the field but also because they offer the first set of consistent, comparable valuation estimates that can be used for supporting national chemicals policies as well as for comparing the benefits of chemicals policies across countries. Moreover, since the health effects covered in this report can also be triggered by other health hazards, these values can also be applied outside of the chemicals context.

1.2. Overview and history of the SWACHE project

The OECD Surveys on Willingness-to-pay to Avoid negative Chemicals-related Health Effects (SWACHE) project aims to establish internationally comparable values of willingness-to-pay (WTP) to avoid negative health effects due to chemicals exposure. WTP is a measure used by economists to quantify economic benefits that arise from enacting a specific policy. WTP estimates can be derived from survey responses collected from a representative sample of a population. In chemicals policy, such values are then used to assess the economic benefits of a policy that addresses the impacts of chemicals on human health.

The SWACHE project is a collaborative project anchored in a long-standing effort to improve protection of human health and the environment. For more than 50 years, the OECD has assisted countries by developing and supporting the implementation of international standards and best practices that make their systems for managing chemicals as efficient and robust as possible, while protecting human health and

the environment (OECD, 2025[1]; OECD, 2019[2]). The SWACHE project aligns with this objective by providing values needed for the benefits assessment of chemicals management programmes and policies.

The path towards the SWACHE project began with discussions in 2015 at both the Chemicals and Biotechnology Committee (CBC) and the Environment Policy Committee (EPOC), which led to a collaboration between chemicals regulators and economists. In 2016, the European Chemicals Agency (ECHA) hosted an OECD workshop to identify the practices used for cost-benefit analysis of chemicals management related policies in OECD countries (Alberini, 2017[3]; Chiu, 2017[4]). One of the gaps identified during this workshop was the lack of WTP values to support socio-economic benefit assessments and an associated recommendation to conduct coordinated valuation studies in relation to morbidity and environmental impacts of chemicals.

An expert group was established in 2017 to plan the design and implementation of a cross-country collaborative initiative, and to agree on the methodological approaches to be used. This was informed by the workshop on Supporting the socio-economic analysis of chemicals by allowing a better quantification and monetisation of morbidity and environmental impacts (SACAME), hosted by Canada in 2018, which examined case studies assessing the economic benefits of managing several chemicals and recommended the development of multi-country stated preference surveys (Dubourg, 2018[5]; Gabbert, 2018[6]; Holland, 2018[7]; Hunt and Dale, 2018[8]; Hunt and Dale, 2018[9]; Navrud, 2018[10]). This marked the beginning of the SWACHE project and the initial steps towards endpoint selection and WTP survey design.

1.3. Selection of health endpoints covered in the SWACHE project

After acknowledging the need to establish morbidity values related to chemicals exposure, the first step in carrying out the SWACHE project was to select the health effects to address. Policymakers in the countries participating in the SWACHE project, informed by input from stakeholders and experts, identified priority health endpoints for the development of WTP values within the SWACHE project, considering both regulatory relevance and gaps in the valuation literature. Priority health endpoints typically align with the Globally Harmonised System of Classification and Labelling of Chemicals (UN, 2025[11]). These include cancer, mutagenicity, reproductive toxicity, specific target organ toxicity, acute toxicity and impacts on the skin, eyes and respiratory systems. Regulators also expressed interest in health effects associated with endocrine disruption and neurotoxicity.

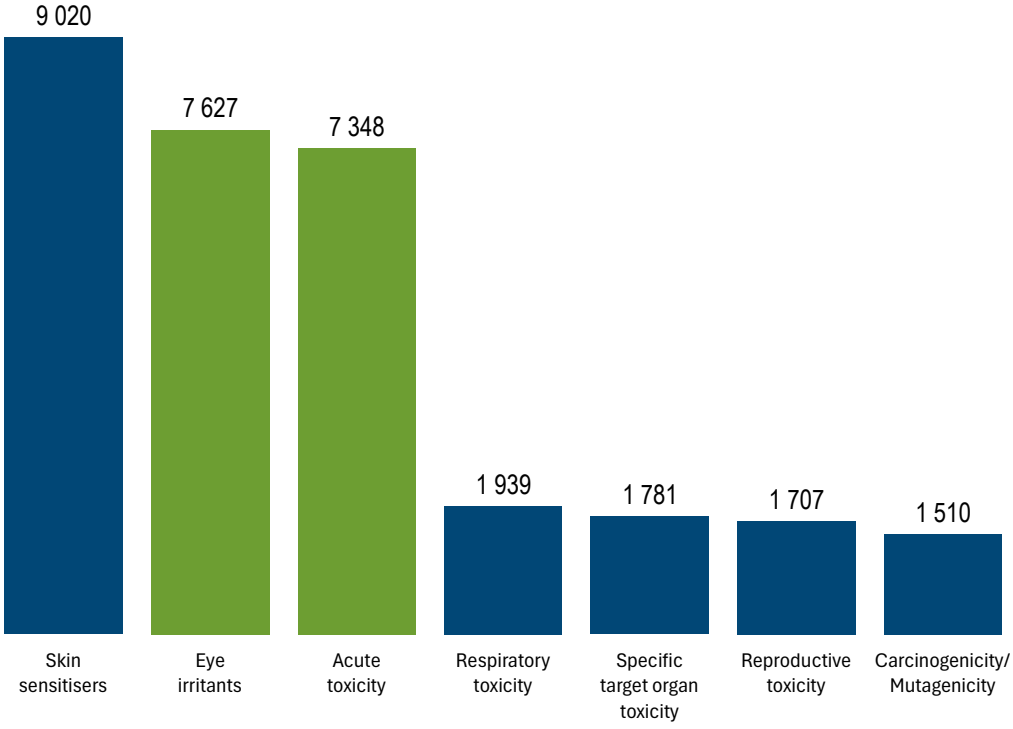
There are several endpoints that lead to regulatory scrutiny and might necessitate a benefits assessment in the context of a regulatory impact assessment and where an associated WTP value would be useful. For example, as of June 2025, 13 748 of the 21 719 substances (63.3%) registered under the European Union's Regulation for Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and the EU Regulation on Classification, Labelling and Packaging of substances and mixtures (CLP) have a classification for one or multiple hazards (European Union, 2025[12]; European Union, 2008[13]). Figure 1.1 presents an overview of the types of hazard classifications available for these substances. The most common classifications are for skin sensitisation and eye irritation, and acute toxicity, which refers to adverse effects that occur after a short (usually less than 24 hours) exposure to a chemical. Between one and two thousand substances are classified for each of cancer/mutagenicity, reproductive toxicity, and specific organ toxicity.

The health effects selected for the first two rounds of the SWACHE project are asthma severity and risk, infertility, very low birth weight, chronic kidney disease, IQ loss in children, underactive thyroid, miscarriage, hypertension, non-fatal cancer, and skin sensitisation. All these health effects fall within at least one hazard classification category. Asthma falls under the "respiratory toxicity" hazard class. Chronic kidney disease and hypertension fall under "specific target organ toxicity". Infertility, very low birth weight and miscarriage fall under "reproductive toxicity", while skin sensitisation falls under "skin sensitisers". Non-fatal cancer falls under "carcinogenicity/mutagenicity". Some health effects may fall under more than one

hazard class. For example, underactive thyroid may fall under “specific target organ toxicity” and “reproductive toxicity”. IQ loss may fall under “specific target organ toxicity” as well as “reproductive toxicity”, depending on the cause of the IQ loss. The categories shown in blue indicate hazard classes that include at least one health effect covered in the SWACHE project. The categories in green, i.e. eye irritants and acute toxicity do not include endpoints covered in the first two rounds of the SWACHE project.

Figure 1.1. Hazard classifications for substances registered under EU REACH

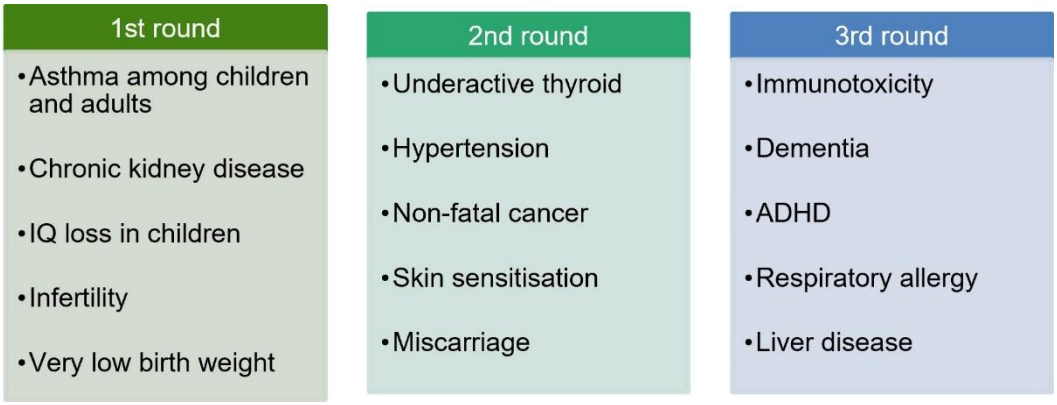
Number of substances classified by denoted hazard class as of June 2025



Note: All health effects selected for the SWACHE project fall within at least one hazard classification category. The categories shown in blue indicate hazard classes that include at least one health effect covered in the SWACHE project. The categories in green, i.e. eye irritants and acute toxicity do not include endpoints of the SWACHE project. Asthma falls under the “respiratory toxicity” hazard class. Chronic kidney disease and hypertension fall under “specific target organ toxicity”. Infertility, very low birth weight and miscarriage fall under “reproductive toxicity”, while skin sensitisation falls under “skin sensitisers”. Non-fatal cancer falls under “carcinogenicity/mutagenicity”. Some health effects may fall under more than one hazard class. For example, underactive thyroid may fall under “specific target organ toxicity” and “reproductive toxicity”. IQ loss may fall under “specific target organ toxicity” as well as “reproductive toxicity”, depending on the cause of the IQ loss.
Source: Christoph Rheinberger’s elaboration based on (European Union, 2025[12]).

Figure 1.2 summarises the health effects selected and covered in the SWACHE project. So far, two rounds of surveys have been completed. A third round of surveys is planned for 2027-2028 and will include immunotoxicity, dementia, attention deficit hyperactivity disorder (ADHD), respiratory allergy and liver disease.

Figure 1.2. Health effects assessed across the three rounds of the SWACHE project



Note: IQ stands for intelligence quotient, and ADHD stands for attention deficit hyperactivity disorder.

1.4. Implementing surveys in 28 countries

Once the health effects were selected, the SWACHE project implemented surveys in 28 countries. In these surveys, individuals were asked to report their WTP to reduce their risk of developing or worsening a specific health outcome. To date, two rounds of surveys were fielded as part of this project.

The first round was implemented in 2022 and covered 5 health endpoints. Each survey focusing on a specific health effect was conducted in at least 7 countries. In each country a representative sample of at least 1 200 respondents was collected. Overall, 1 to 5 surveys were implemented in 22 countries, totalling 46 surveys conducted. The second round covered 5 additional health effects and was carried out between 2023 and 2025 in 19 countries, for a total of 50 surveys conducted. Each survey was implemented in at least 9 countries. Across both rounds of surveys, 1 to 10 surveys were implemented in 28 countries, amounting to 96 surveys implemented and more than 116 000 respondents surveyed.

Table 1.1 displays, for each health endpoint, the countries in which the surveys were implemented and the type of values recommended for policy analysis. These recommended values are either WTP estimates or Value of a Statistical Case (VSC) estimates. VSC estimates are derived from WTP estimates and are often more convenient for use in policy analysis as they represent the value that a population assigns to avoiding one statistical case of a specific health effect. The definition of WTP and VSC values, along with the methodology used to derive them, is described just below in the section Valuation of morbidity in a consistent manner and summarised in Box 1.1.

Table 1.1. Overview of the ten health endpoints covered in the first two rounds of SWACHE

Health endpoint	Surveyed countries	Recommended values
Asthma	7 countries: Canada, Czechia, France, Poland, Sweden, the United Kingdom and the United States	WTP estimates for asthma severity VSC estimates for asthma risk
Chronic kidney disease	9 countries: Canada, Chile, Denmark, Germany, Italy, Norway, Türkiye, the United Kingdom and the United States	VSC estimates
IQ loss in children	11 countries: Australia, Canada, Denmark, Korea, the Netherlands, Poland, Portugal, South Africa, Sweden, the United Kingdom and the United States	WTP estimates
Infertility	10 countries: Australia, Canada, Chile, Germany, Japan, Poland, Portugal, Sweden, the United Kingdom and the United States	VSC estimates
Very low birth weight	9 countries: Canada, Czechia, Italy, Mexico, the Netherlands, Switzerland, Türkiye, the United Kingdom, and the United States	VSC estimates
Underactive thyroid	12 countries: Austria, Canada, Denmark, Estonia, Finland, Greece, Japan, the Netherlands, Poland, Portugal, the United Kingdom, and the United States	VSC estimates
Hypertension	10 countries: Austria, Belgium, Canada, Finland, Greece, Japan, Portugal, Slovenia, the United Kingdom and the United States	VSC estimates
Non-fatal cancer	10 countries: Canada, Denmark, Estonia, Japan, Mexico, Norway, Slovenia, Spain, the United Kingdom and the United States	VSC estimates
Skin sensitisation	9 countries: Canada, Denmark, Japan, the Netherlands, Poland, Spain, Switzerland, the United Kingdom and the United States	WTP estimates for the sensitised sample VSC estimates for the non-sensitised sample
Miscarriage	9 countries: Belgium, Canada, Denmark, France, Italy, Korea, the Netherlands, the United Kingdom and the United States	VSC estimates

Note: WTP stands for Willingness-To-Pay, VSC for Value of a Statistical Case. The study on cancer distinguishes between fatal and non-fatal cases. It estimates respondents' WTP to avoid both types of outcomes, leading to a Value of Statistical Life (VSL) estimate for fatal outcomes and a value for non-fatal case - referred to in this report as the Value of a Statistical Case (VSC). In the working paper, this value is termed the Value of a Non-Fatal cancer case (VNF). For further details please refer to the working paper (Herrera-Araujo et al., 2026[14]).

1.5. Valuation of morbidity in a consistent manner

The main challenge of the SWACHE project has been in valuing morbidity effects. Traditionally, the valuation of health impacts of chemicals has been driven by estimates related to mortality and the use of Value of Statistical Life (VSL) estimates. However, exposure to chemicals can also cause morbidity effects, i.e. illness and disease. Valuing morbidity is challenging given the heterogeneous nature of different disease and illness states, and the need to capture both the physical and psychological experience of suffering. Yet, it is vital for a complete assessment of policies and regulations that shape individuals' health and well-being.

This section details the harmonised approach of the SWACHE project, which provides WTP and VSC estimates in a standardised manner. A steering group of experts including internationally renowned researchers, practitioners, regulators and health professionals provided regular feedback throughout the standardised process from the elaboration of the survey questionnaire to the data analysis. By using similar methodologies, survey design, approach to analyse survey data across many health impacts – and by implementing the surveys in parallel in a large number of countries – the SWACHE project offers a unique perspective that allows for the comparison of value estimates for non-fatal health impacts across health endpoints and countries.

1.5.1. What does willingness-to-pay capture?

Several approaches exist to place a monetary value on morbidity impacts, with the most comprehensive being estimates of WTP or Willingness-To-Accept (WTA). The value individuals place on the burden of morbidity can be inferred by measuring their WTP to reduce their risk of developing a disease, or by their WTA of bearing a higher-than-normal risk. The WTA compensation is less frequently used and WTP is generally considered best practice for non-market survey-based valuation studies (Freeman III, Herriges and Kling, 2014[15]).

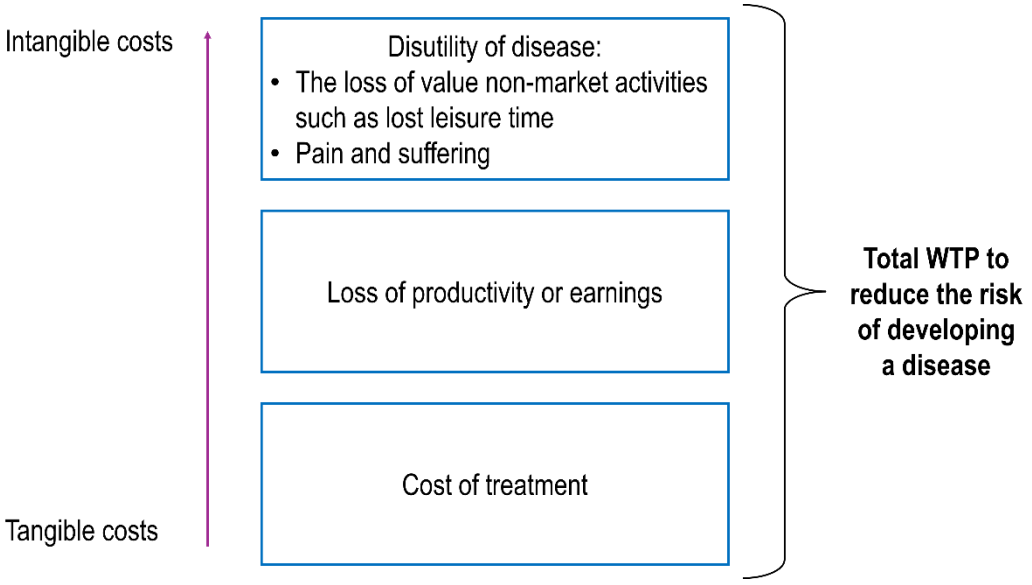
In the context of the SWACHE project, WTP represents the maximum amount that individuals are willing to spend from their own income in order to reduce their personal risk of developing or worsening a specific disease. In the absence of WTP estimates, policymakers typically rely on cost-of-illness (COI) estimates, which reflect medical treatment costs, or on valuations of productivity losses, which are sometimes combined with COI. However, economic theory and empirical studies show that COI is generally an underestimate of WTP or a lower bound for the WTP measure (Alberini and Krupnick, 2000[16]; Harrington and Portney, 1987[17]; Berger et al., 1987[18]; Cropper et al., 2004[19]). These existing metrics only cover the impact of morbidity on lost productivity, lost earnings or the cost of treatment, whereas WTP extends beyond these components by also capturing the disutility of illness. WTP therefore reflects a broader physical, emotional, social, and economic burden of disease as perceived by individuals.

The elaboration of the survey questionnaires for SWACHE followed several steps and resulted in a harmonised introduction and series of debriefing questions specific to the health effect being valued. First, a description of the health effect was drafted including information about the related quality-of-life impact, a review of any prior stated preference studies on the same health effect and suggestions for how to characterise the endpoint in a new study. Second, various valuation scenarios were developed describing the target population, the risk reduction mechanism, the payment vehicle and the elicitation method. Third, a complete draft survey questionnaire was developed including the most appropriate valuation scenario. Each questionnaire was drafted by a team of authors that included recognised experts in the field of stated preference surveys related to health impacts as well as practitioners in the analysis of chemicals management options.

As a result, each SWACHE survey begins with a detailed and easily understandable description of the health endpoint to inform respondents of the potential symptoms, health impacts and treatments associated with the disease. For example, in the infertility survey, respondents are informed of the potential impacts of infertility on their lives and relationships. They are also informed that assisted reproductive technologies can help them to conceive, but that such treatments are costly and not always successful. In the underactive thyroid endpoint description, lifelong daily hormone treatment is mentioned. By detailing all these aspects of the respective disease, the survey aims to inform respondents about the context in which their WTP should be considered, thereby capturing their total WTP, including the potential cost and effort of treatment as perceived by respondents, potential loss of productivity, and the disutility associated with the disease.[1]

The disutility of disease includes the loss of value of non-market activities, such as maintaining a home or enjoying leisure time, as well as individual pain, suffering, discomfort and anxiety that the disease may cause. As illustrated in Figure 1.3, surveys may often be the only way to capture an individual's WTP to reduce the risk of developing a disease and thus monetise the part of disutility of the health outcome that is not otherwise captured in monetary terms such as the value of lost income or the cost of treatment.

Figure 1.3. Willingness-to-pay to reduce the risk of developing a disease



Source: Authors' own elaboration based on (Navrud, 2018[10]; US EPA, 2000[20]; Drummond et al., 2015[21]).

1.5.2. Measuring willingness-to-pay through stated-preference surveys

Survey-based stated preference (SP) studies are often used to estimate the WTP for reducing the risk of developing or worsening a disease. Alternatively, WTP can sometimes be inferred from observed market behaviour. These approaches are referred to as Revealed Preference (RP) methods. The SWACHE project opted for SP studies for estimating the full WTP to reduce the risk for a specific health effect because relevant market transactions are typically unavailable for the health endpoints of interest. Thus, in the SP context, WTP is not based on observed market behaviour or actual expenditures. Instead, it is elicited through surveys that ask respondents how much they would be willing to pay for a hypothetical reduction in a specific morbidity risk. In order to minimise hypothetical bias, respondents are reminded about their budget constraint and instructed to behave as if the valuation scenarios were real and as if the WTP would actually be deducted from their budget. Box 1.1 summarises the key valuation concepts and methods used in this report.

Box 1.1. Valuation concepts and methods in brief

- **Willingness-to-pay** (WTP): the maximum money amount an individual is willing to pay to obtain a good or service or to avoid an undesirable outcome. In the context of the SWACHE project, it represents the maximum money amount individuals are willing to spend from their own income to reduce their risk of developing or worsening a specific health effect due to chemical exposure over a given period.
- **Value of a Statistical Case** (VSC): the aggregate measure of individuals' WTP for a marginal reduction in the probability of developing a specific adverse health endpoint. It is termed "statistical" because it does not refer to the illness of any identified individual, but to the aggregation of values placed on small changes in morbidity risk across a reference population. Indeed, the VSC corresponds to the WTP for a small decrease in the probability of developing a particular illness, normalised by the size of the risk change so that it reflects the value of preventing one case of disease. This normalisation also allows the VSC to be independent of a

specific time horizon, as WTP is divided by the corresponding risk reduction defined over the same period. In other words, the VSC represents the monetary value that a population assigns to avoiding one case of a given health effect. For example, the VSC of miscarriage is the value that a population attributes to avoiding one case of miscarriage. VSC estimates are particularly convenient for policy evaluation as benefits of policies or programmes affecting human health are often expressed in terms of cases avoided. The corresponding monetary benefits can then be calculated by multiplying the number of cases avoided by the respective VSC.

- **Stated preference** (SP) **and Revealed Preference** (RP): two primary approaches for eliciting an individual's WTP for risk reduction. SP methods rely on surveys, asking respondents to state their preferences for specific changes in morbidity or severity risks in a hypothetical scenario. Such surveys may ask respondents directly for their WTP for a given (hypothetical) risk reduction or ask them to choose between scenarios with different risk and cost combinations. In contrast, RP methods observe actual behaviour in labour and consumer markets, focusing on trade-offs between morbidity risk and income, and between the cost of a product and its expected impact on the risk of developing an illness.
- **Contingent valuation** (CV): a survey-based stated-preference valuation method where respondents are asked about their WTP for a hypothetical good or service, such as to reduce their risk of developing or worsening negative health effects
- **Double-bounded dichotomous choice** (DBDC): a WTP elicitation format in which respondents answer two sequential yes/no questions about paying a specific amount for reducing their morbidity risk. If the first response is positive, the follow-up question typically proposes a higher bid; conversely, if the first response is negative, a lower follow-up bid is proposed.
- **Discrete Choice Experiments** (DCE): a survey-based stated-preference valuation method where respondents are asked to make a series of choices between alternatives with different characteristics (attribute levels) and monetary costs. DCEs are preferred to CV when multiple dimensions of a health endpoint are assessed, as they allow capturing trade-offs between these dimensions.

The two SP methods used in the SWACHE project are Contingent Valuation (CV) method and Discrete Choice Experiments (DCE). When the study focused on a single dimension of the health effect – reducing the risk of developing or worsening the condition – a CV method using a Double-Bounded Dichotomous Choice (DBDC) was adopted. When the study addressed multiple attributes of a health effect, for example in the skin sensitisation survey where the location, duration, and severity of flare-ups were considered, a DCE was used to capture these different components. The choice of method was tailored to each health endpoint, and careful harmonisation of the surveys enabled the derivation of comparable estimates across studies, as described above. Box 1.2 and Box 1.3 provide examples of a CV method using a DBDC format and a DCE, respectively.

Box 1.2. Contingent valuation method in the underactive thyroid survey

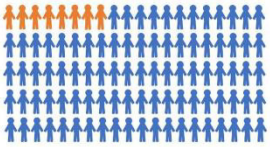
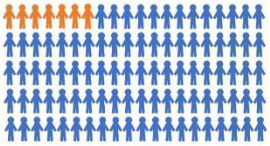
The underactive thyroid survey relied on a double-bounded dichotomous choice (DBDC) format to assess respondents' willingness-to-pay (WTP). Respondents were asked whether they would be willing to pay a specific monetary amount to buy safer products and reduce their own risk of developing an underactive thyroid. If they answered yes, a follow-up question asked whether they would pay an amount twice as large. If they answered no, a follow-up question asked whether they would pay an amount half as large. The payment was specified as an annual payment to be made for the next 20

years, coinciding with the time horizon of the risk reduction. Standard income and budget reminders were included before and during the WTP questions to ensure realistic responses.

Figure 1.4. Double-bounded dichotomous choice example from the underactive thyroid survey

You are now asked to choose between two options: one with conventional products and current risk, and second with safer products and reduced risk.

Which of the two options would you choose? Please consider both the risk reduction and the additional cost when choosing between the options. Remember to consider your budget.

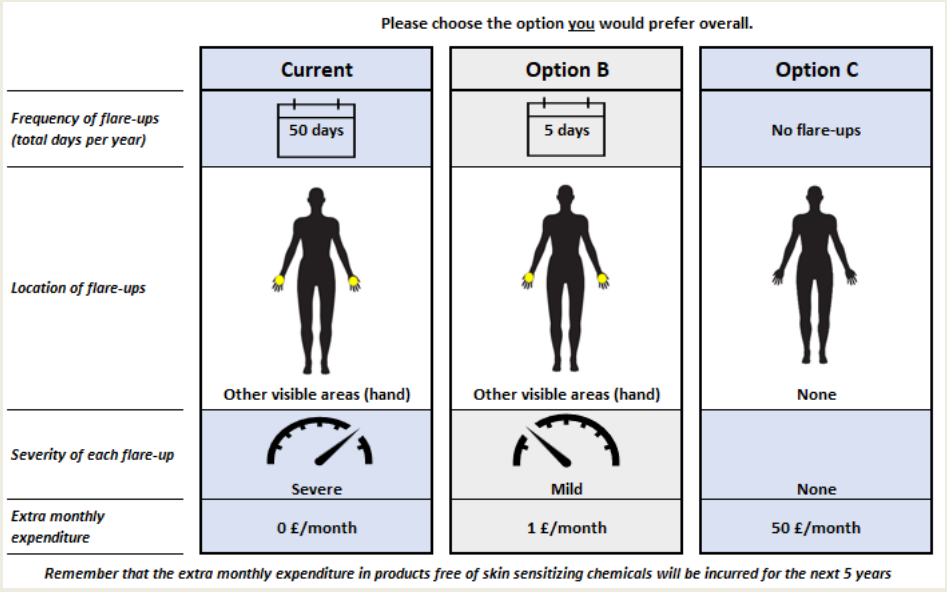
	Option A: Conventional products and current risk	**Option B: Safer products and reduced risk**
Your personal risk of developing an underactive thyroid over the next 20 years	**8 %** *over 20 years* 	**7 %** *over 20 years* 
Payment per year (total over 20 years)	**0 €** *(no cost over 20 years)*	**10 € per year** *(total* **200 €** *over 20 years)*
I would choose…	☐	☐

Source: (Ahtiainen et al., 2026[22])

Box 1.3. Discrete choice experiment in the skin sensitisation survey

The skin sensitisation survey relied on a discrete choice experiment (DCE) to assess respondents' willingness-to-pay (WTP). Respondents were presented with six consecutive choice cards. Each card presents a choice between three different options. The first option represented the current situation, and the other two represented alternative options that could be achieved by purchasing products free of skin sensitising chemicals. Each option was described by a series of attributes including the frequency of flare-ups, their location, their severity and the extra monthly household expenditure for products free of skin-sensitising chemicals. The payment was specified as a monthly payment to be made over the next 5 years, coinciding with the time horizon of the risk reduction.

Figure 1.5. Discrete choice experiment choice card example from the skin sensitisation survey



Source: (Contu et al., 2026[23])

Most of the surveys used an explicit payment vehicle in the form of safer household products that would lower respondents' risk of developing or worsening health effects related to chemicals exposure. These safer alternatives, such as safely packaged foods and beverages, safer cosmetics, cleaning products and pesticides, were presented as having a higher cost and described as identical in all other respects, without having any other health or environmental effects.

1.6. Objectives and contribution of this report

This report summarises and compares the economic valuation results of ten health endpoints that were derived through the SWACHE surveys in the 2022-2025 period and provides guidance on their direct application in policy analysis. The report also provides guidance on how the estimated values can be transferred and used in countries that have not benefitted yet from the SWACHE surveys and valuation of health effects.

The remainder of the report is structured as follows. Chapter 2 presents and compares the WTP and VSC estimates recommended for policy analysis of ten health effects for the surveyed countries. Chapter 3 discusses the drivers of preferences in WTP responses among individuals and among countries. Chapter 4 provides guidance on the use of SWACHE values in policy impact assessment, including cost-benefit analysis and break-even analysis. Chapter 5 offers additional guidance on applying SWACHE values in other countries and contexts, including results from a benefit transfer analysis that provide WTP and VSC estimates of ten health endpoints for all OECD Member countries and countries that have been surveyed at least once. Chapter 6 discusses the methodological limitations of the project and the need for additional research.

References

Ahtiainen, H. et al. (2026), "Valuing a reduction in the risk of an underactive thyroid: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 272, OECD Publishing, Paris, https://doi.org/10.1787/4af8f3aa-en. [22]

Alberini, A. (2017), "Measuring the economic value of the effects of chemicals on ecological systems and human health", *OECD Environment Working Papers*, No. 116, OECD Publishing, Paris, https://doi.org/10.1787/9dc90f8d-en. [3]

Alberini, A. and A. Krupnick (2000), "Cost-of-Illness and Willingness-to-Pay Estimates of the Benefits of Improved Air Quality: Evidence from Taiwan", *Land Economics*, Vol. 76/1, p. 37, https://doi.org/10.2307/3147256. [16]

Berger, M. et al. (1987), "Valuing Changes in Health Risks: A Comparison of Alternative Measures", *Southern Economic Journal*, Vol. 53/4, p. 967, https://doi.org/10.2307/1059689. [18]

Chiu, W. (2017), "Chemical risk assessment and translation to socio-economic assessments", *OECD Environment Working Papers*, No. 117, OECD Publishing, Paris, https://doi.org/10.1787/a930054b-en. [4]

Contu, D. et al. (2026), "Valuing a reduction in the risk of skin sensitisation: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 277, OECD Publishing, Paris, https://doi.org/10.1787/fc305de9-en. [23]

Cropper, M. et al. (2004), "The demand for a malaria vaccine: evidence from Ethiopia", *Journal of Development Economics*, Vol. 75/1, pp. 303-318, https://doi.org/10.1016/j.jdeveco.2003.02.006. [19]

Drummond, M. et al. (2015), *Methods for the Economic Evaluation of Health Care Programmes*, Press, Oxford University, https://nibmehub.com/opac-service/pdf/read/Methods%20for%20the%20Economic%20Evaluation%20of%20Health%20Care%20Programmes.pdf. [21]

Dubourg, R. (2018), "Economic assessments of the benefits of regulating mercury: A review", *OECD Environment Working Papers*, No. 132, OECD Publishing, Paris, https://doi.org/10.1787/77045f1a-en. [5]

European Union (2025), *Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)*, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32006R1907. [12]

European Union (2008), *Regulation on classification, labelling and packaging of substances and mixtures*, http://data.europa.eu/eli/reg/2008/1272/oj. [13]

Freeman III, A., J. Herriges and C. Kling (2014), *The Measurement of Environmental and Resource Values*, Routledge, https://doi.org/10.4324/9781315780917. [15]

Gabbert, S. (2018), "Economic assessment and valuations of environmental and health impacts caused by Perfluorooctanoic acid (PFOA) and its salts", *OECD Environment Working Papers*, No. 128, OECD Publishing, Paris, https://doi.org/10.1787/f5250745-en. [6]

Harrington, W. and P. Portney (1987), "Valuing the benefits of health and safety regulation", *Journal of Urban Economics*, Vol. 22/1, pp. 101-112. [17]

Herrera-Araujo, D. et al. (2026), "Valuing a reduction in the risk of non-fatal cancer: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 274, OECD Publishing, Paris, https://doi.org/10.1787/0345660e-en. [14]

Holland, M. (2018), "Socio-economic assessment of phthalates", *OECD Environment Working Papers*, No. 133, OECD Publishing, Paris, https://doi.org/10.1787/a38a0e34-en. [7]

Hunt, A. and N. Dale (2018), "Economic valuation in 1-Methyl-2-pyrrolidone (NMP) regulation", *OECD Environment Working Papers*, No. 131, OECD Publishing, Paris, https://doi.org/10.1787/ef67fa08-en. [8]

Hunt, A. and N. Dale (2018), "Economic valuation in formaldehyde regulation", *OECD Environment Working Papers*, No. 134, OECD Publishing, Paris, https://doi.org/10.1787/c0f8b8e5-en. [9]

Navrud, S. (2018), "Assessing the economic valuation of the benefits of regulating chemicals: Lessons learned from five case studies", *OECD Environment Working Papers*, No. 136, OECD Publishing, Paris, https://doi.org/10.1787/9a061350-en. [10]

OECD (2025), *Chemical Safety and Biosafety Progress Report*, No. 47, OECD, Paris, https://www.oecd.org/content/dam/oecd/en/topics/policy-issues/chemical-safety-and-biosafety/progress-report-june-2025.pdf. [1]

OECD (2019), *Saving Costs in Chemicals Management: How the OECD Ensures Benefits to Society*, OECD Publishing, Paris, https://doi.org/10.1787/9789264311718-en. [2]

UN (2025), *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)*, United Nations, https://unece.org/transport/documents/2025/09/standards/globally-harmonized-system-classification-and-labelling. [11]

US EPA (2000), *Handbook for Non-Cancer Health Effects Valuation*, United States Environmental Protection Agency, https://nepis.epa.gov/Exe/ZyNET.exe/P1009Y5G.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2000+Thru+2005&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=. [20]

Note

[1] The asthma endpoint survey is an exception because it explicitly asks respondents to focus only on the non-monetary benefits of avoiding or reducing asthma. This WTP therefore captures only the disutility associated with the disease. In these circumstances, the WTP for asthma can be added to the COI to provide a full morbidity valuation.

2 Recommended values for policy analysis

Policymakers often face trade-offs that require balancing competing priorities and determining the right level of intervention. The economic valuation of health effects provides essential input for policy evaluation and implementation supporting balanced policy decisions. This chapter presents an overview of the recommended values for ten health effects across 28 surveyed countries in the SWACHE project.

2.1. Average values across countries for the ten health endpoints

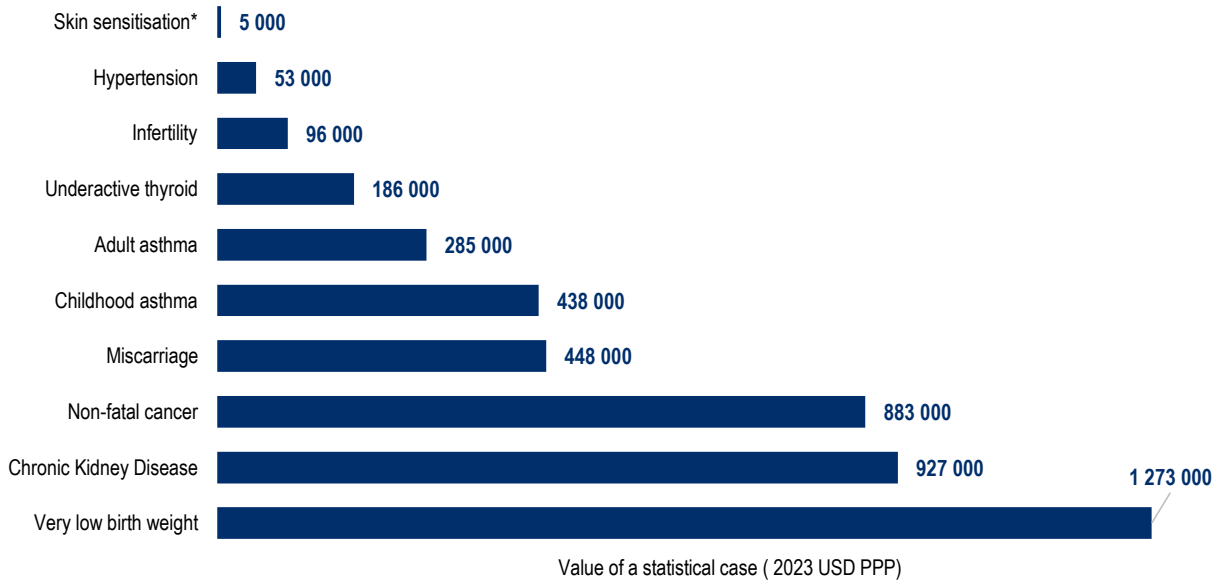
This section presents an overview of the average willingness-to-pay (WTP) and value of a statistical case (VSC) estimates across countries for the ten health effects. These values are expressed in 2023 USD Purchasing Power Parity (PPP). Values from the working papers have been converted to 2023 USD Purchasing Power Parity (PPP). For clarity, 2023 USD PPP is simply written as USD throughout the rest of this report.

The results from the first two rounds of the surveys indicate that individuals are willing to pay a significant amount to reduce their risks of developing various negative health effects linked to chemicals. Figure 2.1 provides a snapshot of the valuations of skin sensitisation, hypertension, infertility, underactive thyroid, adult asthma risk, childhood asthma risk, miscarriage, chronic kidney disease, non-fatal cancer and very low birth weight, measured as the average VSC for each endpoint across the surveyed countries. The average VSC ranges from USD 5 000 for skin sensitisation (defined as a case involving a two-week severe flare-up visible on the face) to USD 1 273 000 for very low birth weight. The second highest value is observed for chronic kidney disease with an average VSC of USD 927 000, followed by non-fatal cancer at USD 883 000.

The health effects also include the severity of asthma, the avoidance of IQ losses in children and the avoidance of skin sensitisation among individuals already diagnosed with the condition. In the asthma severity survey, respondents were asked how much they would be willing to pay to reduce asthma severity by one level (e.g. from severe to moderate-plus). In the skin sensitisation survey, individuals already sensitised were asked about their WTP to avoid a flare-up. In the IQ loss survey, respondents were asked about their WTP to avoid the certain loss of one IQ point for their own hypothetical children. For these effects, WTP values are therefore recommended for policy analysis, noting that these values relate to the change in the health effect and to the time period presented to respondents, as opposed to the VSC which is not indexed to a time horizon, as specified in Box 1.1 of Chapter 1.

The mean WTP for reducing asthma severity equals USD 629 per year for adults and USD 1 134 per year for children over a period of ten years. To avoid the loss of one IQ point in children, respondents are willing to pay USD 667 per year on average over a period of 5 years. Finally, a scenario involving a two-week severe flare-up visible on the face results in an estimated value per averted case of USD 106 per year over a period of 5 years for individuals already skin-sensitised to chemicals.

Figure 2.1. Value of a statistical case, by health effect, averaged across countries (USD)



Note: * the value of a statistical case for skin sensitisation refers to a hypothetical skin sensitisation case that involves a two-week severe flare-up visible on the face and is derived from a sample of respondents without prior skin sensitisation to chemicals.
Source: (Appéré et al., 2023[1]; Contu et al., 2026[2]; Dockins et al., 2023[3]; Dussaux et al., 2023[4]; Herrera-Araujo et al., 2026[5]; Hunt et al., 2026[6]; Mourato et al., 2023[7]; Ščasný, Zvěřinová and Dussaux, 2023[8]; Ahtiainen et al., 2026[9]; Dockins et al., 2026[10]).

StatLink https://stat.link/z724kb

In Figure 2.1, three endpoints relate to reproductive health and show contrasting results. The mean VSC for infertility is the third lowest among the ten health effects, whereas the mean VSC for very low birth weight is the highest. The mean VSC for miscarriage lies between these two values. In viewing these results, it is important to keep the study design and context in mind for each health effect. For example, infertility, as defined in this project, refers to a condition that is not necessarily permanent but for which the risk can be reduced, while miscarriage refers to the occurrence of a specific event. In contrast, very low birth weight is described to respondents as a condition with consequences that extend over the infant's entire lifetime. A description of each of the ten health endpoints, as presented to respondents, is provided below, and a comparative analysis of the VSC rankings is further discussed in Section 4.2 of Chapter 4. Detailed descriptions of each health effect and its empirical estimation are available in the respective underlying OECD Environment Working Papers.

2.2. Results by health effect

This section presents the values recommended for policy analysis for the surveyed countries for the ten health effects. These values are expressed in 2023 USD PPP. Results with confidence intervals as well as results in local currencies are presented in Annex A. Confidence intervals are provided for information purposes, but the central values presented below are the recommended values for policy analysis. This section also provides a brief description of the ten health effects, along with the valuation scenario used in each survey including the baseline risk, the risk reduction and time horizon considered for each condition, which were specifically tailored to each health effect to reflect epidemiological data. The next chapter offers further details on the drivers of preferences in the valuation of non-fatal health effects among individuals and across countries.

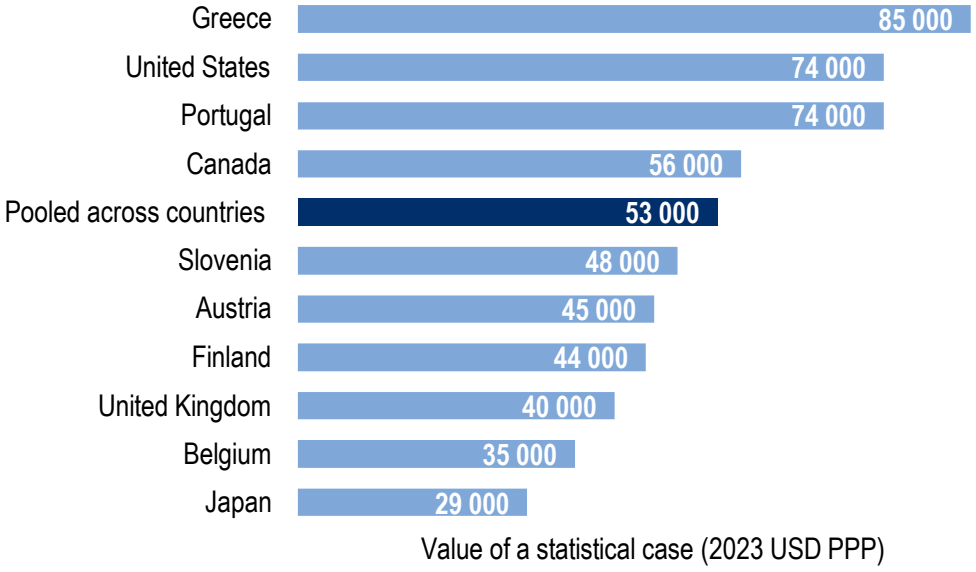
2.3. Hypertension

Hypertension, also known as high blood pressure, is a common medical condition that affects roughly 30% of the adult population worldwide (WHO, 2025[11]). Although it often presents without warning signs or symptoms, it can lead to severe health issues such as cardiovascular disease, kidney disease[1], vascular dementia, etc. In the ten countries surveyed, ischaemic heart disease, for which hypertension is one of the most common risk factors, is the leading cause of burden of disease, as measured by Disability-Adjusted Life Years (DALYs), a metric that combines years of life lost due to premature death and years lived with disability (WHO, 2025[12]).

Previous valuation work does not provide internationally comparable WTP to avoid hypertension. The Surveys on Willingness-to-pay to Avoid negative Chemicals-related Health Effects (SWACHE) hypertension survey fills this gap. The valuation scenario divided respondents, representative of the general population in each surveyed country, into two age groups (18-45 and over 45) according to their baseline risk of hypertension (30% and 55%, respectively), as informed by corresponding epidemiological data. They were then asked how much they would be willing to pay to reduce their risk of high blood pressure, with each respondent presented with one of two possible risk reductions over the next ten years: 10 percentage points or 20 percentage points. Respondents' WTP was directly assessed using a double-bounded dichotomous choice (DBDC) format.

The hypertension survey was implemented in Austria, Belgium, Canada, Finland, Greece, Japan, Portugal, Slovenia, the United Kingdom and the United States. The mean VSC of hypertension varies from USD 29 000 in Japan to USD 85 000 in Greece, as illustrated in Figure 2.2. The mean VSC across the surveyed countries equals USD 53 000. A detailed description of this survey and its results is available in (Hunt et al., 2026[6]).

Figure 2.2. Values of a statistical case of hypertension by country (USD)



Note: values have been converted to 2023 USD PPP. Results in local currencies can be found in Annex A.
Source: (Hunt et al., 2026[6])

StatLink https://stat.link/8g9nsu

2.4. Infertility

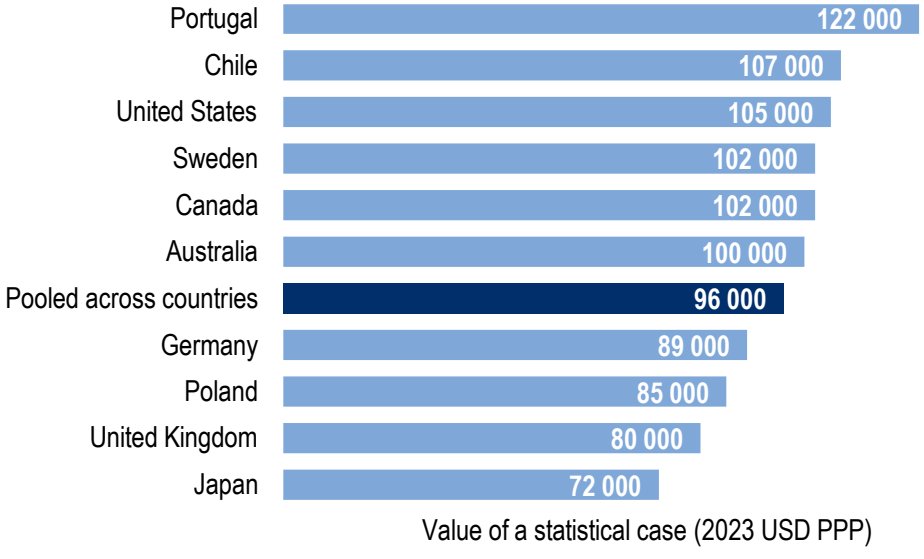
In the medical literature, infertility is the inability of a couple to get pregnant after trying for one year or more. Infertility is associated with exposure to chemicals and, in some cases, can be treated medically. One in six adults worldwide experiences infertility in their lifetime (WHO, 2023[13]). Infertility can have profound psychological, social and financial impacts on individuals and couples. Fertility rates have been declining globally since the 1950s, which has led to concern among many individuals in OECD Member countries. While this decline is primarily driven by socio-economic and cultural factors, environmental pollution also plays a significant role, as individuals are increasingly exposed to chemicals that disrupt the hormonal system, thereby increasing the risk of infertility (Seli and Taylor, 2023[14]; UNFPA, 2025[15]).

Previous studies estimated the WTP for improved fertility, but many focused on assisted reproduction technologies. These previous studies estimated a value per statistical pregnancy. Overall, the existing metrics are difficult to apply in regulatory impact analysis. The SWACHE infertility survey was designed to elicit WTP for a reduced risk of infertility that can be easily used in cost-benefit analysis.

In each country, a sample of 1 200 adult respondents of childbearing age who were part of couples planning to have a child within the next five years was collected and analysed. Respondents were informed that they could reduce their risk of infertility by purchasing foods and beverages packaged in extra-safe materials. After being assigned a baseline infertility risk based on their sex and age, as well as that of their partner (ranging from 8 in 100 couples to 24 in 100 couples), respondents were asked how much they would be willing to pay each month for a 20-month period to ensure a reduction in their infertility risk from substances in food packaging. A risk reduction of either 1 or 2 percentage points was randomly assigned to respondents. The valuation scenario was arranged in a DBDC format.

The survey was fielded in ten countries: Australia, Canada, Chile, Germany, Japan, Poland, Portugal, Sweden, the United Kingdom and the United States. Figure 2.3 displays the VSC estimates for these ten countries. The mean VSC of infertility varies from USD 72 000 in Japan to USD 122 000 in Portugal. The mean VSC across the surveyed countries equals USD 96 000. A detailed description of this survey and its results is available in (Dussaux et al., 2023[4]).

Figure 2.3. Values of a statistical case of infertility by country (USD)



Note: values have been converted to 2023 USD PPP. Results in local currencies can be found in Annex A.
Source: (Dussaux et al., 2023[4])

StatLink https://stat.link/1o8thn

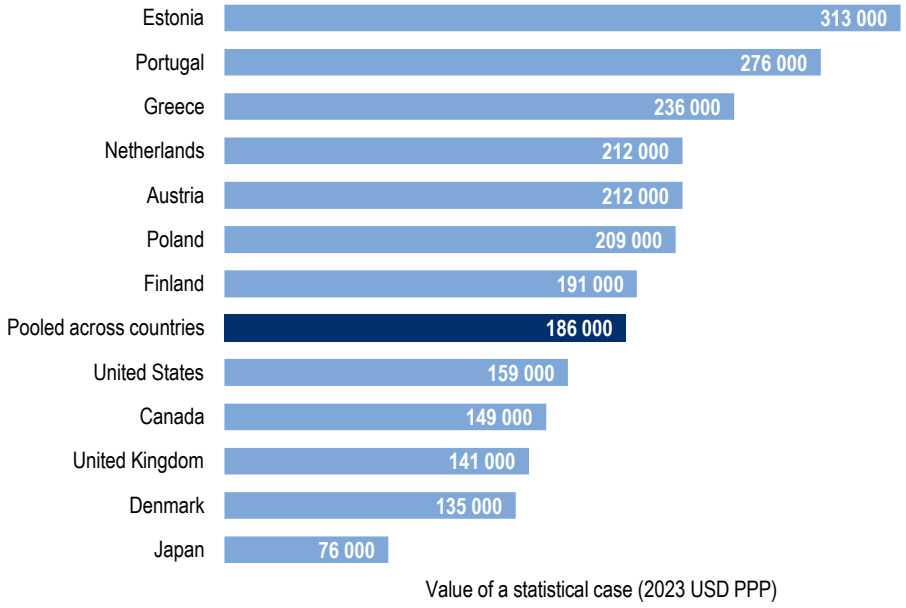
2.5. Underactive thyroid

Underactive thyroid, or hypothyroidism, is a pathological condition of thyroid hormone deficiency, where too little thyroid hormone is produced by the thyroid gland. Hypothyroidism is a relatively common condition, with a prevalence of approximately 7% to 9% of the world population (Vanderpump et al., 1995[16]; Knudsen et al., 1999[17]; Bjoro et al., 2000[18]; Garmendia Madariaga et al., 2014[19]; Valdes et al., 2017[20]). The most common symptoms in adults are fatigue, lethargy, cold intolerance, weight gain, constipation, change in voice, and dry skin (Chaker et al., 2017[21]). The risk of developing hypothyroidism varies significantly with age and gender, being higher at older ages and approximately ten times more common among women than among men at any age (Taylor et al., 2018[22]).

Several studies have estimated non-monetary impacts on wellbeing of thyroid disease, such as quality- and disability-adjusted life years (i.e. QALYs and DALYs, which are explained in Box 4.1 of Chapter 4), as well as cost-effectiveness and cost-utility effects of thyroid disease treatments. However, up until now, no stated preference valuation studies on reductions in the risk of developing hypothyroidism have been published. The SWACHE underactive thyroid survey fills this gap by asking respondents, representative of the general population in each surveyed country, how much they are willing to pay over a period of 20 years for safer household products that reduce their risk of developing an underactive thyroid. In line with epidemiological data, each respondent was assigned a baseline risk of hypothyroidism and a possible risk reduction over the next 20 years. Four baseline risk levels were defined according to age and sex: 8% for women younger than 50 years, 13% for women aged 50 years or older, 4% for men younger than 50 years, and 7% for men aged 50 years or older. Respondents were then randomly offered either a 1 or 2 percentage points reduction in this risk.

Figure 2.4 shows the VSCs for the twelve countries in which the survey was implemented, namely Austria, Canada, Denmark, Estonia, Finland, Greece, Japan, the Netherlands, Poland, Portugal, the United Kingdom and the United States. The mean VSC for underactive thyroid ranges from USD 76 000 in Japan to USD 313 000 in Estonia. The mean VSC across the surveyed countries is USD 186 000. A detailed description of this survey and its results is available in (Ahtiainen et al., 2026[9])

Figure 2.4. Values of a statistical case of underactive thyroid by country (USD)



Note: values have been converted to 2023 USD PPP. Results in local currencies can be found in Annex A.
Source: (Ahtiainen et al., 2026[9])

StatLink https://stat.link/cqg96r

2.6. Asthma

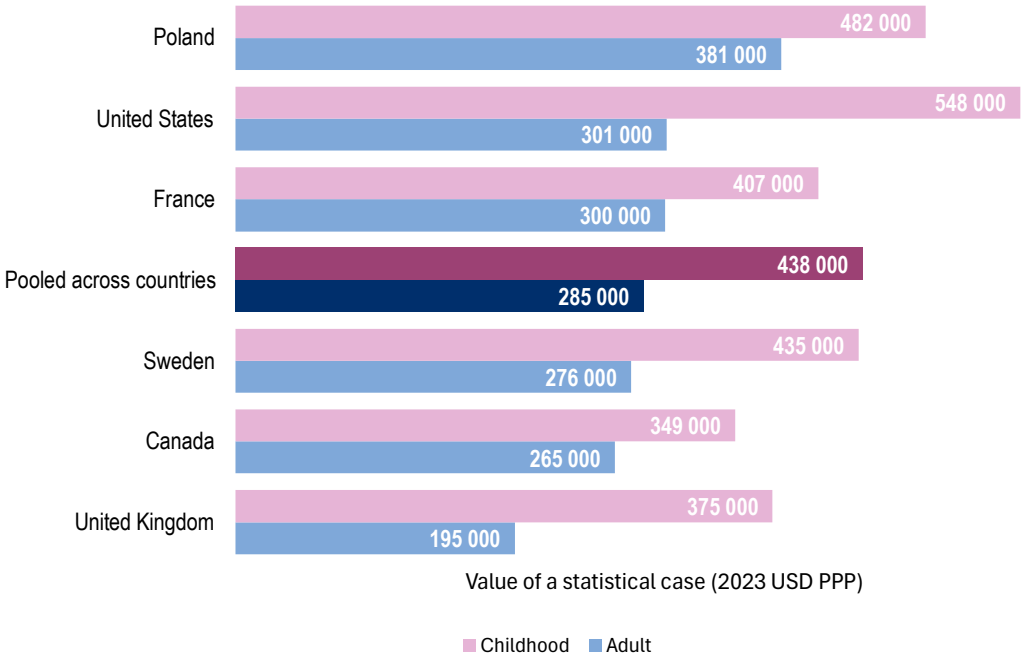
Asthma is a non-curable long-term condition affecting children and adults. Asthma is the most prevalent chronic condition among children, affecting nearly one in ten (Global Asthma Network, 2022[23]). Asthmatics experience symptoms such as coughing, wheezing, shortness of breath and chest tightness. Depending on its severity, asthma can prevent normal outdoor activities, necessitate routine medication, and sometimes require oxygen intake, emergency care, and hospitalisation.

Previous valuation work does not provide internationally comparable WTP values for asthma risk and severity. To fill this gap, the SWACHE asthma study asks what asthmatics are willing to pay to reduce their asthma severity e.g., from severe to moderate. Further, it asks respondents who do not have asthma what they are willing to pay to reduce their risk of getting it. Finally, the survey asks parents what they are willing to pay to reduce the severity of the asthma of their youngest asthmatic child, and the risk that their youngest non-asthmatic child gets it.

The survey dedicated to valuing asthma risk asked non-asthmatic adults and parents of non-asthmatic children how much they would be willing to pay over a ten-year period for safer, albeit more expensive, household products designed to reduce their own or their child's risk of developing asthma. Through a discrete choice experiment (DCE) that presented different sets of choices, respondents were asked to choose amongst the baseline scenario and two alternative scenarios with lower risk. The baseline risk of getting asthma was modelled on the incidence rates over ten years in the United States, and lower risk was defined in terms of reductions from this baseline. For example, one choice set offered respondents the following options: Choice A, a total risk of getting adult asthma over the next ten years using original products of 40 in 1 000; Choice B, using safer products with a reduced risk of 25 in 1 000; and Choice C, using safer products with a reduced risk of 33 in 1 000, with costs set at 0 for the baseline and increasing with the size of the risk reduction.

The survey produced robust results across six[2] countries: Canada, France, Poland, Sweden, the United Kingdom and the United States. The mean VSC of adult asthma, derived from the WTP to reduce one's risk of developing asthma, varies from USD 195 000 in the United Kingdom to USD 381 000 in Poland. The mean VSC of childhood asthma varies from USD 349 000 in Canada to USD 548 000 in the United States. The mean VSC values of adult and childhood asthma across the surveyed countries equal USD 285 000 and USD 438 000, respectively. Figure 2.5 presents these results. A detailed description of this survey and its results is available in (Appéré et al., 2023[1]).

Figure 2.5. Values of a statistical case of asthma by country (USD)



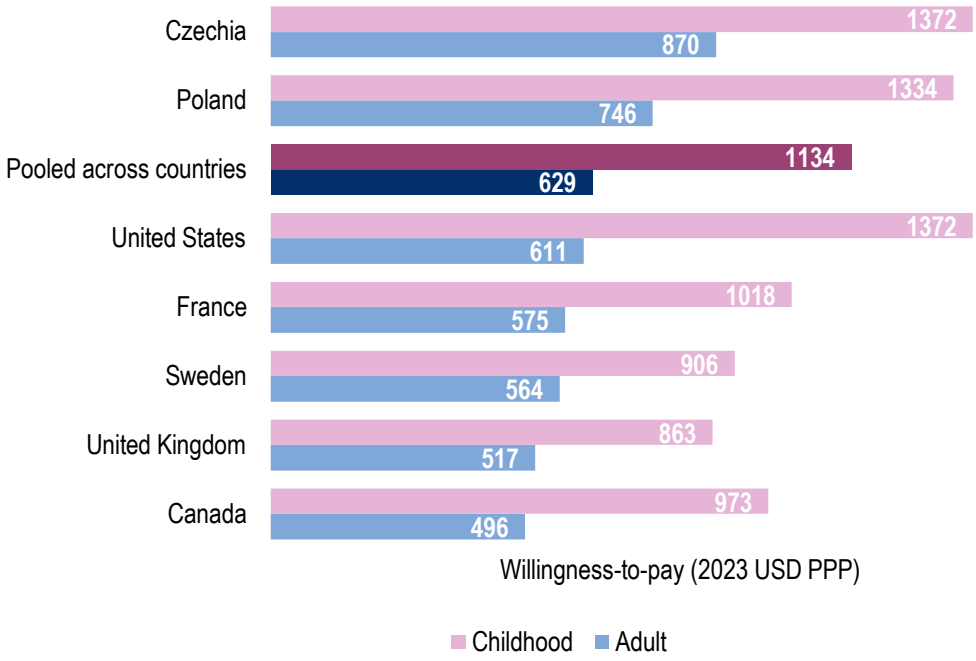
Note: values have been discounted (3% discount rate) and converted to 2023 USD PPP. Results in local currencies can be found in Annex A.
Source: (Appéré et al., 2023[1]).

StatLink https://stat.link/lk2zrg

The survey regarding asthma severity first asked asthmatic adults and parents of asthmatic children to indicate their own or their child's current level of asthma severity on a 6-point scale ranging from very mild, mild, mild plus, moderate, moderate plus, to severe. Respondents were then asked for their WTP to use home cleaning and other products formulated to contain fewer and safer chemicals, which would reduce asthma severity by one level for a period of ten years (for example, from severe to moderate plus). The valuation questions were structured using a DBDC format.

The survey for asthmatic respondents was implemented in seven countries: Canada, Czechia, France, Poland, Sweden, the United Kingdom and the United States. Figure 2.6 displays the WTP estimates for these seven countries for both adult and childhood asthma, as well as their means. The mean WTP for reducing adult asthma severity varies from USD 496 per year in Canada to USD 870 in Czechia. The mean WTP for reducing asthma severity in children is higher across all surveyed countries and varies from USD 863 per year in the United Kingdom to USD 1 372 per year in Czechia and the United States. The mean WTP across the surveyed countries for reducing asthma severity equals USD 629 per year for adults and USD 1 134 per year for children over a period of ten years. A detailed description of this survey and its results is available in (Appéré et al., 2023[1]).

Figure 2.6. Willingness-to-pay per year for one step reduction in asthma severity by country (USD)



Note: WTP per year over ten years. Values have been converted to 2023 USD PPP. Results in local currencies can be found in Annex A.
Source: (Appéré et al., 2023[1])

StatLink https://stat.link/kdn1bp

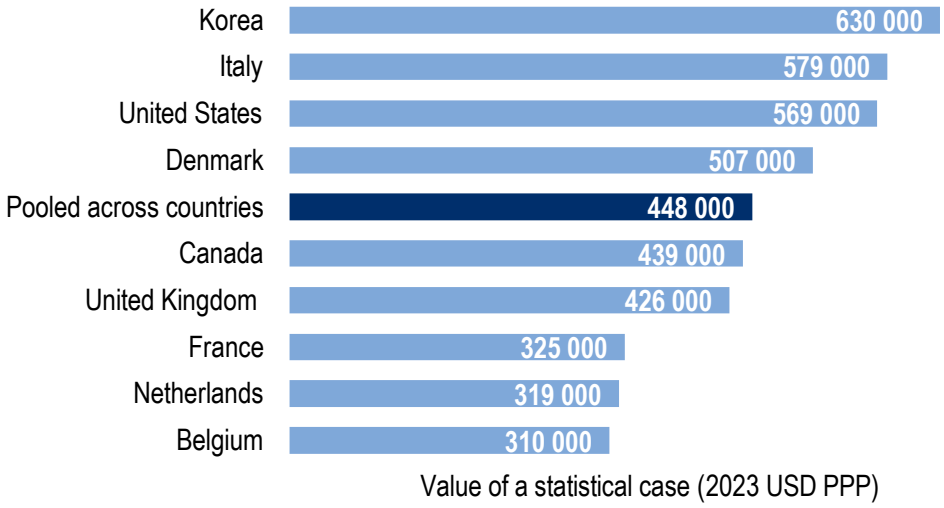
2.7. Miscarriage

About 15% of pregnancies worldwide result in miscarriage, or loss of pregnancy within the first 20 to 24 weeks (Quenby et al., 2021[24]). In some cases, miscarriage can lead to severe abdominal cramps, vaginal bleeding and general body weakness. Sometimes medical attention is required to control heavy bleeding, or because an infection has developed, causing fever and abdominal tenderness. Physical symptoms usually resolve within four to eight weeks, but the emotional burden can last longer, potentially leading to depression and anxiety.

Valuation studies to date have focused on the cost of treatment for foetal loss but no existing study appears to provide WTP for reduced risk of miscarriage. The SWACHE miscarriage survey fills this gap by asking adults who plan to have a child within the next five years how much they are willing to pay for safer household products that reduce their risk of miscarriage. Respondents were assigned a baseline miscarriage risk based on their age: 13% for individuals under 35; 18% for individuals aged 35–40; and 37% for individuals over 40. They were then randomly assigned a risk reduction of either 2 or 4 percentage points and asked a series of yes/no questions, in a DBDC format, about their WTP for this reduction over a period of 15 months.

The survey was implemented in nine countries: Belgium, Canada, Denmark, France, Italy, Korea, the Netherlands, the United Kingdom and the United States. The mean VSC across countries, using the pooled data, equals USD 448 000, as illustrated in Figure 2.7. A detailed description of this survey and its results is available in (Dockins et al., 2026[10]).

Figure 2.7. Value of a statistical case of miscarriage by country (USD)



Note: VSC of miscarriage come from a pooled econometric model for all countries except the Netherlands and Korea, where a country-specific model performed better. The pooled estimate across countries uses the country estimates from the pooled model. Results in local currencies can be found in Annex A.
Source: (Dockins et al., 2026[10])

StatLink https://stat.link/texz4a

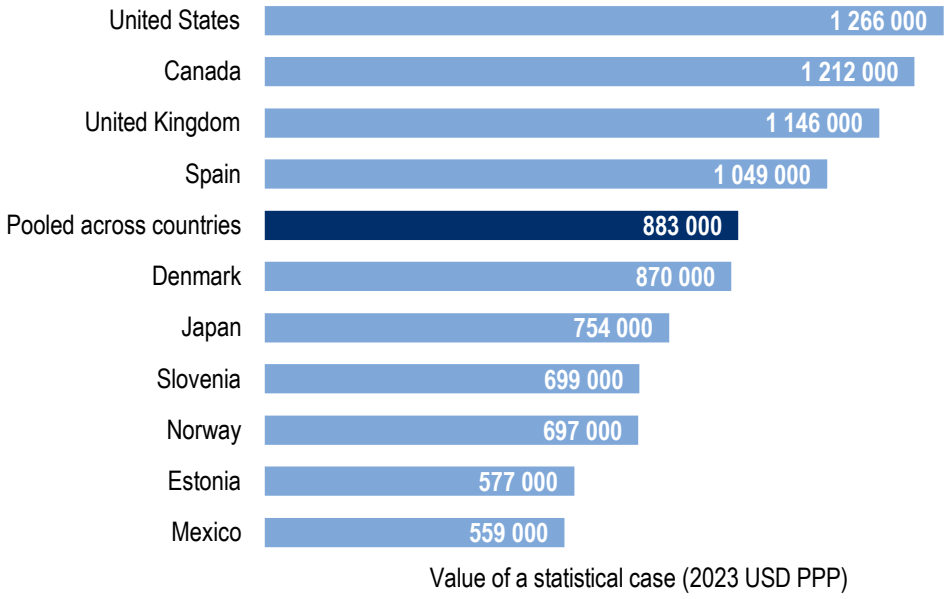
2.8. Non-fatal cancer

Cancer is a group of diseases characterised by the rapid growth of abnormal cells that invade tissues and spread throughout the body. Cancer impacts multiple dimensions of well-being, affecting physical abilities, cognitive function, social interactions, and overall quality of life. The prevalence of cancer is projected to rise, with the number of cases expected to increase by 77% by 2050 compared to 2022 (WHO, 2024[25]).

The heterogeneity of cancer diseases and the multiple survey contexts conducted by previous studies limit the ability to provide internationally comparable WTP values to avoid non-fatal cancer (OECD, 2025[26]). The SWACHE survey asks adult respondents, representative of the general population, how much they are willing to pay over a period of 5 years for safer products that reduce their risk of developing cancer that may or may not be fatal. All respondents were given the same baseline risks, modelled on the epidemiological profile of individuals aged 45 to 55. The baseline risk of developing *and* surviving cancer was 24 per 1 000, and the baseline risk of developing cancer *and* not surviving was 6 per 1 000. Each respondent was then presented with a series of choice tasks in which different options offered small reductions in these risks at varying costs. Their WTP for these risk reductions was measured using a DCE method.

The survey was implemented in ten countries: Canada, Denmark, Estonia, Japan, Mexico, Norway, Slovenia, Spain, the United Kingdom and the United States. The mean VSC[3] ranges from USD 559 000 in Mexico to over USD 1 266 000 in the United States. The mean VSC across the surveyed countries is USD 883 000. Figure 2.8 presents these results. A detailed description of this survey and its results is available in (Herrera-Araujo et al., 2026[5]).

Figure 2.8. Values of a statistical case of non-fatal cancer by country (USD)



Note: results in local currencies can be found in Annex A.
Source: (Herrera-Araujo et al., 2026[5])

StatLink https://stat.link/skjl6h

2.9. Chronic kidney disease

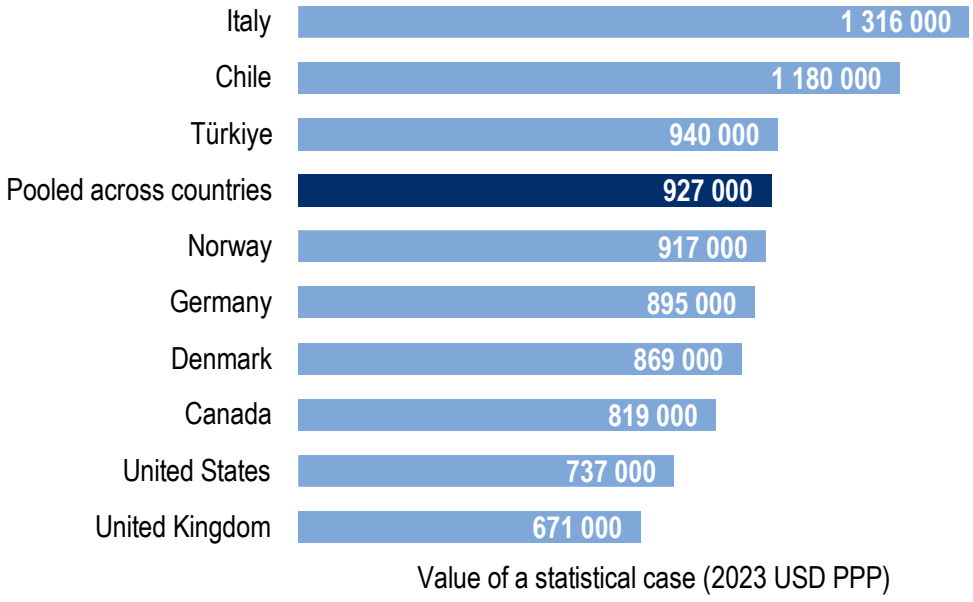
The prevalence of chronic kidney disease is increasing (Mark et al., 2025[27]). Chronic kidney disease affects 9.1% to 12.4% of the worldwide population and has important negative impacts on quality of life. According to the World Health Organisation, chronic kidney disease ranks as the 12th leading cause of DALYs lost (WHO, 2025[12]). Chronic kidney disease can lead to severe health complications, such as cardiovascular diseases, bone fragility and a weakened immune system.

Valuation studies to date have focused on the final stage of chronic kidney disease that is permanent kidney failure requiring dialysis or kidney transplant. The SWACHE chronic kidney disease survey focused on a range of severities (stages 3 and 4 out of 5 stages) capturing symptomatic kidney disease and valuing the specific impacts of disease progression. This novel approach provides a more useful estimate for cost-benefit analysis and makes the results more representative of the full impact of chemicals exposure on individuals' lives.

In this valuation, respondents, representative of the general population in each surveyed country, were divided into age groups (18-40, 40-60, and over 60) according to their baseline risk of serious kidney disease (15, 25, and 60 in 1 000) based on corresponding epidemiological data. They were then randomly assigned a risk reduction of either 2 in 1 000 or 5 in 1 000 over a 5-year period. Respondents were directly asked the cost they were willing to pay for the assigned risk reduction through a DBDC survey.

The SWACHE chronic kidney disease survey was fielded in nine countries: Canada, Chile, Denmark, Germany, Italy, Norway, Türkiye, the United Kingdom and the United States. As illustrated in Figure 2.9, the mean VSC of chronic kidney disease varies from USD 671 000 in the United Kingdom to USD 1 316 000 in Italy. The mean VSC across the surveyed countries equals USD 927 000. A detailed description of this survey and its results is available in (Dockins et al., 2023[3]).

Figure 2.9. Values of a statistical case of chronic kidney disease by country (USD)



Note: values have been converted to 2023 USD PPP. Results in local currencies can be found in Annex A.
Source: (Dockins et al., 2023[3])

StatLink https://stat.link/ti691p

2.10. Very low birth weight

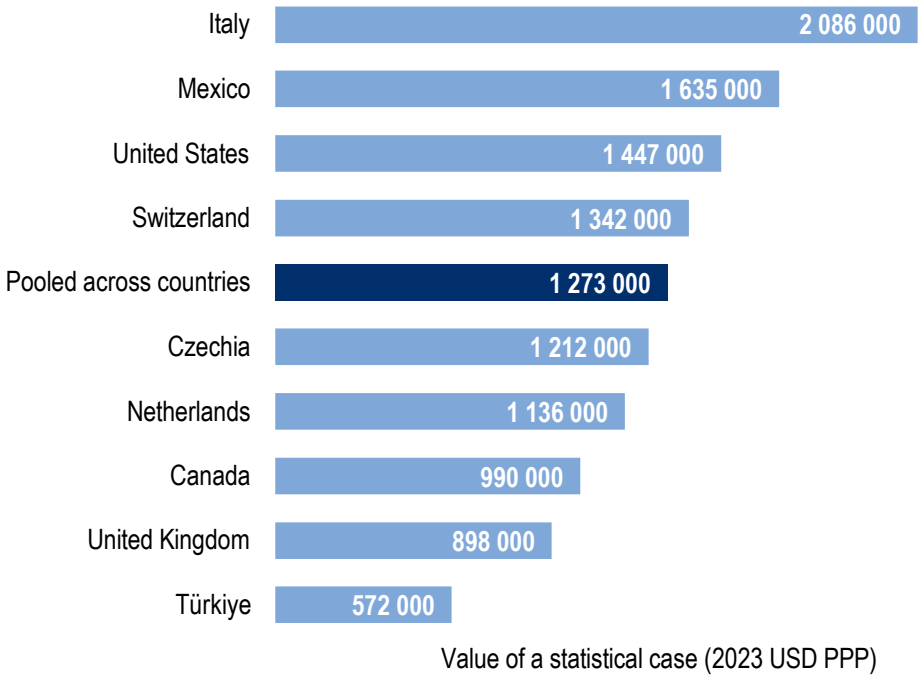
Very low birth weight is defined in the SWACHE project as a birth weight of less than 1 500 g. The prevalence of this outcome ranges from 0.6% to 1.3% depending on the country. Infants born with a very low birth weight are at increased risk of serious lifelong health complications, including neurosensory impairments, behavioural and social difficulties, and learning disabilities, including a lower IQ. They are also more likely to develop chronic conditions in adulthood, such as obesity and diabetes.

There is limited internationally comparable evidence on the economic benefits of reducing exposure to chemicals and consequent health risks related to very low birth weight. The SWACHE very low birth weight survey fills this gap by asking adults planning and in capacity to have a child how much they are willing to pay over a period of eight months for safer products – including cleaning products, toiletries, cosmetics, clothes, textiles, furniture, and electronics – that reduce the risk of very low birth weight.

In this valuation, respondents were randomly assigned to one of three baseline risk levels for very low birth weight: 6, 10, or 12 per 1 000. Depending on the assigned baseline, they were then presented with specific risk-reduction levels. For a baseline risk of 6 per 1 000, reductions of 2 or 3 per 1 000 were proposed; for a baseline of 10 per 1 000, reductions of 2, 3, 5, or 6 per 1 000; and for a baseline of 12 per 1 000, reductions of 2, 3, 5, 6, or 7 per 1 000. Respondents' WTP was captured using a DBDC format.

Figure 2.10 displays the valuation results for the nine countries in which the survey was implemented, namely, Canada, Czechia, Italy, Mexico, the Netherlands, Switzerland, Türkiye[4], the United Kingdom and the United States. The mean VSC of very low birth weight varies from USD 572 000 in Türkiye to USD 2 086 000 in Italy. The mean VSC across the surveyed countries equals USD 1 273 000. A detailed description of this survey and its results is available in (Ščasný, Zvěřinová and Dussaux, 2023[8]).

Figure 2.10. Values of a statistical case of very low birth weight by country (USD)



Note: values have been converted to 2023 USD PPP. Results in local currencies can be found in Annex A.
Source: (Ščasný, Zvěřinová and Dussaux, 2023[8])

StatLink https://stat.link/d9uk7p

2.11. IQ loss in children

Intelligence Quotient (IQ) is a score designed to assess human intelligence. IQ loss is associated with lower educational achievement, lower lifetime income and higher probability to engage in criminal behaviour (Schwartz, 1994[28]; Salkever, 1995[29]; Gould, 2009[30]; Miranda et al., 2007[31]). Yet, there is no internationally comparable value of the WTP to avoid the loss of one point of IQ that can be used in analysis of chemicals management options. The SWACHE IQ loss in children survey provides this missing data by asking adult respondents to value a certain reduction in IQ loss associated with chemicals exposure for their own hypothetical children.

In this valuation study, respondents representative of the general population in each surveyed country, were randomly assigned to one of four groups. Three groups were presented with a scenario describing the loss of 5 IQ points starting from different initial levels: 90 (below average), 100 (average), or 110 (above average), meaning the child's IQ would decrease to 85, 95, or 105 respectively. The fourth group was shown a loss of 1 IQ point from a baseline of 100 (average). These four scenarios were randomly and evenly distributed across respondents in all surveyed countries. Respondents were informed that introducing a government ban on relevant harmful chemicals would prevent this reduction in IQ from occurring, and they were asked how much extra they would be willing to pay per month. Respondents' WTP was solicited for a payment period lasting 5 years using a DBDC format.

The SWACHE IQ loss survey was implemented in 11 countries: Australia, Canada, Denmark, Korea, the Netherlands, Poland, Portugal, South Africa, Sweden, the United Kingdom and the United States. The mean WTP per year over 5 years to avoid one IQ point loss varies from USD 365 in the United Kingdom to USD 1 010 in Canada. The mean WTP across the surveyed countries equals USD 667. Figure 2.11 presents these findings. A detailed description of this survey and its results is available in (Mourato et al., 2023[7]).

Figure 2.11. Willingness-to-pay per year to avoid one IQ point loss in children by country (USD)



Note: WTP per year over five years. Values have been converted from the working paper to 2023 USD PPP. Results in local currencies can be found in Annex A.
Source: (Mourato et al., 2023[7])

StatLink https://stat.link/wcu6q1

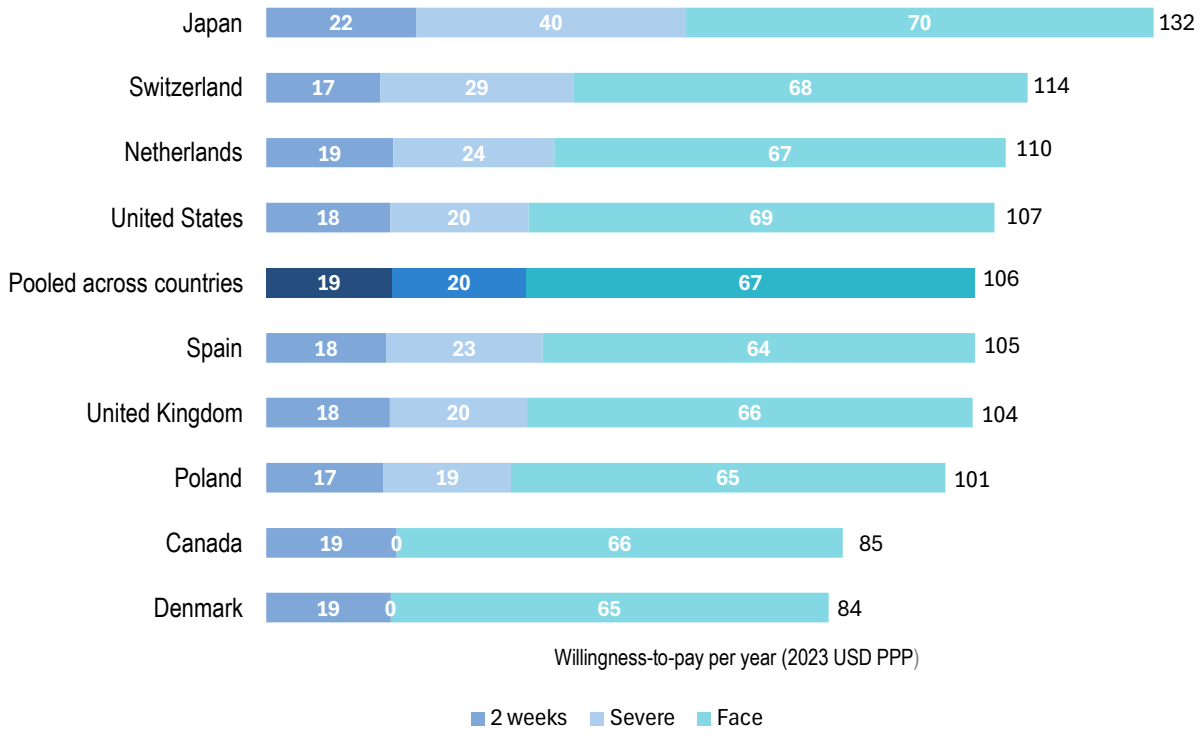
2.12. Skin sensitisation

Skin sensitisation is a condition that affects millions of people worldwide. It develops primarily through allergic contact dermatitis and related dermatological reactions. Beyond causing physical discomfort, skin sensitisation can lead to reduced occupational productivity and significant psychological distress (Courtney and Su, 2024[32]; Kalboussi et al., 2019[33]). Chemicals exposure in both occupational and everyday contexts represents a significant source of skin sensitisation (Goossens and Aerts, 2022[34]; Hostýnek, Reagan and Maibach, 2019[35]).

Empirical evidence on the value that populations place on avoiding chemical-induced skin sensitisation remains limited. The SWACHE skin sensitisation survey addresses this gap by eliciting both individuals diagnosed with skin sensitisation and undiagnosed individuals' WTP to avoid experiencing skin sensitisation over a period of five years. The study captures the multidimensional nature of the condition, including the duration, severity, and location of flare-ups. Individuals were presented with valuation tasks in the form of discrete choice cards (see Box 1.3 of Chapter 1). The choice cards varied attribute levels to enable estimation of values for avoiding one additional day of flare-up, a severe case, a case visible on the face, and a case visible on other visible areas. Given the wide variability in how a flare-up manifests in terms of severity, duration, and location on the body, it is difficult to define a typical case of skin sensitisation. Therefore, the examples provided in this section are intended solely to illustrate how the values can be applied and how they compare with other health effects considered in this report.

The skin sensitisation survey was implemented in nine countries: Canada, Denmark, Japan, the Netherlands, Poland, Spain, Switzerland, the United Kingdom, and the United States. The results provide WTP derived from the sensitised sample and VSC estimates derived from the non-sensitised sample that support the construction of case-specific values, as described in Annex A. The WTP to avoid one additional day of flare-up is scaled by duration, while severity and location values are added once per scenario. For a two-week severe flare-up visible on the face, the mean WTP for the sensitised sample is USD 106 per year over a five-year period, as illustrated in Figure 2.12. The mean VSC for the non-sensitised sample is USD 4 720 across countries, as shown in Figure 2.13. A detailed description of this survey and its results is available in (Contu et al., 2026[2]).

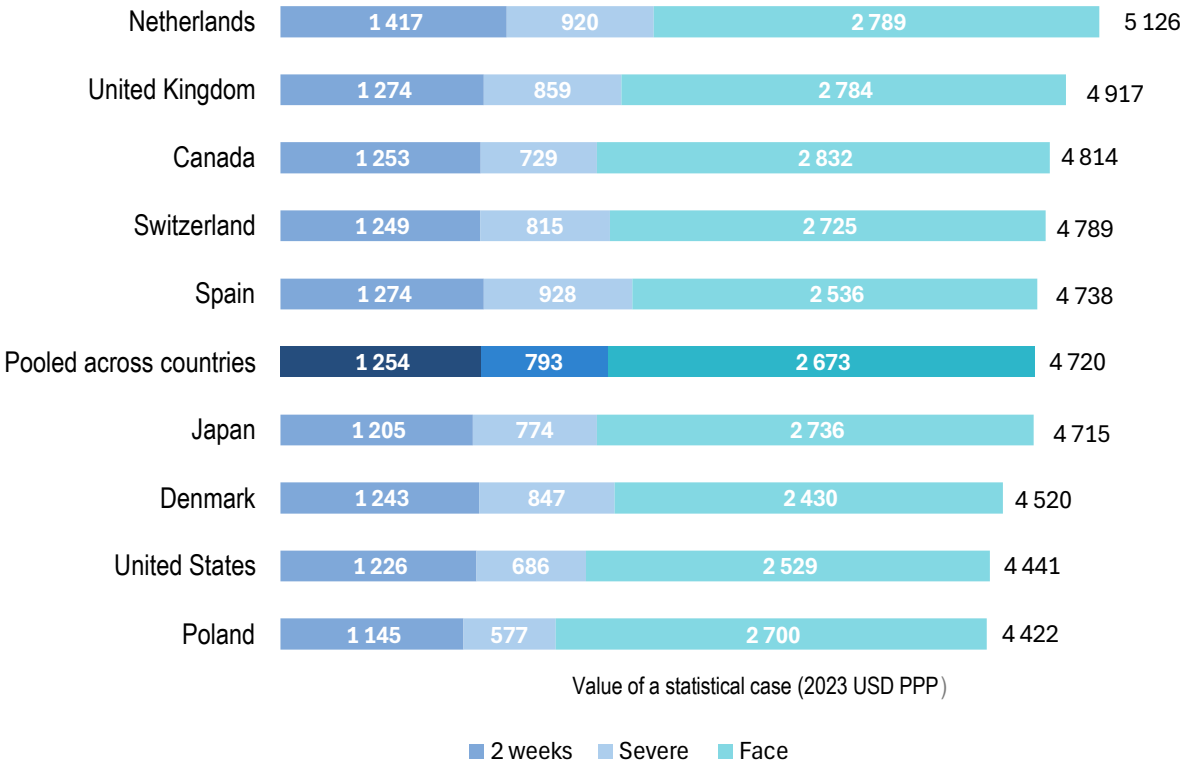
Figure 2.12. Willingness-to-pay estimates per year to avoid a skin sensitisation case involving a two-week severe flare-up visible on the face for the sensitised sample, by country (USD)



Note: WTP per year over five years.
Source: (Contu et al., 2026[2])

StatLink https://stat.link/6jzn8a

Figure 2.13. Values of a statistical case to avoid a skin sensitisation case involving a two-week severe flare-up visible on the face for the non-sensitised sample, by country (USD)



Source: (Contu et al., 2026[2])

StatLink https://stat.link/15xbta

References

Ahtiainen, H. et al. (2026), "Valuing a reduction in the risk of an underactive thyroid: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 272, OECD Publishing, Paris, https://doi.org/10.1787/4af8f3aa-en. [9]

Appéré, G. et al. (2023), "Valuing a reduction in the risk and severity of asthma: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 218, OECD Publishing, Paris, https://doi.org/10.1787/f289d29e-en. [1]

Bjoro, T. et al. (2000), "Prevalence of thyroid disease, thyroid dysfunction and thyroid peroxidase antibodies in a large, unselected population. The Health Study of Nord-Trondelag (HUNT)", *European journal of endocrinology*, Vol. 143/5, pp. 639-647. [18]

Chaker, L. et al. (2017), "Hypothyroidism", *The Lancet*, Vol. 390/10101, pp. 1550–62. [21]

Contu, D. et al. (2026), "Valuing a reduction in the risk of skin sensitisation: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 277, OECD Publishing, Paris, https://doi.org/10.1787/fc305de9-en. [2]

Courtney, A. and J. Su (2024), "The Psychology of Atopic Dermatitis", *Journal of Clinical Medicine*, Vol. 13, https://doi.org/10.3390/jcm13061602. [32]

Dockins, C. et al. (2026), "Valuing a reduction in the risk of miscarriage: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 271, OECD Publishing, Paris, https://doi.org/10.1787/23bb6643-en. [10]

Dockins, C. et al. (2023), "Valuing a reduction in the risk of chronic kidney disease: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 216, OECD Publishing, Paris, https://doi.org/10.1787/9c93138f-en. [3]

Dussaux, D. et al. (2023), "Valuing a reduction in the risk of infertility: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 215, OECD Publishing, Paris, https://doi.org/10.1787/7242509f-en. [4]

Garmendia Madariaga, A. et al. (2014), "The incidence and prevalence of thyroid dysfunction in Europe: a meta-analysis", *The Journal of Clinical Endocrinology & Metabolism*, Vol. 99/3, pp. 923-931. [19]

Global Asthma Network (2022), *The Global Asthma Report 2022*, International Union Against Tuberculosis and Lung Disease, https://doi.org/10.5588/ijtld.22.1010. [23]

Goossens, A. and O. Aerts (2022), "Contact allergy to and allergic contact dermatitis from formaldehyde and formaldehyde releasers: a clinical review and update", *Contact Dermatitis*, Vol. 87, pp. 20-27, https://doi.org/10.1111/cod.14089. [34]

Gould, E. (2009), "Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control", *Environmental Health Perspectives*, Vol. 117/7, pp. 1162-1167, https://doi.org/10.1289/ehp.0800408. [30]

Herrera-Araujo, D. et al. (2026), "Valuing a reduction in the risk of non-fatal cancer: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 274, OECD Publishing, Paris, https://doi.org/10.1787/0345660e-en. [5]

Hostýnek, J., K. Reagan and H. Maibach (2019), "Nickel allergic hypersensitivity: prevalence and incidence by country, gender, age, and occupation", in *Nickel and the Skin*, CRC Press. [35]

Hunt, A. et al. (2026), "Valuing a reduction in the risk of hypertension: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 270, OECD Publishing, Paris, https://doi.org/10.1787/9da8057a-en. [6]

Kalboussi, H. et al. (2019), "Impact of Allergic Contact Dermatitis on the Quality of Life and Work Productivity", *Dermatology Research and Practice*, p. 3797536, https://doi.org/10.1155/2019/3797536. [33]

Knudsen, N. et al. (1999), "The prevalence of thyroid dysfunction in a population with borderline iodine deficiency", *Clinical endocrinology*, Vol. 51/3, pp. 361-367. [17]

Mark, P. et al. (2025), "Global, regional, and national burden of chronic kidney disease in adults, 1990–2023, and its attributable risk factors: a systematic analysis for the Global Burden of Disease Study 2023", *The Lancet*, Vol. 406/10518, pp. 2461-2482, https://doi.org/10.1016/s0140-6736(25)01853-7. [27]

Miranda, M. et al. (2007), "The Relationship between Early Childhood Blood Lead Levels and Performance on End-of-Grade Tests", *Environmental Health Perspectives*, Vol. 115/8, pp. 1242-1247, https://doi.org/10.1289/ehp.9994. [31]

Mourato, S. et al. (2023), "Valuing the avoidance of IQ losses in children: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 219, OECD Publishing, Paris, https://doi.org/10.1787/71574eb4-en. [7]

OECD (2025), *Mortality Risk Valuation in Policy Assessment: A Global Meta-Analysis of Value of Statistical Life Studies*, OECD Publishing, Paris, https://doi.org/10.1787/76ca89a2-en. [26]

Quenby, S. et al. (2021), "Miscarriage matters: the epidemiological, physical, psychological, and economic costs of early pregnancy loss", *The Lancet*, Vol. 397/10285, pp. 1658-1667, https://doi.org/10.1016/s0140-6736(21)00682-6. [24]

Salkever, D. (1995), "Updated Estimates of Earnings Benefits from Reduced Exposure of Children to Environmental Lead", *Environmental Research*, Vol. 70/1, pp. 1-6, https://doi.org/10.1006/enrs.1995.1038. [29]

Ščasný, M., I. Zvěřinová and D. Dussaux (2023), "Valuing a reduction in the risk of very low birth weight: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 217, OECD Publishing, Paris, https://doi.org/10.1787/dfd159a1-en. [8]

Schwartz, J. (1994), "Societal Benefits of Reducing Lead Exposure", *Environmental Research*, Vol. 66/1, pp. 105-124, https://doi.org/10.1006/enrs.1994.1048. [28]

Seli, D. and H. Taylor (2023), "The impact of air pollution and endocrine disruptors on reproduction and assisted reproduction", *Current Opinion in Obstetrics & Gynecology*, Vol. 35/3, pp. 210-215, https://doi.org/10.1097/gco.0000000000000868. [14]

Taylor, P. et al. (2018), "Global epidemiology of hyperthyroidism and hypothyroidism", *Nature Reviews Endocrinology*, Vol. 14/5, pp. 301-316. [22]

UNFPA (2025), *"The real fertility crisis: the pursuit of reproductive agency in a changing world", State of World Population 2025*, United Nations Population Fund, https://www.unfpa.org/sites/default/files/pub-pdf/EN_State%20of%20World%20Population%20report%202025.pdf. [15]

Valdes, S. et al. (2017), "Population-based national prevalence of thyroid dysfunction in Spain and associated factors: Diabetes study", *Thyroid*, Vol. 27/2, pp. 156-166. [20]

Vanderpump, M. et al. (1995), "The incidence of thyroid disorders in the community: a twenty-year follow-up of the Whickham Survey", *Clinical endocrinology*, Vol. 43/1, pp. 55-68. [16]

WHO (2025), *Global health estimates: Leading causes of DALYs*, World Health Organization, https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/global-health-estimates-leading-causes-of-dalys. [12]

WHO (2025), *Hypertension*, World Health Organization, https://www.who.int/news-room/fact-sheets/detail/hypertension. [11]

WHO (2024), *Global cancer burden growing, amidst mounting need for services*, World Health Organization, https://www.who.int/news/item/01-02-2024-global-cancer-burden-growing--amidst-mounting-need-for-services. [25]

WHO (2023), *Infertility Prevalence Estimates, 1990–2021*, World Health Organization, https://www.who.int/news/item/04-04-2023-1-in-6-people-globally-affected-by-infertility. [13]

Notes

[1] Chapter 6 discusses the challenges in valuing comorbidities.

[2] The survey was also implemented in Czechia. However, the country was excluded from the analysis to ensure more reliable estimates, as a large share of respondents reported that making choices in the DCE was difficult.

[3] In the working paper, this value is referred to as the Value of a Non-Fatal Cancer case (VNF). For further details, please refer to the working paper (Herrera-Araujo et al., 2026[5]).

[4] For Türkiye, the values expressed in USD 2023 PPP and in local currency 2023 differ substantially from those reported in USD 2022 PPP and in local currency 2022 in the chronic kidney disease working paper, owing to high inflation (Dockins et al., 2023[3]).

3 Drivers of preferences in the valuation of health effects

What are the drivers that explain the differences in Willingness-To-Pay (WTP) among individuals and among countries? Findings from the first two rounds of the SWACHE project suggest that WTP for a reduction in the risk of a given health effect is driven by many factors. The results notably highlight the role of socio-economic determinants such as gender or education level, as well as country-specific effects that point to cultural differences. This chapter explores the drivers of observed differences in valuation across the ten health effects.

3.1. Drivers of differences in willingness-to-pay among individuals

In all ten surveys, respondents were presented with the option to choose a safer scenario that would reduce their risk of developing or worsening a health condition and which would be available at an additional cost. In the econometric model of each study, several variables were controlled for to assess their influence on the likelihood of choosing a particular reduced-risk option. The detailed econometric results can be found in each of the working papers that feature the original health effect studies (Appéré et al., 2023[1]; Contu et al., 2026[2]; Dockins et al., 2023[3]; Dussaux et al., 2023[4]; Herrera-Araujo et al., 2026[5]; Hunt et al., 2026[6]; Mourato et al., 2023[7]; Ščasný, Zvěřinová and Dussaux, 2023[8]; Ahtiainen et al., 2026[9]; Dockins et al., 2026[10]). This section summarises key results from the analyses presented in the working papers and introduces some additional analysis.

3.1.1. Socio-economic determinants and valuation scenario attributes

Across the health outcomes, a common set of valuation scenario attributes and socio-economic characteristics of respondents was included in all working paper analyses, with additional variables defined for each specific health endpoint. Table 3.1 shows how these common characteristics influence the valuation results. This table highlights some important consistent features across the surveys that align with economic theory, namely that the WTP generally increases with the size of the risk reduction, decreases as costs increase and is positively correlated with income (OECD, 2025[11]; Gerking et al., 2017[12]). For example, in the chronic kidney disease survey, an increase in the risk reduction of 1 in 1 000 raises the mean WTP by 20%, whereas an increase in monthly household income of USD 500 raises the mean WTP by 3.6%. Conversely, as expected, the higher the cost of the safer option, the lower the likelihood of selecting it. Figure 3.1 illustrates that, across all countries, the probability of accepting a bid to reduce the risk of hypertension decreases as the bid amount increases. This pattern is consistent across all countries and all surveys.

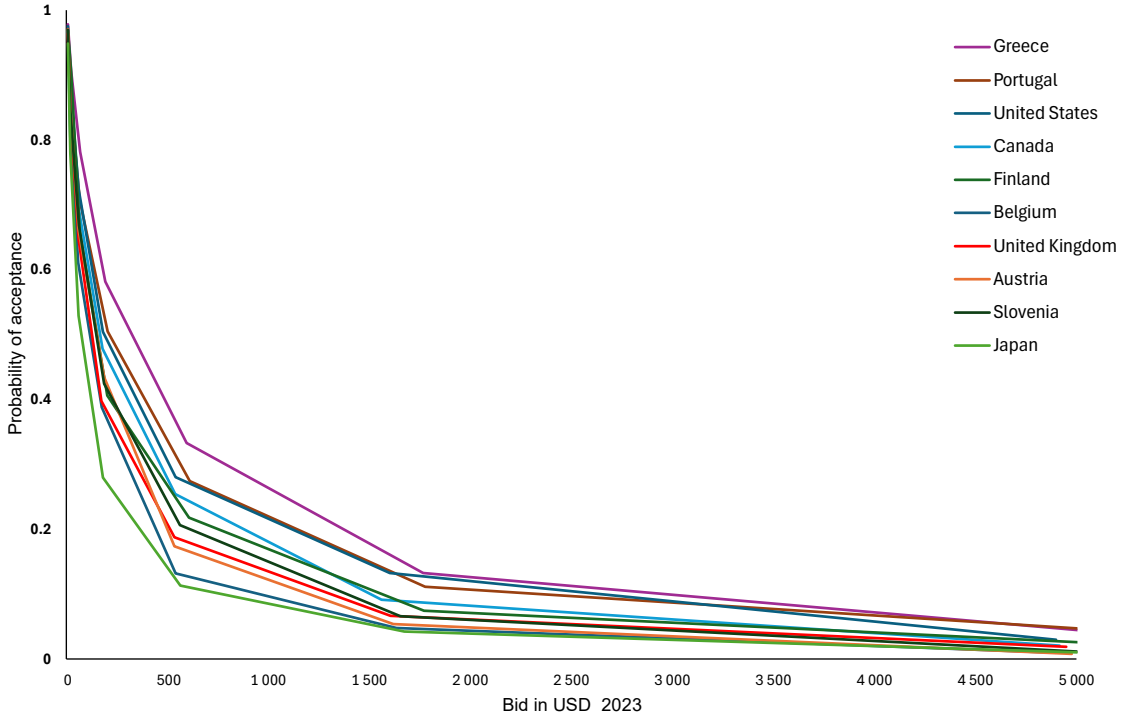
Table 3.1. The influence of socio-economic variables and scenario attributes on the probability of choosing the safer option

	Valuation scenario attributes			Socio-economic variables			
	Baseline risk	Risk Reduction	Cost	Income	Female	Experience	Education
Chronic kidney disease	○	●	●	●	○	●	○
Infertility	●	●	●	●	●		●
Asthma severity in adult	●		●	●	●	●	●
Asthma severity in children	●		●	●	●	●	
Very low birth weight	○	●	●	●	●	○	●
IQ loss in children	●	●	●	●	●		●
Underactive thyroid	○	●	●	●	○	○	●
Hypertension	●	●	●	●	●	●	●
Miscarriage	○	●	●	●	●	◔	○
Non-fatal cancer		●	●	●	●		●
Skin sensitisation*				●	●	●	●

Legend:
● The variable has a significantly positive effect on the probability of choosing the reduced-risk option (significance level set at 0.05)
● The variable has a significantly negative effect on the probability of choosing the reduced-risk option (significance level set at 0.05)
○ The variable does not have a significant effect on the probability of choosing the reduced-risk option (significance level set at 0.05)
◔ The variable has a significantly positive or negative effect (depending on its exact definition) on the probability of choosing the reduced-risk option (significance level set at 0.05; see below for further explanations).
An empty cell indicates that the variable has not been controlled for (in the case of the non-fatal cancer survey, the baseline risk was the same for all respondents and respondents with an experience of cancer were screened out).

Note: The following variables capture the influence of different factors on the likelihood of choosing the reduced-risk option. Multivariate regressions were conducted in the working paper, with a significance level set at 0.05. Baseline risk indicates the influence of a larger baseline risk assigned to respondents at the beginning of the survey. Risk reduction indicates the influence of a larger reduction in risk proposed to respondents. Cost captures the effect of a higher monetary cost associated with the reduced-risk option. Female represents the effect of the respondent self-identifying as female. Experience reflects the influence if the respondent has personally experienced the disease or knows a relative who has. Education shows the effect of having a higher level of education. Income represents the effect of an increase of USD 500 in the respondent's monthly household income (in logarithmic form).
* For the skin sensitisation study, the information reported here pertains to WTP estimates to avoid one extra day of flare-up.
Source: Authors' own elaboration based on the regression analyses conducted in the corresponding working papers (Appéré et al., 2023[1]; Contu et al., 2026[2]; Dockins et al., 2023[3]; Dussaux et al., 2023[4]; Herrera-Araujo et al., 2026[5]; Hunt et al., 2026[6]; Mourato et al., 2023[7]; Ščasný, Zvěřinová and Dussaux, 2023[8]; Ahtiainen et al., 2026[9]; Dockins et al., 2026[10])

Figure 3.1. Relationship between bid acceptance and bid amounts by country in the hypertension study



Source: (Hunt et al., 2026[6])

Baseline risk, i.e. the initial risk of developing a given health outcome attributed to respondents at the beginning of the valuation scenario, most often assigned according to epidemiological characteristics matching the respondent's state, does not systematically influence choices across the ten health endpoints. Baseline risk is found to be positively associated with WTP in the infertility, child IQ loss and asthma severity studies, negatively associated in the hypertension study, and not statistically significant in the other studies. These contrasting results are consistent with empirical evidence from the economics literature on the valuation of health effects, which shows that WTP for a reduction in morbidity risk can be positively, negatively related or not related at all to baseline risk (Wolff, Larsson and Svensson, 2020[13]; Gerking et al., 2017[12]).

The effects of gender, education and experience with the disease vary across the ten health outcomes. Being female is, in most surveys, negatively associated with the probability of choosing the reduced-risk option, indicating a lower willingness-to-pay relative to the male sample. For instance, it is associated with a 20% reduction in WTP in the adult asthma study. One possible explanation for the lower WTP among women is that the analysis controls for household income but does not capture income disparities within the household. Furthermore, lower WTP estimates among women are in line with evidence from other stated-preference studies where women report lower WTP than men, even after controlling for income (Wolff, Larsson and Svensson, 2020[13]; Ternent et al., 2010[14]).

Familiarity with the experience of the disease increases respondents' WTP in the hypertension, chronic kidney disease, and asthma severity studies, and decreases it in the skin sensitisation study. For example, individuals with a family history of hypertension are willing to pay 45% more than individuals without such a genetic condition in their family. The miscarriage study reveals a more nuanced pattern: having a relative who has experienced a miscarriage decreases WTP by 18%, whereas having personal experience with miscarriage increases WTP by 21%. In the skin sensitisation study, respondents already diagnosed have a significantly lower WTP across all outcomes (flare-up duration, severity, and location) than those without a diagnosis.

Respondents with a higher level of education exhibit higher WTP in the hypertension, underactive thyroid, adult asthma severity, non-fatal cancer, very low birth weight, IQ loss in children and skin sensitisation studies. In the IQ loss survey, highly educated respondents are willing to pay 55% more compared to other respondents.

Additional variables also matter in specific studies: in the miscarriage study, practising a religion raises WTP by 37%. In the non-fatal cancer and very low birth weight surveys, respondents living in urban areas are willing to pay more than other respondents.

Across all endpoints, the cost of the reduced-risk option is the variable with the highest effect on WTP, often followed by the size of the risk reduction or income. For example, the very low birth weight survey reveals that the most significant determinants of WTP are the cost of the reduced-risk option, followed by income, having more than three children, and living in an urban area (all increasing WTP).

Other variables such as age, self-perceived health status above or below average, employment status, number of children in the household, and whether respondents had been diagnosed with COVID-19 were controlled for in the regressions conducted in some working papers but were found not to be significant determinants of WTP.

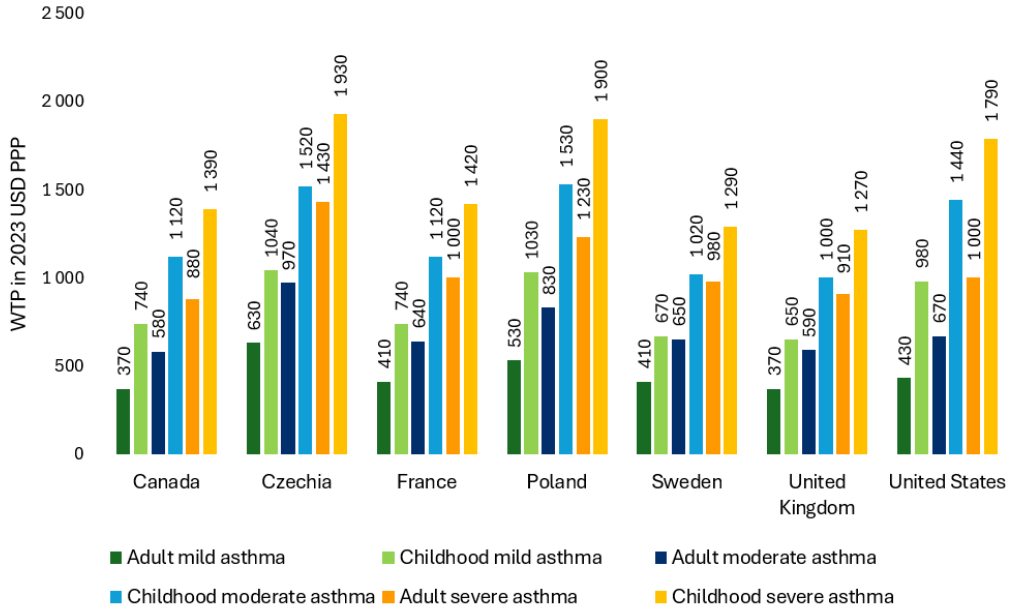
3.1.2. Example of a psychological and societal determinant

The results of the first two rounds of Surveys on Willingness-to-pay to Avoid negative Chemicals-related Health Effects (SWACHE) provide some evidence that factors beyond those controlled for in the regressions discussed above may play an important role. One example is an apparent child premium in the valuation of asthma with respondents being willing to pay significantly more to reduce the risk and severity of asthma for their child than for themselves.

Policymakers tend to be more concerned about risks faced by children than those faced by adults, as reflected in stricter laws and regulations that apply when children are involved (OECD, 2006[15]; OECD, 2025[11]). The results from the asthma study appear to confirm this intuition: individuals are willing to pay more to protect their children than themselves.

Figure 3.2 shows the differences in mean annual WTP over ten years for a one-step reduction in adult and childhood asthma across countries. The WTP is systematically higher for childhood asthma. The most striking example is in the United States, where the WTP for moderate asthma in children (USD 1 440) is more than twice that for adults (USD 670).

Figure 3.2. Mean willingness-to-pay values for a one step reduction in adult and childhood asthma severity



Note: Asthmatic adults were asked about their WTP for themselves, while parents of asthmatic children were asked about their WTP for their children. The valuation scenarios were similar.
Source: Authors' own elaboration based on (Appéré et al., 2023[1]).

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The findings of the asthma study align with the literature on the economic valuation of mortality and morbidity risks, which often shows that the value assigned to health risk reductions for children exceeds that for adults. For example, Viscusi, Magat and Huber (1987[16]) analyse willingness-to-pay for reductions in the risk of injury from household pesticide use. They find that parents of young children exhibit higher willingness-to-pay than adults without children, and that risk reductions affecting children are valued more highly than reductions in the other risks considered in the study. Dickie and Gerking (2008[17]) estimate parents' willingness-to-pay to reduce skin cancer risks from solar radiation exposure, both for their children and for themselves. Their results indicate that parents are willing to pay approximately twice as much to reduce non-melanoma skin cancer risks for their children as for themselves.

Altruism from parents toward their children can indeed explain these discrepancies. Reflecting one's concern for the well-being of others, altruism towards one's own children, as well as towards other children or children in general, has been shown to affect individuals' choice and WTP (Long, 2021[18]; Alberini et al., 2010[19]). Higher valuations for health risk reductions in children may also be explained by the fact that parents know they will be personally affected by their children's illness, bearing both tangible and intangible costs of illness (OECD, 2006[15]). These considerations can explain why the value of a statistical case (VSC) in the very low birth weight study is the highest among the ten health endpoints. In this survey (Ščasný, Zvěřinová and Dussaux, 2023[8]), respondents planning and with physical capacity to have children were informed of all the negative health consequences that a child born with a very low birth weight could face throughout their lifetime. The risk therefore extends beyond the birth itself and impacts the affected child's entire life. The findings from the asthma and the very low birth weight studies consolidate the base of empirical evidence that shows that altruism from parents towards their children or hypothetical children is indeed significant.

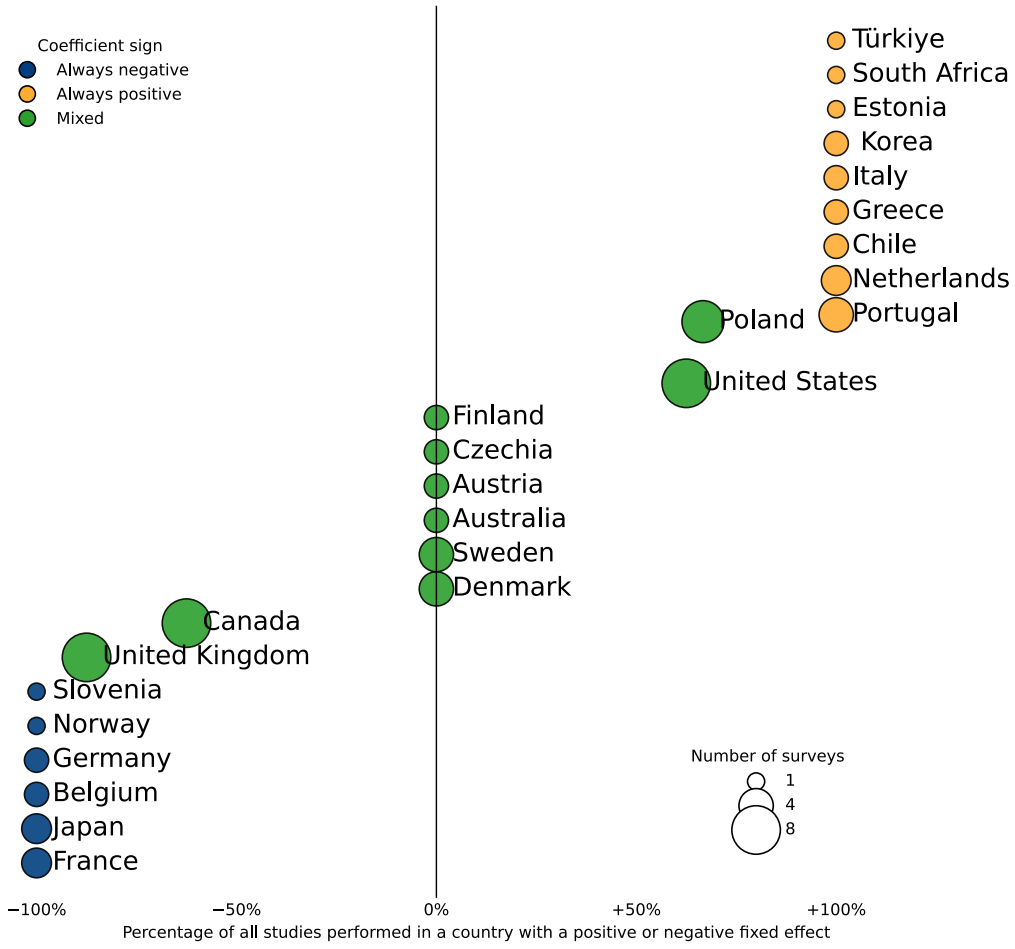
Although several studies indicate that the values assigned to reducing mortality and morbidity risk in children are higher, the available evidence remains difficult to compare across countries, making it challenging to determine an appropriate "child premium" (OECD, 2025[11]). Similarly, the literature provides mixed and inconclusive evidence regarding a so-called "senior discount", which refers to the effect of attributing a lower value to mortality risk reductions among older individuals, as would be the case if applying the same value per statistical life-year[1] for all individuals in a population regardless of their age (OECD, 2025[11]; Bleichrodt, Crainich and Eeckhoudt, 2003[20]; Kniesner and Viscusi, 2019[21]). Given the lack of consistent evidence on age adjustments for mortality and morbidity valuations, the recommended approach is to use age-specific WTP/VSC estimates when such are available – for example, the estimates derived from the IQ-loss in children and asthma in children studies – and otherwise apply the recommended adult WTP/VSC uniformly across all age groups (Robinson, Hammitt and O'Keeffe, 2019[22]; Robinson et al., 2019[23]; OECD, 2025[11]). Clearly, further empirical research is needed to provide more precise estimates of variation in values across age groups.

3.2. Drivers of differences in willingness-to-pay among countries

Estimates also varied considerably across countries. The analysis therefore included country fixed effects for most health effects to account for unobserved country-specific factors. This "everything else" variable captures country-level factors that influence WTP estimates but are not captured in other parts of the statistical analysis and can capture country-specific factors such as differences in culture, health care systems, and attitudes.

Figure 3.3 displays a count of positive versus negative fixed effects for the SWACHE countries, without accounting for their statistical significance or magnitude. Country fixed effects are shown for all endpoints except asthma severity, skin sensitisation, and non-fatal cancer, for which they were not estimated. This graph provides a high level indication of whether a country, all else equal, tends to value SWACHE health effects higher or lower than its peers. For example, Canada has completed studies for 8 health effects, of which 5 (or 62.5%) showed a negative fixed effect, suggesting that Canada tends to show lower valuations than some other countries (all else equal) but that this effect is not systematic. In contrast, some countries, such as Portugal or Germany show consistently positive or negative fixed effects.

Figure 3.3. Positive and negative fixed effects by country across implemented surveys



Note: this graph includes all SWACHE health endpoints except asthma severity, skin sensitisation, and non-fatal cancer, for which country fixed effects were not estimated. The results should be interpreted with caution, as the graph considers only the direction (positive or negative sign) of the country fixed effects and does not account for their statistical significance. Furthermore, both the number and composition of surveyed countries vary across health endpoints.
Source: Authors' own elaboration based on the results of (OECD, 2026[24])

Although the country fixed effects provide a general indication of differences across countries, the underlying detailed factors driving the cross-country differences in WTP remain unexplained. To address this issue, additional variables were explored that could help explain cross-country differences in WTP, including gross domestic product (GDP) per capita, health system effectiveness, medical cost borne by individuals, disease prevalence and attitudes towards chemicals[2]. For each health endpoint, country-level WTP estimates were compared across these indicators. A summary of this analysis is provided below.

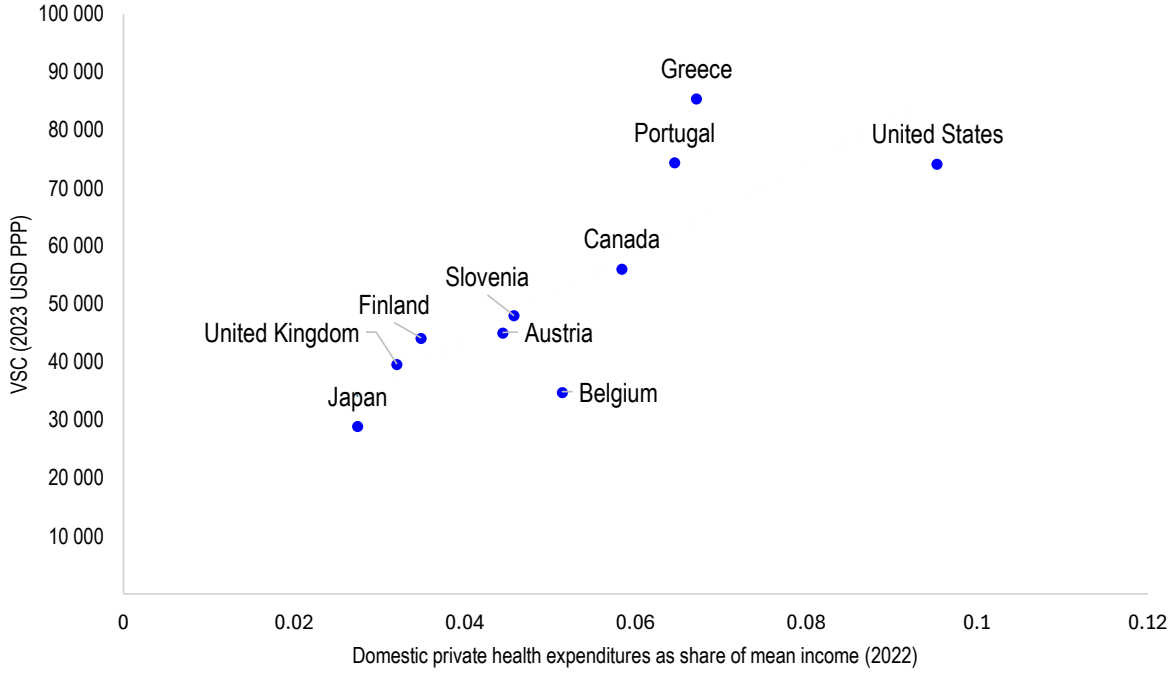
3.2.1. Country-level income and health system effectiveness, costs and satisfaction

Correlation between GDP per capita and WTP shows a positive association with WTP estimates in the non-fatal cancer study, but this relationship is not consistent across other studies. For example, in the case of chronic kidney disease, GDP per capita is negatively correlated with WTP, and in the other studies, the relationship appears weak or non-existent. While preferences for health risk reduction are significantly impacted by personal or household income, as illustrated in Table 3.1 above, they cannot be straightforwardly attributed to a country's national wealth.

Institutional and experiential factors related to healthcare costs, effectiveness and satisfaction can possibly contribute to the variations observed across countries. Country-specific health system effectiveness can be assessed using data on avoidable mortality from preventable and treatable diseases. Avoidable mortality includes deaths from preventable causes that can be avoided through effective public health measures and primary preventive interventions, as well as treatable deaths that could be averted with timely and effective healthcare interventions. Country-specific health system effectiveness can therefore be approximated by mortality rates, calculated as the number of deaths registered in a country in a year divided by the total population (OECD, 2025[25]). Mortality rates in the surveyed countries display a positive relationship with WTP estimates across countries in both the asthma and hypertension studies. In other words, across both surveys, the more effective the health system, the lower the WTP values.

The financial burden of healthcare costs borne by households could also be associated with preferences for health risk reduction across countries. This burden can be approximated by the cost of healthcare carried privately by individuals, including prepayment to voluntary health insurance schemes and direct out-of-pocket payments to healthcare providers.[3] For each country, it is measured as the ratio of domestic private health expenditures per capita to mean disposable income. A positive relationship between private health expenditures and WTP estimates is observed in the hypertension, infertility, underactive thyroid and non-fatal cancer surveys. The strongest associations are found in the hypertension and infertility surveys, where higher private health expenditures are associated with higher national WTP estimates. Figure 3.4 illustrates the positive relationship between domestic private health expenditures as share of income and the VSC estimates for each country in the hypertension study. This relationship persists after controlling for countries' income levels. Furthermore, in the analysis of hypertension, when controlling jointly for health system effectiveness and medical cost burden, the latter exhibits a stronger association with WTP estimates than the former.

Figure 3.4. Relationship between the medical cost burden and the value of a statistical case estimates in the hypertension study



Source: Authors' own elaboration. Data on domestic private health expenditure per capita come from the World Health Organization Global Health Expenditure database (Global Health Expenditure Database). Data on the mean disposable income come from the OECD dataset Gross disposable income per capita of households (OECD Data Explorer • NAAG Chapter 5: Households). Data from the VSC estimates come from the working paper (Hunt et al., 2026[6])

Correlations between citizen-level satisfaction with healthcare services in their country and WTP estimates were conducted using data from the OECD Surveys on Drivers of Trust in Public Institutions (OECD, 2024[26]). The analysis reveals a negative relationship between the share of respondents satisfied with healthcare systems and WTP estimates in the infertility, non-fatal cancer, miscarriage, underactive thyroid, chronic kidney disease, and hypertension studies. In other words, in these studies, the more satisfied citizens are with the healthcare system, the lower their WTP to avoid the health endpoints.

The correlation between disease prevalence in each country and WTP estimates was also examined using OECD and national statistics data (OECD, 2025[25]), with no apparent relationship found between the two variables. In addition, maternal and infant mortality rates at the country level were analysed for association with WTP estimates in the infertility, very low birth weight and miscarriage survey, without yielding significant results. These results suggest that the importance of a health effect at the country level does not appear to be associated with WTP estimates, in contrast to personal or relative experience of the disease, which sometimes appear to play a significant role, as shown in Table 3.1.

Most likely, differences in WTP estimates reflect a combination of factors operating within each country. For example, in the hypertension survey, the countries reporting the highest WTP estimates, namely Greece, Portugal, and the United States, are also those in which health systems are perceived by the population as less reliable or most costly (Kruk et al., 2024[27]; WHO, 2025[28]). In addition, relatively high rates of hypertension treatment in these countries (72% of the diagnosed population), compared with the other countries surveyed (63% of the diagnosed population), may reflect greater awareness of the disease and available treatment options, which can work as an incentive for higher WTP (WHO, 2025[29]).

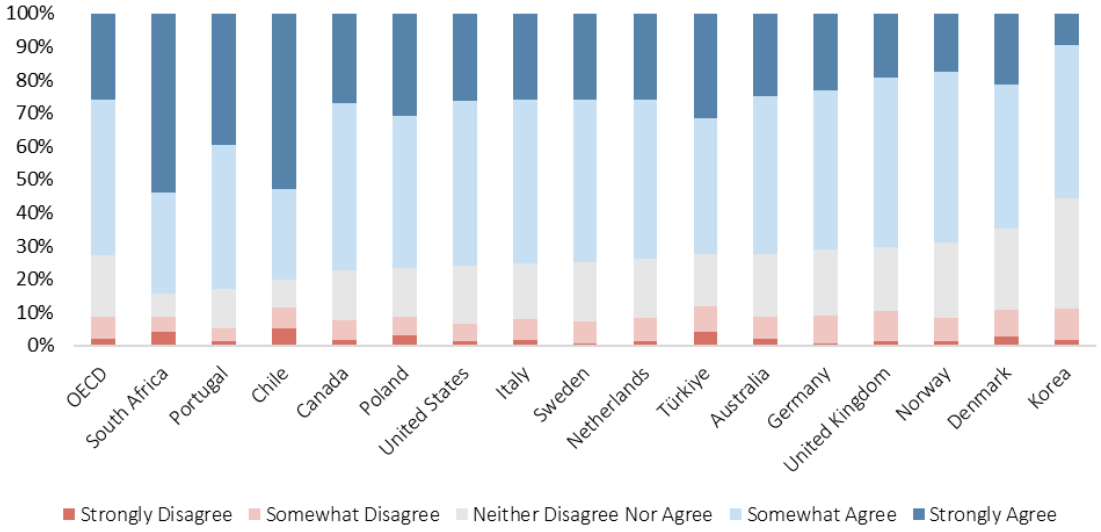
3.2.2. Attitudes towards chemicals

Attitudes towards chemicals were also examined to understand cross-country differences. As part of the SWACHE surveys, respondents were asked about their attitudes towards exposure to harmful chemicals and their views on the need for governments and industry to take action to reduce such exposure[4] (OECD, 2024[30]). This section presents the results of the correlation analyses, highlighting two attitudes that appear to be associated with cross-country variation in certain studies, namely awareness of the risks posed by harmful chemicals and the satisfaction with government regulations of chemicals within each country.

As illustrated in Figure 3.5 there is considerable variation among countries in the proportions of respondents who strongly agree with the statement “I am aware of the health risks associated with harmful chemicals”. South Africa (84.3%), Portugal (83%) and Chile (80%) are the countries with the highest percentage of respondents agreeing with the statement, whereas 55.6% of Korean respondents and 64.8% of Danish respondents agree with the statement.

Figure 3.5. Awareness of the risks posed by harmful chemicals by country

Respondents' answers to the statement: "I am aware of the health risks associated with harmful chemicals"



Note: the survey results on attitudes presented are predominantly drawn from the general population as gathered from the IQ loss and chronic kidney disease valuation surveys and therefore reflect the responses of the countries surveyed in these studies.
Source: (OECD, 2024[30])

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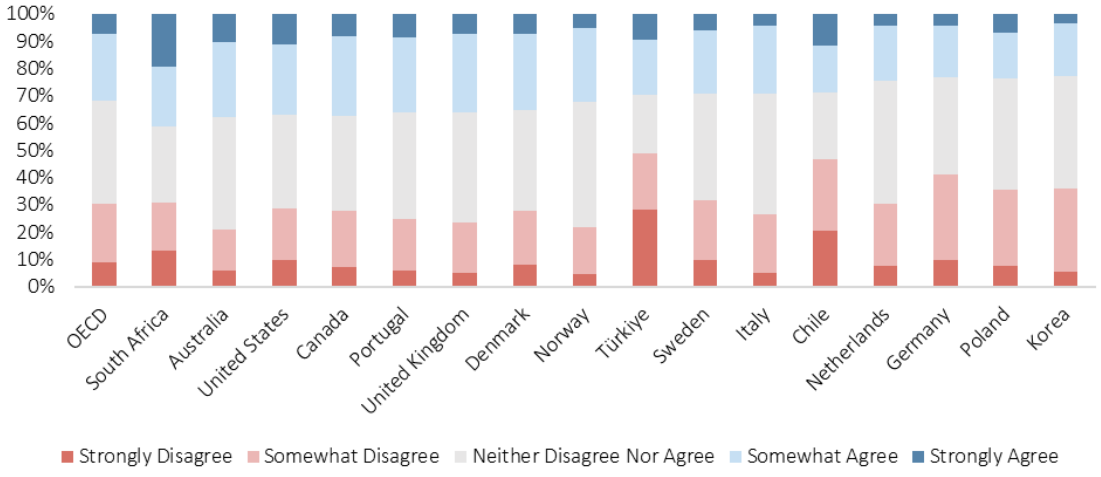
Awareness of the health risks posed by chemicals is positively associated with the WTP estimates in the infertility, adult asthma risk, and underactive thyroid studies. Countries where awareness of chemical risks is higher exhibit higher WTP estimates for these studies. These findings align with the literature on the economic valuation of health effects associated with chemicals exposure, which shows that environmental perceptions play a central role in shaping preferences (Hunter et al., 2012[31]). For example, evidence from recent research indicates that making the link between chemical pollutants and health outcomes is associated with significantly higher WTP values for reducing risks of dementia, stroke, lung cancer, asthma, chronic kidney disease, and type 2 diabetes (Travers et al., 2026[32]).

The perceived efficiency of government regulations of chemicals was also assessed. Respondents were asked to indicate their level of agreement to the sentence "the use of harmful chemicals is sufficiently regulated in my country". As illustrated in Figure 3.6, opinions on the sufficient stringency of national chemicals regulation vary considerably among countries, with agreement ranging from 22.9% in Korea and 23.6% in Poland to 37.4% in Canada and 37.9% in Australia.

Figure 3.6. Satisfaction with the level of governmental regulation of chemicals by country

Respondents' answers to the statement: "The use of harmful chemicals is sufficiently regulated in my country"

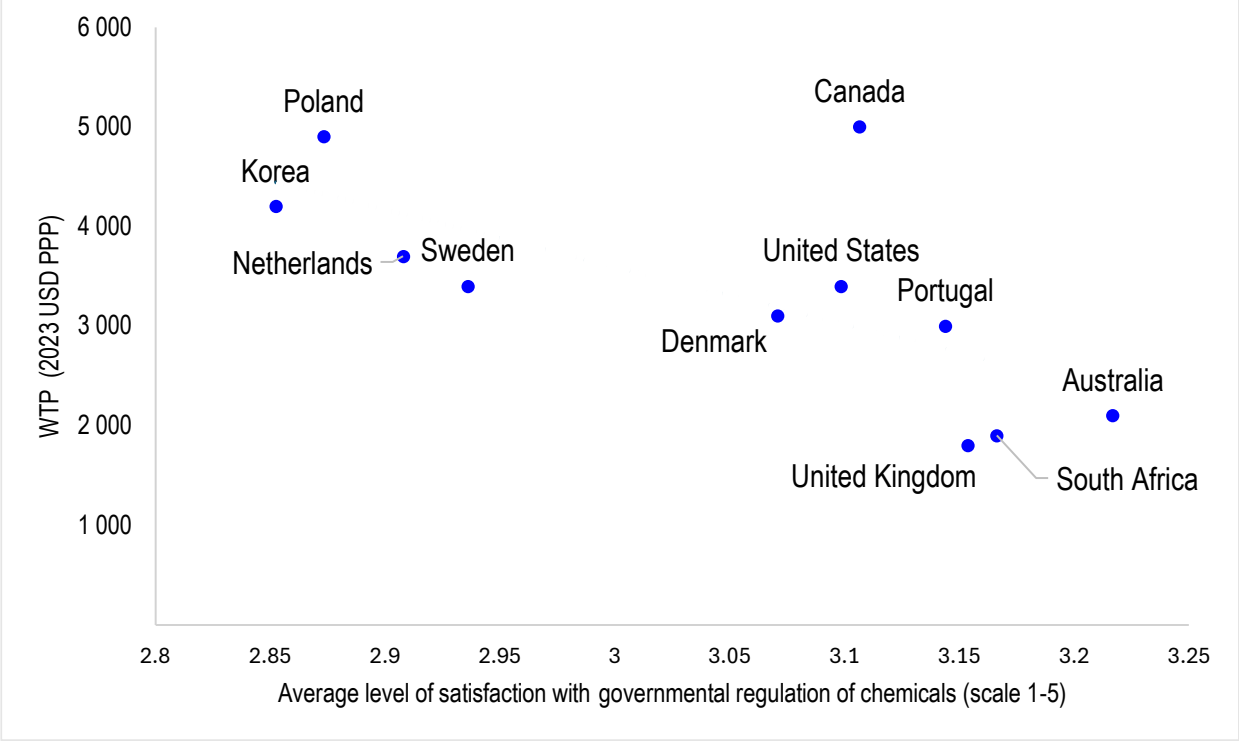


Note: survey results on attitudes presented are predominantly drawn from the general population as gathered from the IQ loss and chronic kidney disease valuation surveys and therefore reflect the responses of the countries surveyed in these studies.
Source: (OECD, 2024[30])

StatLink https://stat.link/cvwq68

In the studies on adult asthma risk and IQ loss in children, respondents who felt that their government's management of chemicals was insufficient also exhibited higher WTP. As illustrated in Figure 3.7, lower WTP estimates are observed in countries where respondents report greater satisfaction with the adequacy of government regulation of chemicals, such as South Africa and Australia. Conversely, higher WTP estimates are observed in countries where respondents perceive that harmful chemicals are not sufficiently regulated.

Figure 3.7. Relationship between perceived chemical regulatory stringency and the willingness-to-pay estimates in the IQ loss in children study



Note: WTP estimates over five years.
Source: Authors' own elaboration based on (OECD, 2024[30]; Mourato et al., 2023[7])

3.2.3. Perceptions of disease and risk

Cultural and traditional factors might shape how individuals perceive and value different health effects. For instance, country-specific perceptions of risk and disease can contribute to differences in WTP across countries. While perceptions of disease are difficult to quantify consistently across countries, certain factors can provide explanatory elements.

The VSC observed in the miscarriage study for Korea may reflect the country's exceptionally low fertility rate and one of the highest average ages for first-time mothers in the world (Dockins et al., 2026[10]). These demographics and cultural characteristics suggest a systematic difference in how miscarriage risks are viewed in Korea relative to other surveyed countries. A second illustration comes from the IQ loss survey which reveals that WTP to avoid IQ loss is negatively associated with the share of government expenditure dedicated to education. One possible interpretation is that IQ-related risks may be perceived as less concerning in contexts where substantial public resources are allocated to education, possibly because the education system is viewed as mitigating or offsetting such losses (Mourato et al., 2023[7]).

While the analysis in this section did not identify additional variables that are consistently associated with differences in WTP estimates, it suggests that a combination of factors may contribute to variations in values across countries. Future work could further explore these factors through harmonised debriefing questions in the surveys, while maintaining consistency to ensure comparability across the entire project.

References

Ahtiainen, H. et al. (2026), "Valuing a reduction in the risk of an underactive thyroid: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 272, OECD Publishing, Paris, https://doi.org/10.1787/4af8f3aa-en. [9]

Alberini, A. et al. (2010), *Valuation of Environment-Related Health Risks for Children*, OECD Publishing, Paris, https://doi.org/10.1787/9789264038042-en. [19]

Appéré, G. et al. (2023), "Valuing a reduction in the risk and severity of asthma: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 218, OECD Publishing, Paris, https://doi.org/10.1787/f289d29e-en. [1]

Bleichrodt, H., D. Crainich and L. Eeckhoudt (2003), "Comorbidities and the willingness to pay for health improvements", *Journal of Public Economics*, Vol. 87/11, pp. 2399-2406, https://doi.org/10.1016/s0047-2727(02)00047-6. [20]

Contu, D. et al. (2026), "Valuing a reduction in the risk of skin sensitisation: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 277, OECD Publishing, Paris, https://doi.org/10.1787/fc305de9-en. [2]

Dickie, M. and S. Gerking (2008), "Family Behavior: Implications for Health Benefits Transfer from Adults to Children", *Environmental and Resource Economics*, Vol. 43/1, pp. 31-43, https://doi.org/10.1007/s10640-008-9229-5. [17]

Dockins, C. et al. (2026), "Valuing a reduction in the risk of miscarriage: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 271, OECD Publishing, Paris, https://doi.org/10.1787/23bb6643-en. [10]

Dockins, C. et al. (2023), "Valuing a reduction in the risk of chronic kidney disease: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 216, OECD Publishing, Paris, https://doi.org/10.1787/9c93138f-en. [3]

Dussaux, D. et al. (2023), "Valuing a reduction in the risk of infertility: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 215, OECD Publishing, Paris, https://doi.org/10.1787/7242509f-en. [4]

Gerking, S. et al. (2017), "Baseline risk and marginal willingness to pay for health risk reduction", *Journal of Risk and Uncertainty*, Vol. 55/2-3, pp. 177-202, https://doi.org/10.1007/s11166-017-9267-x. [12]

Herrera-Araujo, D. et al. (2026), "Valuing a reduction in the risk of non-fatal cancer: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 274, OECD Publishing, Paris, https://doi.org/10.1787/0345660e-en. [5]

Hunt, A. et al. (2026), "Valuing a reduction in the risk of hypertension: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 270, OECD Publishing, Paris, https://doi.org/10.1787/9da8057a-en. [6]

Hunter, P. et al. (2012), "The effect of risk perception on public preferences and willingness to pay for reductions in the health risks posed by toxic cyanobacterial blooms", *Science of The Total Environment*, Vol. 426, pp. 32-44, https://doi.org/10.1016/j.scitotenv.2012.02.017. [31]

Kniesner, T. and W. Viscusi (2019), *The Value of a Statistical Life*, Oxford University Press, https://doi.org/10.1093/acrefore/9780190625979.013.138. [21]

Kruk, M. et al. (2024), "Population confidence in the health system in 15 countries: results from the first round of the People's Voice Survey", *The Lancet Global Health*, Vol. 12/1, pp. e100-e111, https://doi.org/10.1016/s2214-109x(23)00499-0. [27]

Long, M. (2021), "Altruism and the Statistical Value of Human Life for Policy and Regulation", *Social Indicators Research*, Vol. 160/1, pp. 341-355, https://doi.org/10.1007/s11205-021-02784-7. [18]

Mourato, S. et al. (2023), "Valuing the avoidance of IQ losses in children: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 219, OECD Publishing, Paris, https://doi.org/10.1787/71574eb4-en. [7]

OECD (2026), *Benefit transfer of willingness-to-pay estimates for avoiding negative chemicals-related health effects*, OECD Publishing, Paris, https://doi.org/10.1787/f11379a0-en. [24]

OECD (2025), *Health at a Glance 2025: OECD Indicators*, OECD Publishing, Paris, https://doi.org/10.1787/8f9e3f98-en. [25]

OECD (2025), *Mortality Risk Valuation in Policy Assessment: A Global Meta-Analysis of Value of Statistical Life Studies*, OECD Publishing, Paris, https://doi.org/10.1787/76ca89a2-en. [11]

OECD (2024), *Insights on "Attitudes towards chemicals": From the Surveys on Willingness-to-Pay to Avoid Negative Chemicals-Related Health Impacts (SWACHE) Project*, OECD Series on Risk Management of Chemicals, OECD Publishing, Paris, https://doi.org/10.1787/4f98a0e7-en. [30]

OECD (2024), *OECD Survey on Drivers of Trust in Public Institutions – 2024 Results: Building Trust in a Complex Policy Environment*, OECD Publishing, Paris, https://doi.org/10.1787/9a20554b-en. [26]

OECD (2006), *Economic Valuation of Environmental Health Risks to Children*, OECD Publishing, Paris, https://doi.org/10.1787/9789264013988-en. [15]

Robinson, L., J. Hammitt and L. O'Keeffe (2019), "Valuing Mortality Risk Reductions in Global Benefit-Cost Analysis", *Journal of Benefit-Cost Analysis*, Vol. 10/S1, pp. 15-50, https://doi.org/10.1017/bca.2018.26. [22]

Robinson, L. et al. (2019), "Valuing Children's Fatality Risk Reductions", *Journal of Benefit-Cost Analysis*, Vol. 10/2, pp. 156-177, https://doi.org/10.1017/bca.2019.10. [23]

Ščasný, M., I. Zvěřinová and D. Dussaux (2023), "Valuing a reduction in the risk of very low birth weight: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 217, OECD Publishing, Paris, https://doi.org/10.1787/dfd159a1-en. [8]

Ternent, L. et al. (2010), "Willingness to Pay for Maternal Health Outcomes", *Applied Health Economics and Health Policy*, Vol. 8/2, pp. 99-109, https://doi.org/10.2165/11313960-000000000-00000. [14]

Travers, M. et al. (2026), *Policy brief on the WTP to reduce risks arising from a multi-exposure on key VALESOR health endpoints*, https://valesor.eu/download/18.9ea4e0e19c47c9d0a82b0d0/1771840198643/WTP-to-reduce-risks-arising-from-a-multi-exposure-on-key-VALESOR-health-endpoints.pdf. [32]

Viscusi, W., W. Magat and J. Huber (1987), "An Investigation of the Rationality of Consumer Valuations of Multiple Health Risks", *The RAND Journal of Economics*, Vol. 18/4, p. 465, https://doi.org/10.2307/2555636. [16]

WHO (2025), *Global Health Expenditure Database*, World Health Organization, https://apps.who.int/nha/database/. [28]

WHO (2025), *Hypertension*, World Health Organization, https://www.who.int/news-room/fact-sheets/detail/hypertension. [29]

Wolff, E., S. Larsson and M. Svensson (2020), "Willingness to Pay for Health Improvements Using Stated Preferences: Prevention Versus Treatment", *Value in Health*, Vol. 23/10, pp. 1384-1390, https://doi.org/10.1016/j.jval.2020.06.008. [13]

Notes

[1] The value of a statistical life year is an estimate of the value society places on a statistical life-year – i.e. an aggregated value of reducing mortality risk for a period of one year.

[2] Except for the attitude-towards-chemicals variables drawn from the IQ loss and kidney surveys (OECD, 2024[30]), the additional variables examined in this report are not derived from the SWACHE surveys but come from other sources, such as (OECD, 2025[25]). Correlation analyses were performed to examine the relationships between these variables and the WTP values.

[3] The burden of health expenditures can also be measured as the share of household out-of-pocket payments in total health expenditures at the country level (see OECD Data Explorer • Health expenditure and financing). A positive relationship between the share of household out-of-pocket health expenditures and WTP estimates is observed in the hypertension, infertility, underactive thyroid, non-fatal cancer and chronic kidney surveys, where higher shares of household out-of-pocket expenditures relative to total health expenditure are associated with higher national WTP estimates

[4] The survey results on attitudes presented are predominantly drawn from the general population, as gathered from the IQ loss and chronic kidney disease valuation surveys.

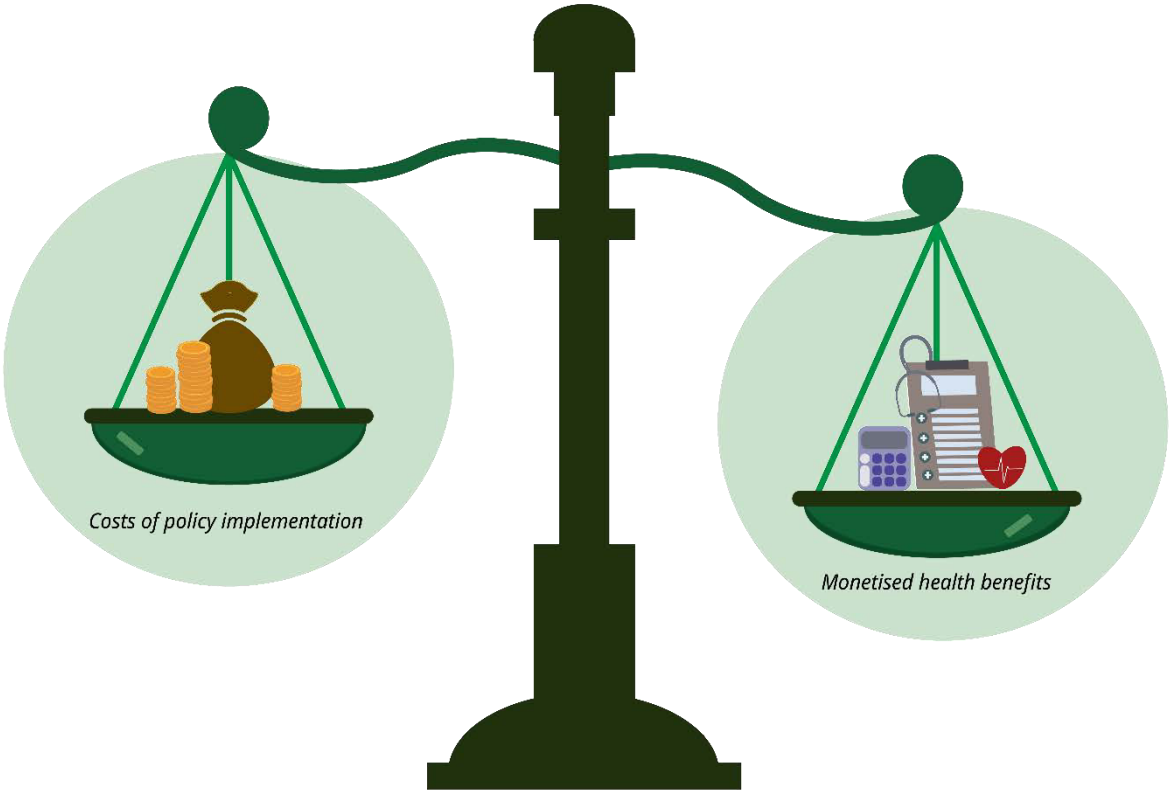
4 Guidance for use of SWACHE values in cost-benefit analysis

Environmental policies and chemicals risk management programmes are essential to protect both human health and the environment from the risks posed by hazardous chemicals. These interventions typically require robust economic justification to demonstrate their necessity and effectiveness. Such justifications often take the form of cost-benefit analyses (CBAs), which assess whether the expected benefits generated by a policy outweigh the costs of policy implementation. The willingness-to-pay (WTP) and value of a statistical case (VSC) values produced by the SWACHE project provide necessary information for calculating these societal benefits. Following a brief overview of the principles of CBA, this chapter highlights the advantages of using SWACHE values in economic impact assessments. It then provides practical guidance on how these values can be applied in CBAs and break-even analyses, illustrated through both hypothetical and real-world examples.

4.1. Cost-benefit analysis

Cost-Benefit Analysis (CBA) is an assessment method that quantifies all the costs and benefits of a project in monetised terms. In CBA of policies or programmes that improve human health, health benefits are usually first measured in physical terms. For morbidity impacts, benefits are typically quantified as the number of disease cases avoided due to the policy, compared to the status quo. These avoided cases are then monetised by multiplying them by the corresponding value of a statistical case (VSC) of the relevant health effect. A similar logic applies to mortality impacts, where avoided fatalities are monetised using the value of statistical life (VSL) (OECD, 2025[1]). Costs are quantified in terms of all the policy inputs including the net value of labour, materials, and capital used to implement and operate a policy.

Figure 4.1. Cost-benefit analysis in the context of health valuation



Source: Authors' own elaboration.

As illustrated in Figure 4.1, CBA then consists of comparing the policy costs to the monetised benefits. The difference between the total discounted benefit and the total discounted cost is called the net present value (NPV). If there are several competing policy options, CBA can also be employed to compare them and determine which one has the highest NPV.

4.2. Convenience of using WTP and VSC values in CBAs, compared to other metrics

To date, a major challenge in policy evaluation and risk management assessment has been a lack of data for valuing the benefits from avoided morbidity outcomes. When WTP values are not available, benefit analyses often rely on qualitative assessments, quantitative but non-monetised metrics, or value approximations, which may in some cases be derived from fractions of mortality values. Among the most common non-monetised metrics for quantifying morbidity effects and making them comparable to mortality impacts are disability-adjusted life years (DALYs) and quality-adjusted life years (QALYs) (see Box 4.1). Due to their non-monetary nature, DALYs and QALYs are not directly suitable for use in CBA. However, under certain assumptions, they can be combined with valuations of statistical life years (VSLY) and converted into monetised units.

WTP and VSC values from the Surveys on Willingness-to-pay to Avoid negative Chemicals-related Health Effects (SWACHE) project enhance the quality of policy impact assessments, by quantifying the intangible welfare benefits associated with reducing or eliminating specific non-fatal health risks associated with chemicals exposure. In particular, the SWACHE valuation approach offers a direct valuation of the health effect which allows for a more transparent and ready-to-use valuation that does not require assessing morbidity as a fraction of mortality or using other approximations. Values from the SWACHE project are therefore convenient for direct application in CBA.

SWACHE values are expressed as VSC whenever the risk reduction in the valuation scenario permits. VSCs are convenient for CBA because they provide a value per case, which can be directly multiplied by the number of cases averted to estimate monetary benefits. Furthermore, VSC estimates also facilitate comparisons across different health outcomes, similar to disability-adjusted life years (DALYs) and quality-adjusted life years (QALYs) measures, as detailed below in Box 4.1.

Box 4.1. Disability-adjusted life years (DALYs) and Quality-adjusted life years (QALYs)

Since the 1990s, the World Health Organisation (WHO) has produced estimates of disease impacts, most commonly using metrics such as disability-adjusted life years (DALYs) for fatal and non-fatal outcomes for hundreds of diseases and health outcomes. Another common metric developed by academics and health institutions over more than 50 years – the Quality-Adjusted Life Years (QALY) – also establishes a single metric for fatal and non-fatal outcomes.

DALYs are a measure of the overall burden of disease, expressing the number of years lost due to ill-health, disability or premature death. For a given disease, DALYs are the sum of years lived with disability (YLDs) and the years of life lost (YLLs). To estimate YLDs for a particular cause in a particular time period, the number of incident cases in that period is multiplied by the average duration of the disease and a weight factor that reflects the severity of the disease on a scale from 0 (perfect life) to 1 (dead). Disability weights are determined using input from medical experts and the general population. To estimate YLLs attributable to a particular cause (such as chemicals exposure), the number of cause-specific deaths are multiplied by a loss function specifying the years lost for deaths as a function of the age at which death occurs.

QALYs combine information on quality and quantity of life generated by healthcare interventions. QALYs weight each year of life by a health-related quality-of-life score ranging from 0 (death) to 1 (perfect health). One QALY is equal to one year in perfect health.

DALYs and QALYs are both utility metrics that integrate considerations of health and longevity. They can be used in Cost-Effectiveness Analysis (CEA), where the benefits are measured in “years” and costs in monetised units. CEAs are often used in the field of health services to inform resource allocation

and compare different health gains. In the absence of robust WTP estimates tailored to a specific condition, such as those derived from the SWACHE project, other approaches – such as monetised QALYs or DALYs or cost-of-illness (COI) methods – can be used as approximations in CBA depending on the policy problem assessed (Robinson et al., 2019[2]; Herrera-Araujo et al., 2026[3]).

However, these approaches have limitations. COI estimates are often underestimates of WTP measures, as they do not capture the disutility of illness and estimates of WTP per QALY rely on strong assumptions about the valuation of health states over time and how health changes are experienced across the life course (Gyrd-Hansen, 2005[4]).

The Global Burden of Disease (GBD) study, led by the Institute for Health Metrics and Evaluation (IHME) in collaboration with governments and academic institutions around the world, regularly reports mortality and morbidity data for causes of death, diseases, injuries, and risk factors, including disability-adjusted life years (DALYs) and associated disability weights. While the SWACHE project provides an economic perspective on health benefit measures, policymakers can use complementary data from the GBD, for example, to determine baseline levels of mortality and morbidity in a population. When available and where comparisons were possible, the disability weights of the health effects addressed in SWACHE were compared with the VSC ranking shown in Figure 2.1 of Chapter 2. The comparison appears broadly consistent. For instance, “stage 3 chronic kidney disease” has a higher disability weight than “symptomatic hypothyroidism”, which in turn has a lower disability weight than “partially controlled asthma”, consistent with the VSC ranking (IHME, 2023[5]). This comparison is not exhaustive and indicative only, as some endpoints are not labelled or defined similarly in the SWACHE and GBD datasets. For example, hypertension is primarily classified in the GBD as a risk factor or a cause of other diseases rather than as a health state in itself.

4.3. How can SWACHE values be used to calculate benefits?

As discussed earlier, the first two rounds of the SWACHE project provide WTP and VSC estimates for ten health effects. These values can be readily combined with estimated policy impacts, which are typically firstly expressed as the number of cases avoided or increased by the introduction or removal of a given policy under consideration. In the context of a policy aiming at improving quality of life and reducing negative health outcomes, the associated economic benefits can be calculated by multiplying the number of cases avoided by the corresponding WTP or VSC value. The methodology for applying VSC estimates is detailed below, and a similar approach applies to WTP estimates.

The first step is to adjust the nominal VSC estimate for inflation and growth in income over time to reflect its value in the year of use. These adjustments reflect the relationship between income levels and individuals’ WTP, as highlighted in Table 3.1 of Chapter 3. While Gross Domestic Product (GDP) per capita[1] is a commonly used approximation of income growth, countries may also prefer alternative indicators that better align with national context and practices, such as household annual or weekly earnings or median income growth. Inflation can be measured using changes in the Consumer Price Index (CPI).

The second step is to calculate the benefits of the policy by multiplying the updated VSC by the number of cases prevented every year by the policy. In a retrospective policy evaluation, the number of cases prevented by the policy can be estimated by comparing the actual number of cases in the population before and after the policy was implemented, while remaining cautious that not all avoided cases are necessarily directly attributable to the policy. In a prospective policy appraisal, the number of cases to be prevented depends on the objectives set for the policy. Alternatively, a break-even analysis can be performed, in which the VSC estimates are used to determine the number of avoided cases needed to offset the costs of the policy, as detailed in the section below.

Importantly, the time lag between changes in exposure to chemicals and the onset of associated health effects should be considered. Some acute effects can be immediate, such as skin irritation, while for other health endpoints this time lag can extend over days, months, or even years. Additionally, some effects may also result in mortality, posing challenges for both epidemiology and valuation. Understanding this time lag can inform how to appropriately account for the total benefits of policies that restrict certain chemicals.

Finally, annual benefits of the policy should be discounted with respect to the base year and then summed across years. The OECD recommends that the discount rate used should follow national government guidance on discount rates for cost-benefit analysis. For example, the United Kingdom government recommended a 1.5% discount rate for health and risk impacts in 2022 (UK Government, 2022[6]). The European Commission's Better Regulation Toolbox recommended in 2023 a 3% discount rate for EU policy analysis (European Commission, 2023[7]). These rates are typically revised periodically.

Table 4.1 provides an illustrative example of how the methodology detailed above can be applied based on a hypothetical policy that is expected to reduce the number of cases of miscarriage by 1 000 every year in France for 2023-2026. Based on a mean VSC of USD_{2023} 325 235 (i.e. EUR_{2023} 216 673), the discounted benefits from the policy over the 4 years equal EUR_{2023} 858 million.

Table 4.1. Measuring the benefits of policy intervention in France: An illustrative example using the value of a statistical case of miscarriage

Year		2023	2024	2025	2026
GDP per capita, volume in USD, at constant PPP (USD_{2020})		55 648	56 079	56 267	56 640
GDP per capita annual growth			0.77%	0.34%	0.66%
Consumer Price Index (2015)		117	119	121	123
Consumer Price Index annual growth			1.71%	1.68%	1.65%
Value of a Statistical Case of miscarriage (VSC)	USD_{2023} PPP	325 235			
	EUR_{2023}	216 673			
	EUR_{2023}	216 673	220 818	224 725	228 833
Estimated annual cases of miscarriage avoided as a result of a policy		1 000	1 000	1 000	1 000
Discount rate		2.5%	2.5%	2.5%	2.5%
Discounted annual benefits (EUR_{2023})		216 672 793	215 432 522	213 896 950	212 494 292
Discounted benefits over 4 years (EUR_{2023})		858 496 557			

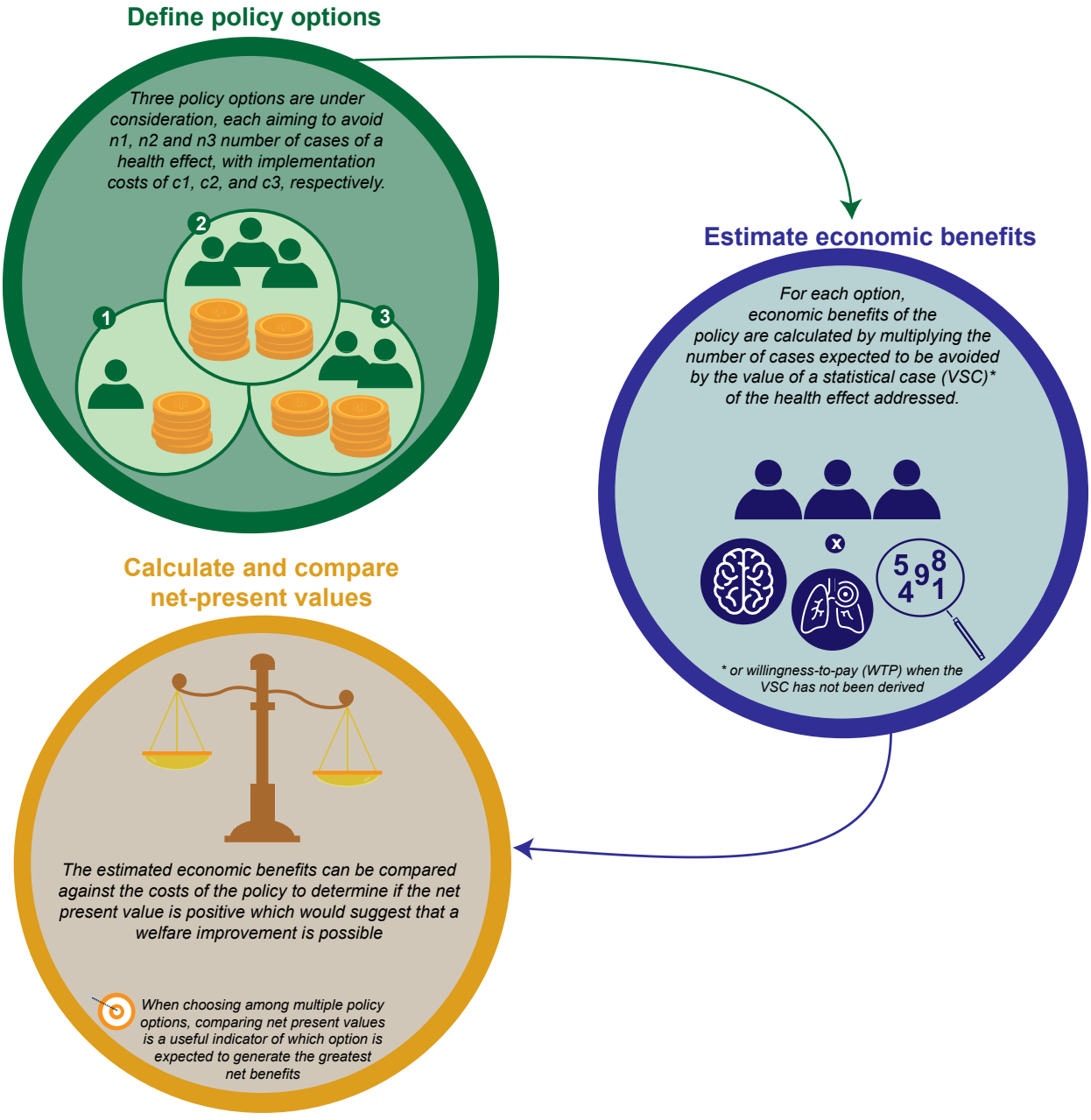
Note: This illustrative example assumes a fictional policy that would reduce the number of statistical cases of miscarriage by 1 000 every year in France from 2023 to 2026. GDP per capita figures and projections come from the OECD Economic Outlook (OECD, 2025[8]) and the OECD Dataset Population projections as of July 2025. Consumer Price Index data for 2023 comes from the OECD Dataset: Consumer price indices as of September 2025. A 2% increase per year is assumed for the Consumer Price Index for 2024-2026 and is not an OECD forecast. PPP for actual individual consumption data is for year 2023 and come from the OECD Dataset: Annual Purchasing Power Parities and exchange rates as of September 2025. The discount rate is based on the ECB figures. (European Central Bank, 2025[9]). The income elasticity equals 0.26 as estimated in the working paper (Dockins et al., 2026[10]).

Similarly, WTP values from the asthma severity survey and the IQ loss in children survey are useful for CBAs. In the IQ loss survey, the reported WTP refers to the amount individuals are willing to pay to avoid the loss of one IQ point in a hypothetical child. Therefore, this WTP can be adjusted for inflation and GDP per capita and then multiplied by the number of IQ points that the policy would prevent from being lost. For example, if a fictional policy avoids the loss of 1 IQ point among 6 000 children born between 2022 and 2027, the resulting discounted benefits would be USD_{2022} 21 million in the United States and about

USD$_{2022}$ 20 million (i.e. DKK$_{2022}$ 147 million) in Denmark. These results are obtained using a 3% discount rate for the United States and a 4% discount rate for Denmark (Mourato et al., 2023[11]).

In the context of health policies or chemicals management programmes, the evaluation of benefits and costs often requires comparing impacts that occur in different time periods, for example in cases where there is a latency period between exposure reduction and the occurrence or avoidance of health effects. Analysts and policymakers can address these timing differences by applying discounting to reflect time preferences, following best practice or standard guidance on the choice of discount rate from national or international CBA guidelines (Robinson and Hammitt, 2011[12]; OECD, 2025[1]). Figure 4.2. summarises and illustrates the steps leading to the comparison of policy costs and benefits, as well as the comparison across different policy options.

Figure 4.2. Steps of a cost-benefit analysis in the context of morbidity valuation



A point of discussion concerns how WTP/VSC estimates should be considered in relation to other health benefit or avoided cost estimates. As explained in Section 1.5 of Chapter 1, the WTP estimates of the SWACHE project reflect the broad physical, emotional, social and economic burden of disease. Consequently, adding these estimates to other metrics such as cost-of-illness (COI) may entail a risk of double-counting, since the WTP/VSC already reflects avoided health care expenditures and productivity losses as perceived and anticipated by individuals when reporting their WTP (Drummond et al., 2015[13]; DEFRA UK, 2025[14]). The asthma survey constitutes an exception, as respondents were explicitly instructed to ignore monetary costs when stating their WTP. In this specific case, combining WTP estimates with COI measures may be considered. Nevertheless, despite asking respondents to focus only on the non-monetary benefits, 40% of respondents reported in the debriefing questions of the asthma survey that they had anticipated medical cost savings (Appéré et al., 2023[15]). This share reaches 60% in the United States. This finding supports the use of WTP as a measure capturing the full welfare benefits of reducing the risk of developing or worsening a disease, as perceived by individuals (Nocera, Telser and Bonato, 2003[16]).

4.4. How can SWACHE values be used in a break-even analysis?

As illustrated in Figure 4.2., VSC and WTP values can be used to calculate the benefits of the policy option. Conversely, since the benefits equal the VSC multiplied by the number of cases avoided, VSC estimates can also be used to demonstrate the number of cases that must be avoided for the policy benefits to offset its implementation costs. Such analyses are called break-even analyses and consist of determining how many cases of a given illness would need to be avoided to economically justify a policy intervention. Similarly, in the context of comparing or switching between options, switching cost analyses can be performed to assess whether the additional benefits from a new option are sufficient to justify the additional costs of switching from a previous option. The number of cases that would need to be avoided in the population for the intervention to break even can be compared with the number of cases actually observed in the same population. The intervention is likely to be justified where the required number of avoided cases is lower than the actual number of avoided cases observed or predicted.

In 2025, the United Kingdom strengthened its chemicals regulation of Persistent Organic Pollutants (POPs) using SWACHE values as inputs for a switching costs analysis (DEFRA UK, 2025[14]). POPs are toxic substances that accumulate in living organisms and pose significant health risks that could include a number of health effects. The impact assessment of the amendment intended to strengthen the regulation included a switching cost analysis, which used SWACHE values for chronic kidney disease, infertility and very low birth weight to compare the health benefits against the business costs of the regulation. The impact assessment estimated that between 83 and 119 incidences of these diseases need to be avoided to offset the estimated regulatory extra costs of £68 million (~EUR 78 million).

Table 4.2. Extract from the switching cost analysis of the United Kingdom regulation on POPs

Value of a statistical case of diseases in the United Kingdom from chemicals pollution	Per person (in GBP)
Chronic kidney disease	711 000
Infertility risk	96 000
Very low birth weight	1 029 000
Cancer	430 000 – 1 430 000
Average of diseases	567 000 – 817 000
Total business impacts of POPs regulation (in GBP million, undiscounted)	
68	
Incidence of disease (average) to offset business impacts of POPs regulation	
83-119	

Note: This switching cost analysis aggregates the different values by taking the simple average of the values of the four diseases considered. The total costs of the regulation were then divided by this averaged value of a statistical case in order to derive the incidences of the diseases that need to be avoided to offset these costs. This approach is presented here to illustrate the methodology of the break-even analysis, consisting of dividing the costs by the value of a statistical case of a disease to derive the incidence of disease that needs to be avoided to offset the costs. However, the methodology used to calculate the average value across the four diseases is not the recommended OECD approach. The discussion on the valuation of multiple health effects is provided in Chapter 6.
Source: 2025 Amendments to the Persistent Organic Pollutants Regulations, Annexes I, IV and V, covering two Statutory Instruments (DEFRA UK, 2025[14]).

4.5. Overview of the use of SWACHE values across institutions

In addition to the United Kingdom Government's impact assessment mentioned above, SWACHE values are also used by multiple institutions. The European Chemicals Agency (ECHA) updated its reference values in September 2023 to monetise the health impacts of chemicals, using VSC estimates derived from the SWACHE project for infertility, adult and childhood asthma, chronic kidney disease, and very low birth weight (ECHA, 2023[17]) and updates for other SWACHE endpoints are envisaged in the near future. These reference values are used by ECHA for applications for authorisation and restriction dossiers concerning substances that pose a risk to human health and the environment. In a similar vein, the European Commission considers the SWACHE project for methodological aspects related to the costing of chemical pollution for our society (European Commission, 2026[18]). Finally, SWACHE values are also used as contextual evidence in discussions and international conventions, such as the Rotterdam Convention, which addresses hazardous chemicals and pesticides in international trade (UNEP/FAO, 2025[19]).

References

Appéré, G. et al. (2023), "Valuing a reduction in the risk and severity of asthma: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 218, OECD Publishing, Paris, https://doi.org/10.1787/f289d29e-en. [15]

DEFRA UK (2025), *Title: 2025 Amendments to the Persistent Organic Pollutants Regulations, Annexes I, IV and V, covering two Statutory Instruments*. [14]

Dockins, C. et al. (2026), "Valuing a reduction in the risk of miscarriage: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 271, OECD Publishing, Paris, https://doi.org/10.1787/23bb6643-en. [10]

Drummond, M. et al. (2015), *Methods for the Economic Evaluation of Health Care Programmes*, Press, Oxford University, https://nibmehub.com/opac-service/pdf/read/Methods%20for%20the%20Economic%20Evaluation%20of%20Health%20Care%20Programmes.pdf. [13]

ECHA (2023), *Reference willingness-to-pay values for monetising chemicals health impacts*, https://echa.europa.eu/documents/10162/17229/seac_reference_wtp_values_en.pdf/b041ac3c-5874-76fc-f317-84cf565c8f7b. [17]

European Central Bank (2025), *Monetary policy decisions*, https://www.ecb.europa.eu/press/pr/date/2025/html/ecb.mp250911~6afb7a9490.en.html. [9]

European Commission (2023), *Better regulation toolbox 2023*, https://commission.europa.eu/document/download/0d32ee11-92da-434d-9c86-fd4579d95dc6_en?filename=BRT-2023-Chapter%208-Methodologies%20for%20analysing%20impacts%20in%20IAs%20evaluations%20and%20fitness%20checks_0.pdf. [7]

European Commission, D. (2026), *The cost of PFAS pollution for our society*, https://data.europa.eu/doi/10.2779/9590509. [18]

Gyrd-Hansen, D. (2005), "Willingness to Pay for a QALY", *PharmacoEconomics*, Vol. 23/5, pp. 423-432, https://doi.org/10.2165/00019053-200523050-00002. [4]

Herrera-Araujo, D. et al. (2026), *WTP for fatal and non-fatal environmental related disease: a QALY-based study across Europe*, https://valesor.eu/download/18.9ea4e0e19c47c9d0a82b0cf/1771840198009/WTP-for-Fatal-and-Non-Fatal-Environmental-Related-Diseases.pdf. [3]

IHME (2023), *GBD Results*, Institute for Health Metrics and Evaluation, https://vizhub.healthdata.org/gbd-results/. [5]

Mourato, S. et al. (2023), "Valuing the avoidance of IQ losses in children: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 219, OECD Publishing, Paris, https://doi.org/10.1787/71574eb4-en. [11]

Nocera, S., H. Telser and D. Bonato (2003), "Cost-Benefit Analysis", in *Developments in Health Economics and Public Policy, The Contingent Valuation Method in Health Care*, Springer US, Boston, MA, https://doi.org/10.1007/978-1-4419-9133-1_8. [16]

OECD (2025), *Mortality Risk Valuation in Policy Assessment: A Global Meta-Analysis of Value of Statistical Life Studies*, OECD Publishing, Paris, https://doi.org/10.1787/76ca89a2-en. [1]

OECD (2025), *OECD Economic Outlook, Volume 2025 Issue 1: Tackling Uncertainty, Reviving Growth*, OECD Publishing, Paris, https://doi.org/10.1787/83363382-en. [8]

Robinson, L. and J. Hammitt (2011), "Behavioral Economics and the Conduct of Benefit-Cost Analysis: Towards Principles and Standards", *Journal of Benefit-Cost Analysis*, Vol. 2/2, pp. 1-51, https://doi.org/10.2202/2152-2812.1059. [12]

Robinson, L. et al. (2019), "Conducting Benefit-Cost Analysis in Low- and Middle-Income Countries: Introduction to the Special Issue", *Journal of Benefit-Cost Analysis*, Vol. 10/S1, pp. 1-14, https://doi.org/10.1017/bca.2019.4. [2]

Robinson, L., J. Hammitt and L. O'Keeffe (2019), "Valuing Mortality Risk Reductions in Global Benefit-Cost Analysis", *Journal of Benefit-Cost Analysis*, Vol. 10/S1, pp. 15-50, https://doi.org/10.1017/bca.2018.26. [20]

UK Government (2022), *The Green Book*, https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government/the-green-book-2020#a6-discounting. [6]

UNEP/FAO (2025), *Conference of the Parties to the Rotterdam Convention on the Prior informed consent procedure for certain hazardous chemicals and pesticides in international trade*, United Nations Environment Programme/Food and Agriculture Organization of the United Nations, https://www.pic.int/Portals/5/download.aspx?d=UNEP-FAO-RC-COP.12-INF-18.En.docx. [19]

Note

[1] GDP per capita is used in this report and the SWACHE working papers, in line with common practices in cost-benefit analysis (CBA) which frequently relies on GDP per capita or Gross National Income (GNI) as approximations for income growth (Robinson, Hammitt and O'Keeffe, 2019[20]; OECD, 2025[1]).

5 Applying SWACHE values in other countries and contexts

The SWACHE values were derived from surveys focusing on chemicals-related health effects implemented in several study countries. While these values are primarily intended for use in the surveyed countries and in the context of chemicals exposure, they can also be applied to other countries and contexts. This chapter presents the results of a benefit transfer analysis that applies the SWACHE values outside of the surveyed countries. The chapter also discusses the applicability of the study results to other conditions that yield the same effects on human health.

5.1. Applying valuations in other countries

5.1.1. Results of the benefit transfer analysis

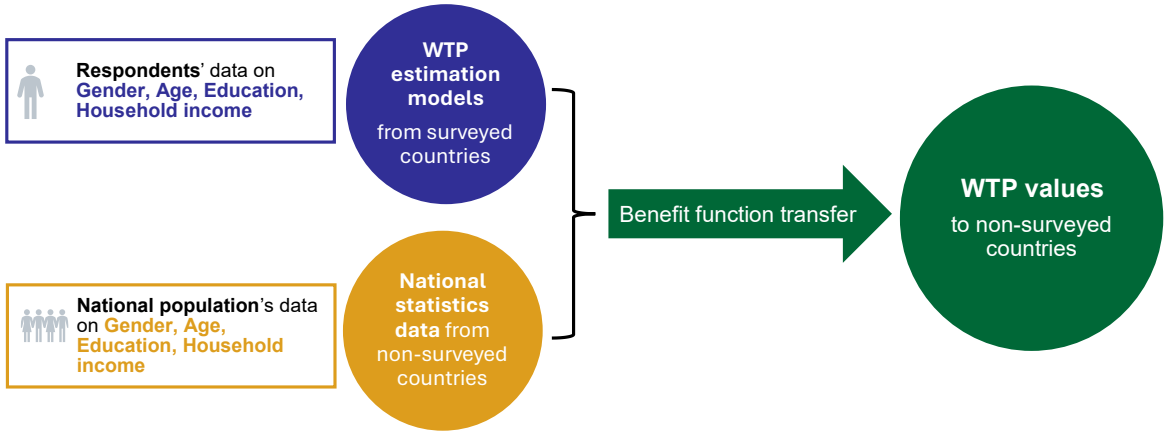
The Surveys on Willingness-to-pay to Avoid negative Chemicals-related Health Effects (SWACHE) project, with its harmonised approaches and coverage of numerous countries and health endpoints, offers a unique basis for applying benefit transfer methodologies to provide willingness-to-pay (WTP) and value of a statistical case (VSC) estimates for non-surveyed countries.

Benefit transfer (BT) approaches are often used when benefit estimates are needed for decision-making, but time or budget constraints prevent conducting primary valuation studies. Like primary estimates, transferred values can be integrated into cost-benefit analyses (CBAs) and other economic assessments. However, while BT saves resources, its accuracy is generally lower than that of primary valuation studies.

This section displays the results of a BT analysis which used SWACHE values to estimate the benefits to reduce or avoid the risk of morbidity of ten different health effects. Depending on available data, WTP and VSC values can be transferred using different approaches, ranging from a simple unadjusted unit value transfer (i.e. using a surveyed country value directly in a non-surveyed country) to complex function-based approaches. For eight endpoints covered in the first two rounds of SWACHE, a benefit transfer function was applied to derive values for non-surveyed countries. The exceptions are skin sensitisation and asthma risk, for which an income-adjusted direct transfer of benefits was used (OECD, 2026[1]).

A benefit function transfer involves transferring the VSC/WTP estimates from one or several surveyed countries to a non-surveyed country, based on demographic information from the surveys and from official national statistics.[1] As illustrated in Figure 5.1, the selected transfer function for the SWACHE project incorporates respondent characteristics on how the WTP is impacted by gender, age, household income, and level of education and then uses the estimated equations together with population level information of the same characteristics to estimate a transferred benefit for countries not included in the original surveys. Therefore, the benefit transfer function accounts for the socio-demographic characteristics of non-surveyed countries when transferring WTP estimates.

Figure 5.1. Methodology of the recommended benefit function transfer



Source: Authors' own elaboration.

Population statistics for countries to which the values were transferred were carefully curated to match the relevant survey samples as closely as possible. Table 5.1 summarises the targeted populations in the surveyed countries for each health endpoint, along with the corresponding transferred populations in the non-surveyed countries.

Table 5.1. Characteristics of the transferred population in surveyed countries compared to SWACHE's targeted sample in non-surveyed countries

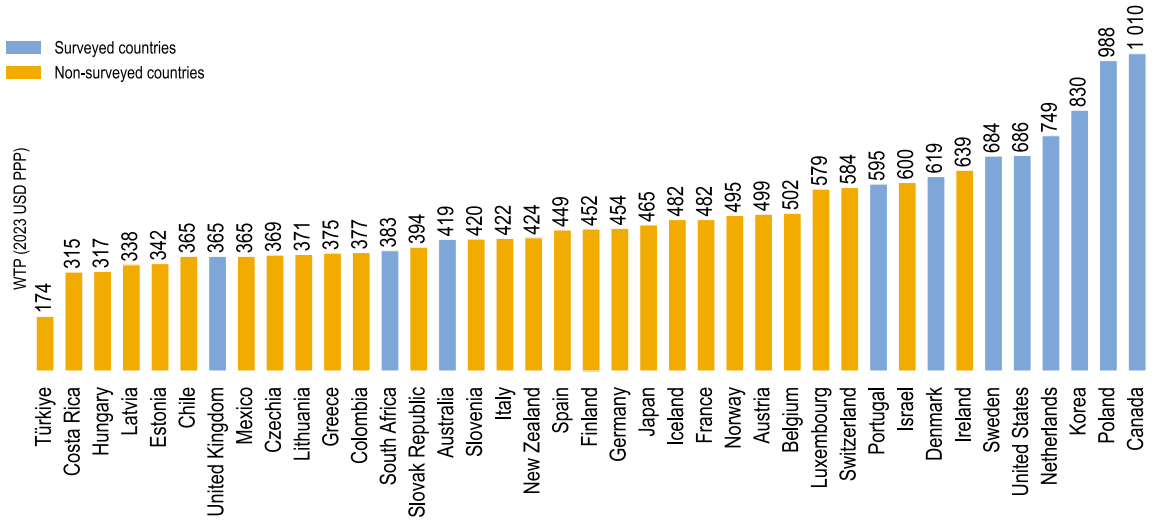
	Targeted sample in surveyed countries	Target population for which values are being transferred in non-surveyed countries
IQ loss	Representative of the total population	Total population
Hypertension	Representative of the total population	Total population
Underactive thyroid	Representative of the total population	Total population
Skin sensitisation	Representative of the total population	Total population
Non-fatal cancer	Population without cancer	Total population
Chronic kidney disease	Population without chronic kidney disease	Total population
Asthma risk	Non-asthmatic adults and non-asthmatic children	Total population
Asthma severity	Asthmatic adults and asthmatic children	Use of a readjustment factor based on the total population, assuming that the ratio of asthmatic adults and asthmatic children's characteristics observed in surveyed countries sites also applies to the non-surveyed countries.[1] See (OECD, 2026[1]) for more details.
Infertility	Males (aged 18-65) and females (aged 18-45) actively planning to have a biological child within the next 5 years, including those currently expecting and wished to have another child within the next 5 years	Male population aged 18-65 and female population aged 18-45
Very low birth weight	Males (aged 18-65) and females (aged 18-45) actively planning to have a biological child within the next 5 years, including those currently expecting and wished to have another child within the next 5 years	Male population aged 18-65 and female population aged 18-45
Miscarriage	Individuals planning a pregnancy within five years where the child-bearing partner is under 50 years old (pregnant couples are excluded)	Male population aged 18-65 and female population aged 18-45

Note: See working papers for more details about sampling strategies (Appéré et al., 2023[2]; Contu et al., 2026[3]; Dockins et al., 2023[4]; Dussaux et al., 2023[5]; Herrera-Araujo et al., 2026[6]; Hunt et al., 2026[7]; Mourato et al., 2023[8]; Ščasný, Zvěřinová and Dussaux, 2023[9]; Ahtiainen et al., 2026[10]; Dockins et al., 2026[11]).

1. This adjustment relies on two strong assumptions. First, it assumes that the surveyed sample – of e.g. individuals with asthma – is representative of the targeted population within each surveyed country, an assumption that cannot be verified due to a lack of available data. Second, it assumes that the adjustment factor derived from surveyed countries is also applicable to non-surveyed countries, which may not hold if countries differ significantly. Ideally, external data on the socio-demographic characteristics of the targeted population would be used directly to obtain benefit transfer WTP tailored to each non-surveyed country. However, in the absence of such data for the target population in each country, the adjustment factor provides an approximation.

For the IQ loss, hypertension, and underactive thyroid studies, the targeted sample in the surveyed countries is the total population, which matches the population for which values are being transferred in non-surveyed countries. Figure 5.1, Figure 5.2, Figure 5.3, and Figure 5.4 present, for each of these health effects, the values for the 38 OECD Member countries and South Africa. In these figures, the orange bars indicate that a country was not surveyed and therefore display values derived from the BT analysis. The blue bars indicate that the country was surveyed and refer to the WTP/VSC estimates derived from the survey collection and analysis, which were already presented in Chapter 2. These values represent mean WTP/VSC estimates. The corresponding medians can be found in (OECD, 2026[1]), which also includes a detailed discussion and testing of alternative methods for the benefit transfer of SWACHE values from surveyed to non-surveyed countries. All values have been converted from working papers and are expressed in 2023 USD PPP.

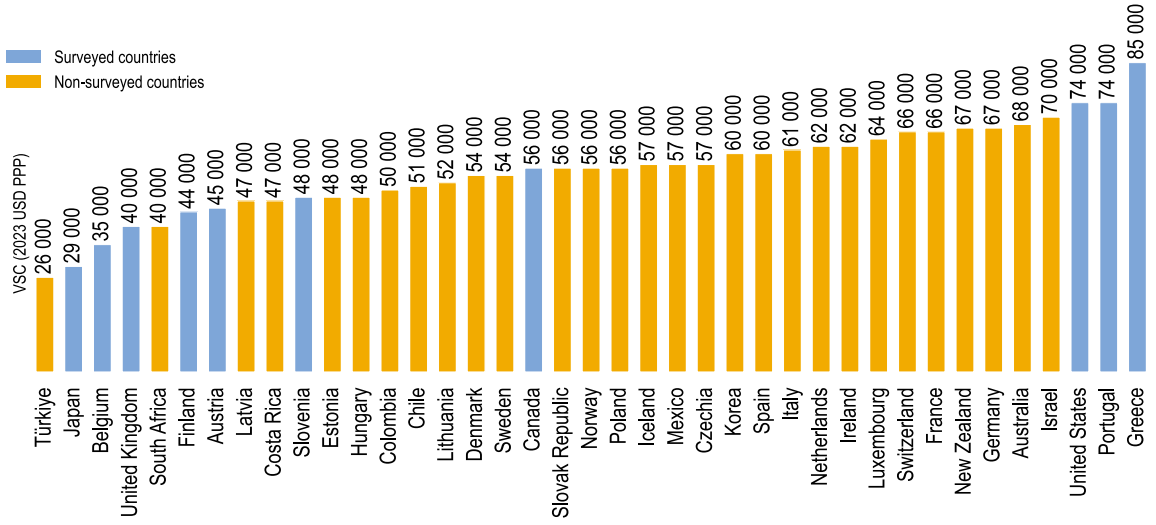
Figure 5.2. Willingness-to-pay estimates over one year to avoid one IQ point loss in children by country (USD), for OECD countries and South Africa



Note: WTP per year over five years. The values for the countries shown in orange were estimated through a benefit transfer function, controlling for countries' socio-demographic composition (age, gender, education, and household income). The values for the countries shown in blue are taken from the IQ loss in children working paper, converted in this report to USD 2023 PPP, and presented in Figure 2.11 of Chapter 2.
Source: (Mourato et al., 2023[8]; OECD, 2026[1]).

StatLink https://stat.link/c65piv

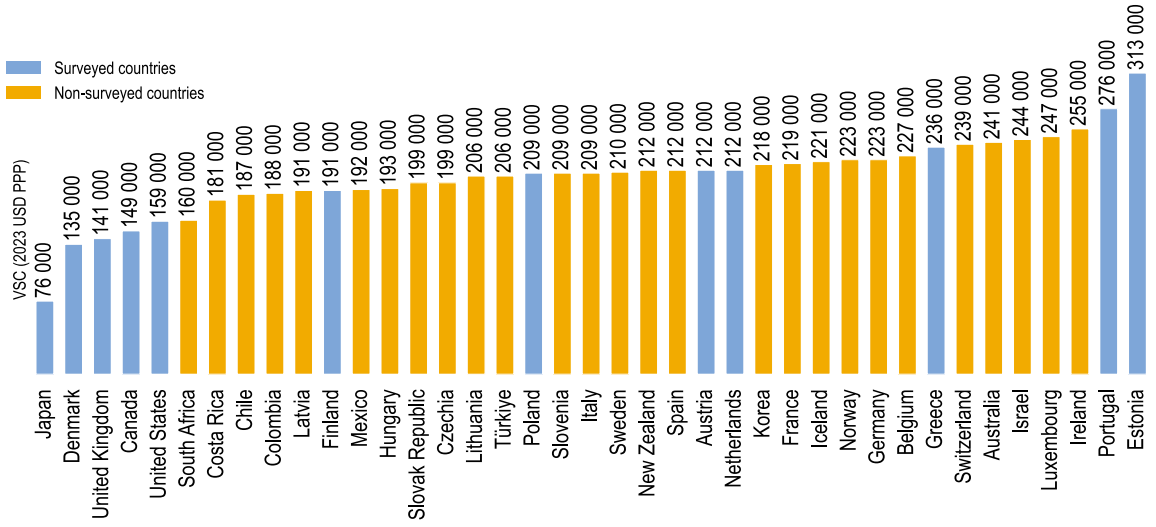
Figure 5.3. Values of a statistical case of hypertension by country (USD), for OECD countries and South Africa



Note: The values for the countries shown in orange were estimated through a benefit transfer function, controlling for countries' socio-demographic composition (age, gender, education, and household income). The values for the countries shown in blue are taken from the hypertension working paper, discounted and converted in this report to USD 2023 PPP, and presented in Figure 2.2 of Chapter 2.
Source: (Hunt et al., 2026[7]; OECD, 2026[1]).

StatLink https://stat.link/frdgoj

Figure 5.4. Values of a statistical case of underactive thyroid by country (USD), for OECD countries and South Africa

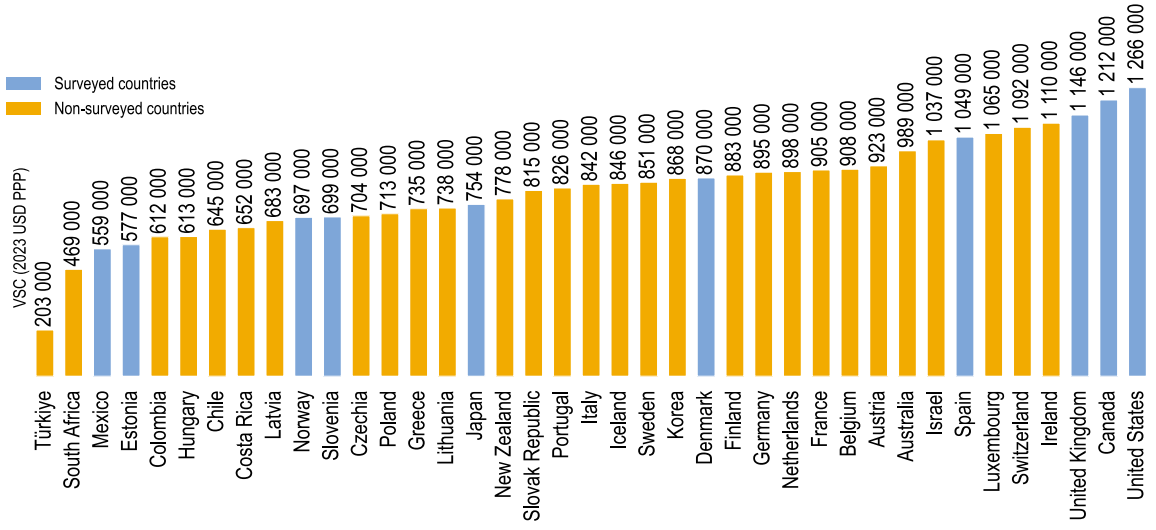


Note: the values for the countries shown in orange were estimated through a benefit transfer function, controlling for countries' socio-demographic composition (age, gender, education, and household income). The values for the countries shown in blue are taken from the underactive working paper and presented in Figure 2.4 of Chapter 2.
Source: (Ahtiainen et al., 2026[10]; OECD, 2026[1]).

StatLink https://stat.link/3hczye

For the other health endpoints, the population for which values are being transferred in the non-surveyed countries did not exactly match the survey samples but were aligned as closely as possible. Figure 5.5, Figure 5.6, Figure 5.7, Figure 5.8, Figure 5.9, Figure 5.10 and Figure 5.11, present respectively the recommended values for non-fatal cancer, chronic kidney disease, asthma severity in adults and children, infertility, very low birth weight and miscarriage endpoints.

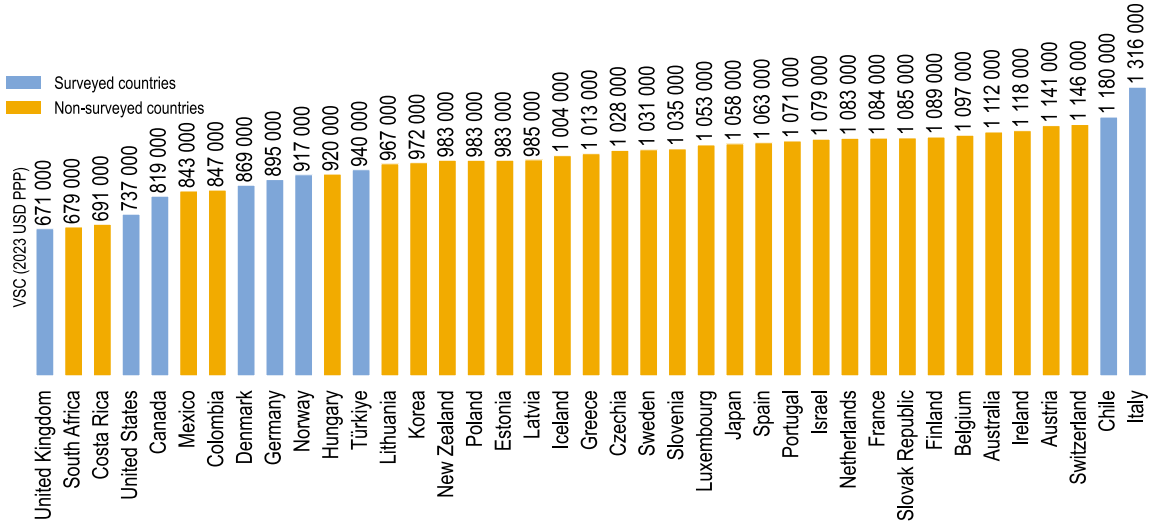
Figure 5.5. Values of a statistical case of non-fatal cancer by country (USD), for OECD countries and South Africa



Note: the values for the countries shown in orange were estimated through a benefit transfer function, controlling for countries' socio-demographic composition (age, gender, education, and household income). The values for the countries shown in blue are taken from the non-fatal cancer working paper presented in Figure 2.8 of Chapter 2.
Source: (Herrera-Araujo et al., 2026[6]; OECD, 2026[1]).

StatLink https://stat.link/3k0ejg

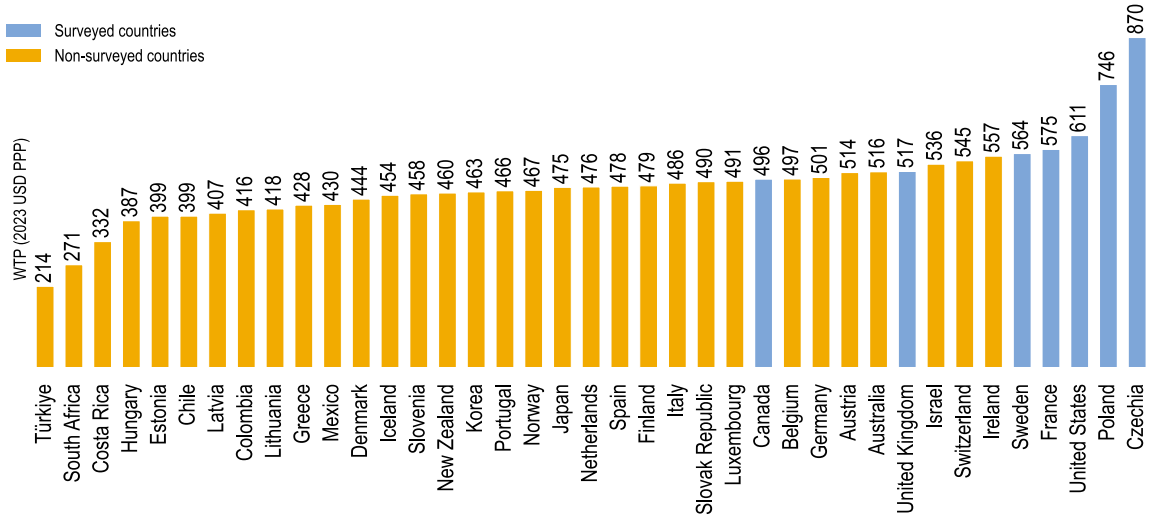
Figure 5.6. Values of a statistical case of chronic kidney disease by country (USD), for OECD countries and South Africa



Note: The values for the countries shown in orange were estimated through a benefit transfer function, controlling for countries' socio-demographic composition (age, gender, education, and household income). The values for the countries shown in blue are taken from the chronic kidney disease working paper, converted in this report to USD 2023 PPP, and presented in Figure 2.9 of Chapter 2.
Source: (Dockins et al., 2023[4]; OECD, 2026[1]).

StatLink https://stat.link/dh36zt

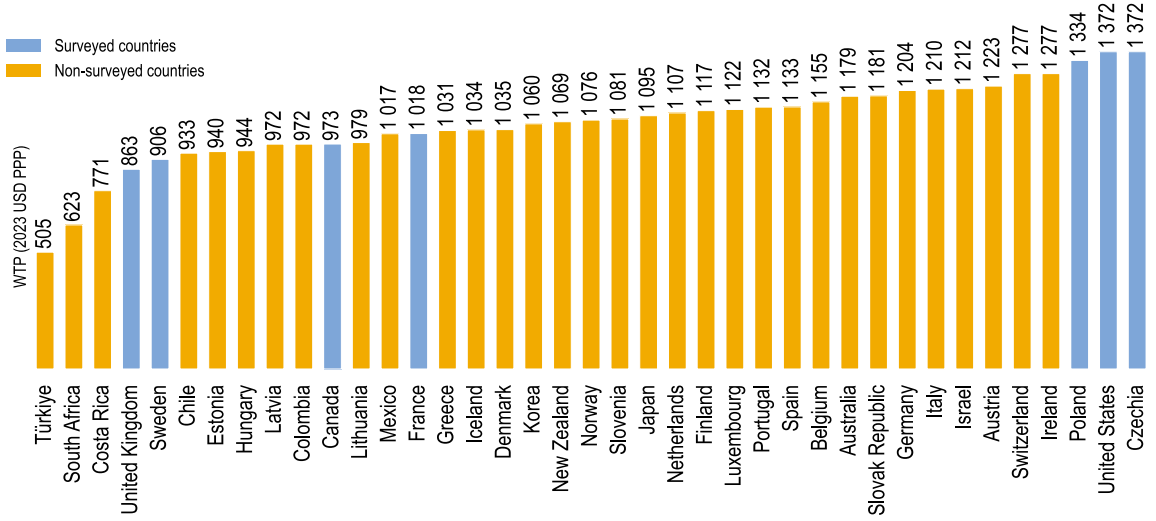
Figure 5.7. Willingness-to-pay estimates over one year for one step reduction in adult asthma by country (USD), for OECD countries and South Africa



Note: WTP per year over ten years. The values for the countries shown in orange were estimated through a benefit transfer function, controlling for countries' socio-demographic composition (age, gender, education, and household income). The values for the countries shown in blue are taken from the asthma working paper, converted in this report to USD 2023 PPP, and presented in Figure 2.6 of Chapter 2.
Source: (Appéré et al., 2023[2]; OECD, 2026[1]).

StatLink https://stat.link/j2usp6

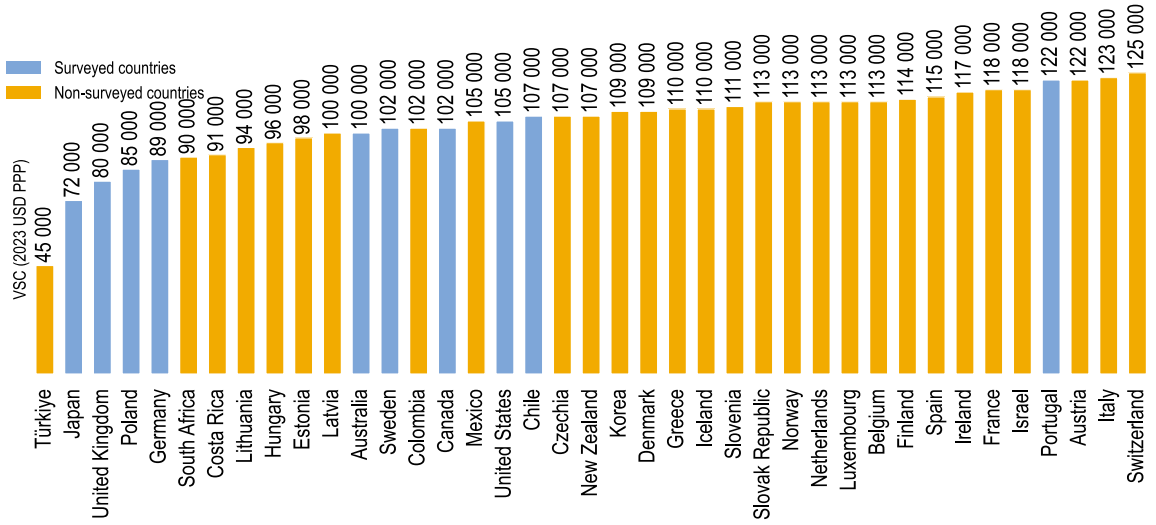
Figure 5.8. Willingness-to-pay estimates over one year for one step reduction in childhood asthma by country (USD), for OECD countries and South Africa



Note: WTP per year over ten years. The values for the countries shown in orange were estimated through a benefit transfer function, controlling for countries' socio-demographic composition (age, gender, education, and household income). The values for the countries shown in blue are taken from the asthma working paper, converted in this report to USD 2023 PPP, and presented in Figure 2.6 of Chapter 2.
Source: (Appéré et al., 2023[2]; OECD, 2026[1]).

StatLink https://stat.link/l3scr5

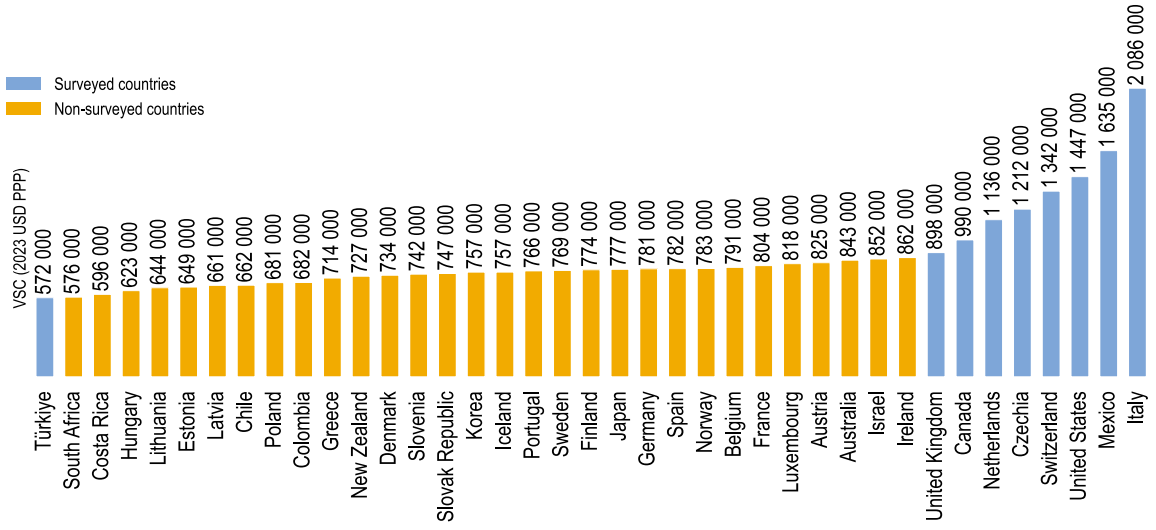
Figure 5.9. Values of a statistical case of infertility by country (USD), for OECD countries and South Africa



Note: The values for the countries shown in orange were estimated through a benefit transfer function, controlling for countries' socio-demographic composition (age, gender, education, and household income). The values for the countries shown in blue are taken from the infertility working paper, converted in this report to USD 2023 PPP, and presented in Figure 2.3 of Chapter 2.
Source: (Dussaux et al., 2023[5]; OECD, 2026[1]).

StatLink https://stat.link/hy58xt

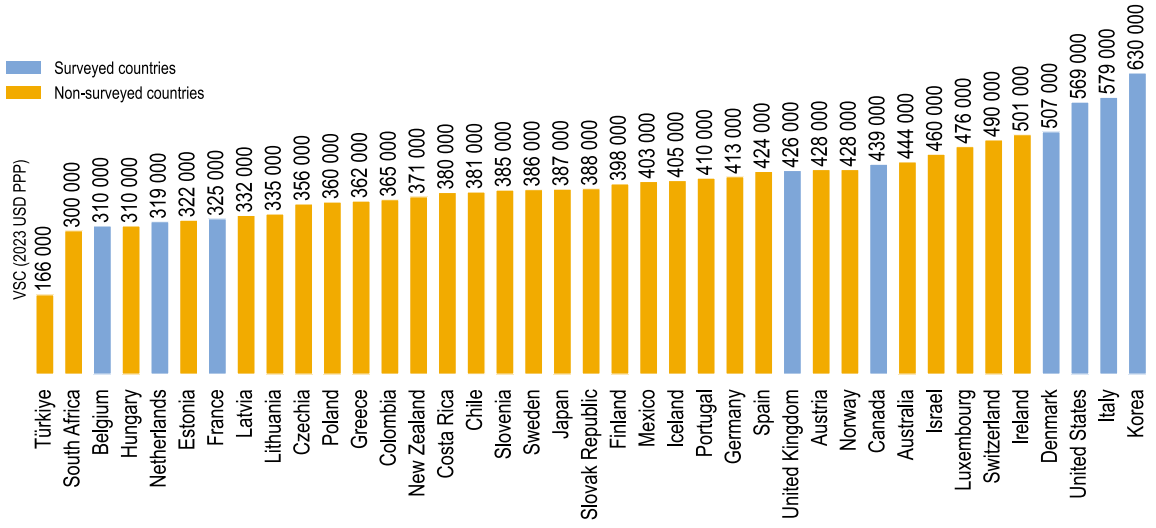
Figure 5.10. Values of a statistical case of very low birth weight by country (USD), for OECD countries and South Africa



Note: The values for the countries shown in orange were estimated through a benefit transfer function, controlling for countries' socio-demographic composition (age, gender, education, and household income). The values for the countries shown in blue are taken from the very low birth weight working paper, converted in this report to USD 2023 PPP, and presented in Figure 2.10 of Chapter 2.
Source: (Ščasný, Zvěřinová and Dussaux, 2023[9]; OECD, 2026[1]).

StatLink https://stat.link/r0cj7b

Figure 5.11. Values of a statistical case of miscarriage by country (USD), for OECD countries and South Africa

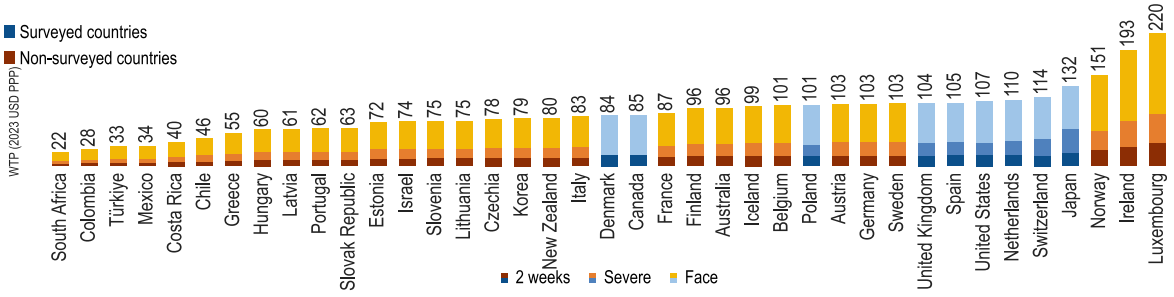


Note: The values for the countries shown in orange were estimated through a benefit transfer function, controlling for countries' socio-demographic composition (age, gender, education, and household income). The values for the countries shown in blue are taken from the miscarriage working paper, converted in this report to USD 2023 PPP, and presented in Figure 2.7 of Chapter 2.
Source: (Dockins et al., 2026[11]; OECD, 2026[1]).

StatLink https://stat.link/0sp412

For skin sensitisation and asthma risk, values for the non-surveyed countries are derived using an income adjustment. Figure 5.12, Figure 5.13, Figure 5.14, and Figure 5.15 display the recommended values.

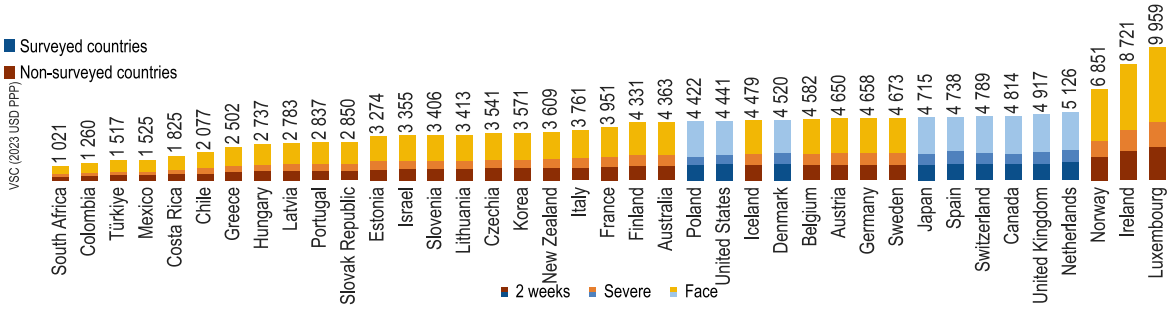
Figure 5.12. Willingness-to-pay estimates over one year to avoid a skin sensitisation case involving a two-week severe flare-up visible on the face for the sensitised sample, by country (USD), for OECD countries and South Africa



Note: the values for the countries shown in orange were estimated through an income-adjusted transfer from the Netherlands. The values for the countries shown in blue are taken from the skin sensitisation working paper and presented in Figure 2.12 of Chapter 2 and in Annex A.
Source: (Contu et al., 2026[3]; OECD, 2026[1]).

StatLink https://stat.link/n5sc74

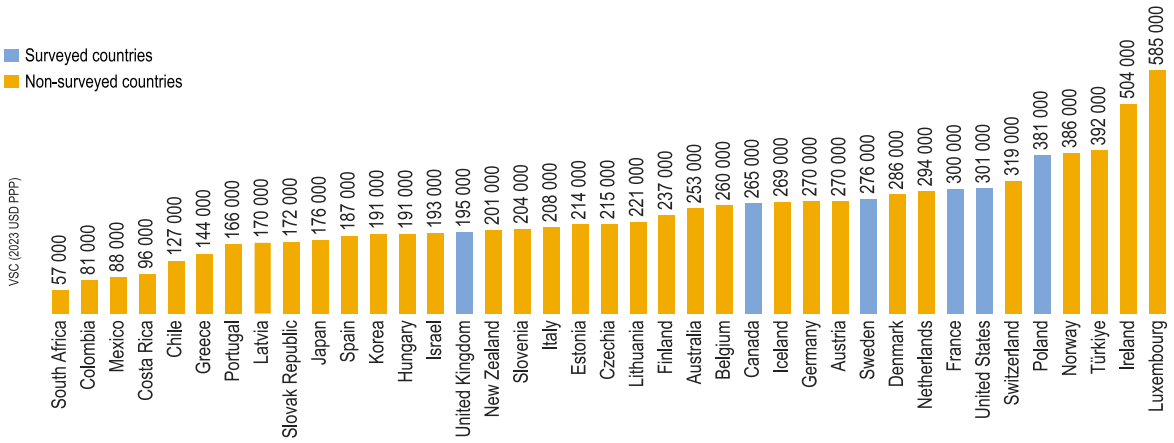
Figure 5.13. Values of a statistical case to avoid a skin sensitisation case involving a two-week severe flare-up visible on the face for the non-sensitised sample, by country (USD), for OECD countries and South Africa



Note: the values for the countries shown in orange were estimated through an income-adjusted transfer from the Netherlands. The values for the countries shown in blue are taken from the skin sensitisation working paper and presented in Figure 2.13 of Chapter 2 and in Annex A.
Source: (Contu et al., 2026[3]; OECD, 2026[1]).

StatLink https://stat.link/4m3zqa

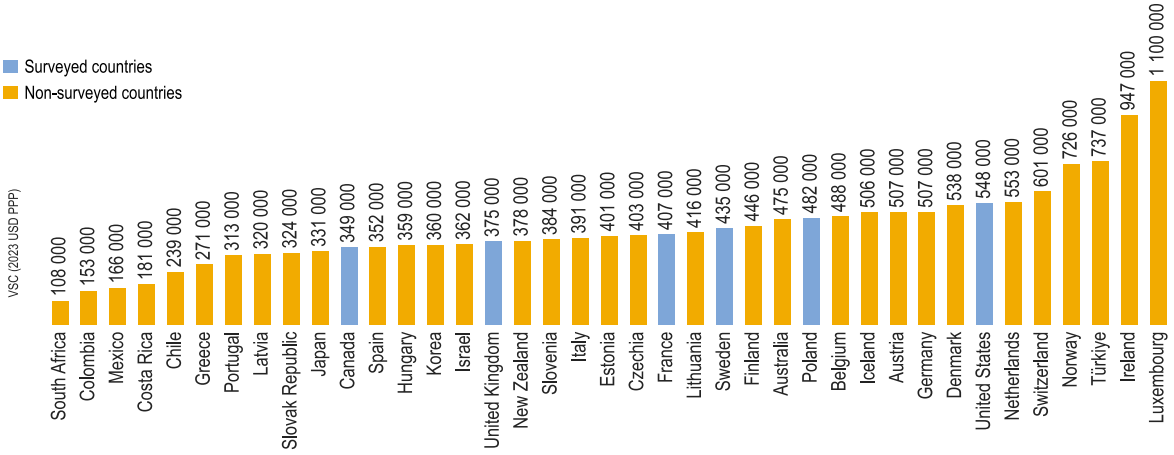
Figure 5.14. Values of a statistical case of adult asthma by country (USD), for OECD countries and South Africa



Note: the values for the countries shown in orange were estimated through an income-adjusted transfer from the United States. The values for the countries shown in blue are taken from the asthma working paper and presented in Figure 2.5 of Chapter 2.
Source: (Appéré et al., 2023[2]; OECD, 2026[1]).

StatLink https://stat.link/wml9t3

Figure 5.15. Values of a statistical case of childhood asthma by country (USD), for OECD countries and South Africa



Note: the values for the countries shown in orange were estimated through an income-adjusted transfer from France. The values for the countries shown in blue are taken from the asthma working paper and presented in Figure 2.5 of Chapter 2.
Source: (Appéré et al., 2023[2]; OECD, 2026[1]).

StatLink https://stat.link/lc6tyw

5.1.2. Recommendations

The recommended values for the ten health effects for all 38 OECD Member countries and South Africa are listed in Annex B. For surveyed countries, recommended values are those directly derived from the surveys. For non-surveyed countries, the recommended values are those obtained through the use of a benefit transfer function.[2] The transfer errors associated with the use of the benefit transfer functions range between 10-35% based on cross-testing benefit transfers among surveyed SWACHE countries (OECD, 2026[1]). Transfer errors of this size are consistent with findings in the literature and align with observed

best-practice values (Kristofersson and Navrud, 2007[12]; OECD, 2012[13]; Kaul et al., 2013[14]; Rosenberger and Loomis, 2017[15]).

Benefit function transfer values show consistent performance, with generally lower dispersion of transfer errors than simple unadjusted values or income-adjusted values. It is therefore recommended to use OECD's estimated benefit functions, in particular for countries where policymakers are not confident about which existing primary estimate could provide the best fit and be directly transferred for use in valuations of benefits in their country.

For more details on the methodology, see (OECD, 2026[1]), which performs an extensive comparative analysis of possible benefit transfer approaches, proposes a recommended methodology for valuations for health risk reductions in non-surveyed OECD countries using the SWACHE data and also offers ranges of the estimated values derived through benefit transfer.

The values derived from the benefit transfer analysis represent a starting point for the valuation of morbidity effects. Adjustment may be appropriate to account for the type of policy or programme considered, as well as for the countries and populations involved, and should also follow national governmental guidelines.

The benefit transfer approaches used in this report can also be applied to non-OECD countries where comparable data are available. However, it is important to note that the benefit-transfer function applied in this report performs best when transferring values between countries that are not vastly different with respect to key socio-economic characteristics, such as household income, gender, age, and education. Alternative approaches, such as unit value transfer or income-adjusted value transfer, may also be considered and are discussed in (OECD, 2026[1]).

5.2. Applying valuations in other contexts

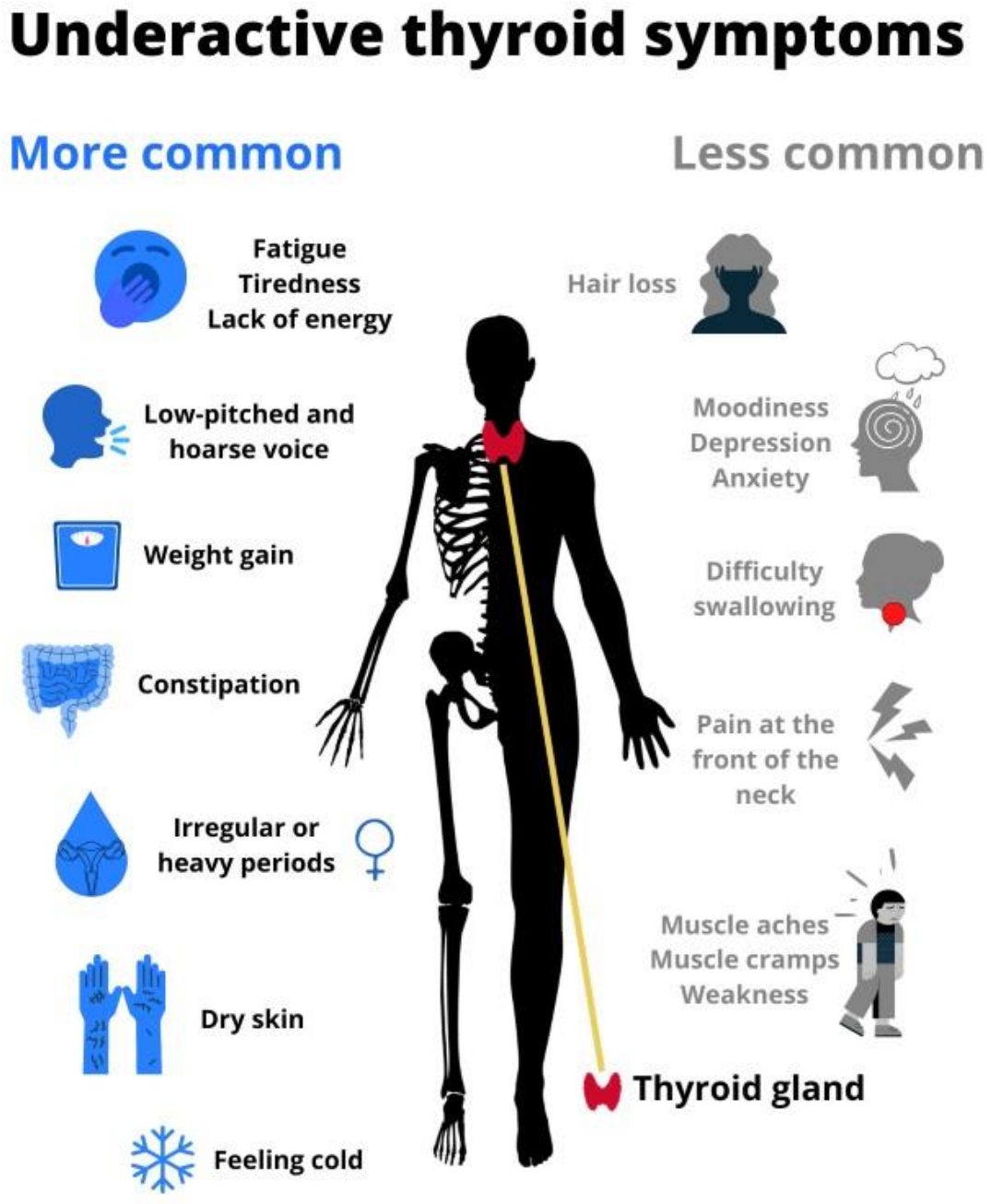
While the estimates provided by the SWACHE project are developed in the context of chemicals exposure, they can also be applied to the economic analysis of other health and environmental policies, provided that the endpoint targeted by the policy matches the endpoint description of the SWACHE project. SWACHE values can thus be applied to a wide range of policies, including air pollution or water regulations, preventive care programmes, or the setting of health and environmental standards.

The payment vehicles used in the studies of the first two rounds of the SWACHE project support the use of values in other policy contexts. All questionnaires describe different causes of the health outcome, with an emphasis on links to chemicals exposure, but the valuation questions themselves focused on the risk of developing or worsening a specific endpoint rather than on a particular regulatory measure.[3] In most surveys, the payment vehicle is framed as paying more for safer products with fewer harmful chemicals, while in two surveys – chronic kidney disease and hypertension – respondents are directly asked how much they would be willing to pay to reduce their risk of developing the disease. In both cases, the resulting WTPs represent the amount respondents are willing to pay to reduce their risk of developing a defined health endpoint, rather than a preference for a specific policy instrument or chemical, which makes it possible to apply these values in other health-related non-chemicals policy domains. Importantly, coercive payment vehicles, such as taxes or mandatory fees, were not used. Instead, when an explicit payment vehicle was specified, the surveys followed guidance to use realistic everyday products that individuals purchase in real-world decisions (OECD, 2018[16]). The choice of the payment vehicles thus ensures credibility to respondents.

The definition of the health outcome and its delimitation are essential when using values from the SWACHE project. For this reason, the choice of the health effect, its careful delimitation, and the definition presented to respondents in the questionnaire, were thoroughly reviewed and discussed within the SWACHE expert group, which includes health professionals, academics, cost-benefit analysis practitioners, and regulators. For example, the underactive thyroid study focuses specifically on hypothyroidism, rather than on other

thyroid disorders. An accurate, clear and informative description of having an underactive thyroid was presented to respondents in the survey. An illustration of common symptoms of an underactive thyroid gland was also presented to respondents, as shown in Figure 5.16.

Figure 5.16. Presentation of underactive thyroid symptoms in the survey



Source: (Ahtiainen et al., 2026[10]).

As a result, the VSC estimates recommended for policy analysis can be used only for policies or measures addressing hypothyroidism and do not apply to other thyroid disorders. In contrast, the study on non-fatal cancer deliberately presents an overview of cancer, without focusing on any specific type or progression of disease. The resulting value can therefore be applied to a wide range of policies, addressing different types of cancer and cancer-related risks as summarised by this extract from the non-fatal cancer survey: "Your answers will be used to measure the benefit of regulations that reduce the risk that people get cancer."

This chapter discussed how benefit transfer approaches can be used to approximate the WTP and VSC in non-surveyed countries based on using a benefit transfer function and values for countries where SWACHE surveys have been performed. The chapter also provided benefit values for the OECD Member countries and South Africa and discussed their use outside of chemical applications, highlighting their potential to be used broadly in cost-benefit analyses that involve comparable health effects.

References

Ahtiainen, H. et al. (2026), "Valuing a reduction in the risk of an underactive thyroid: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 272, OECD Publishing, Paris, https://doi.org/10.1787/4af8f3aa-en. [10]

Appéré, G. et al. (2023), "Valuing a reduction in the risk and severity of asthma: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 218, OECD Publishing, Paris, https://doi.org/10.1787/f289d29e-en. [2]

Contu, D. et al. (2026), "Valuing a reduction in the risk of skin sensitisation: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 277, OECD Publishing, Paris, https://doi.org/10.1787/fc305de9-en. [3]

Dockins, C. et al. (2026), "Valuing a reduction in the risk of miscarriage: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 271, OECD Publishing, Paris, https://doi.org/10.1787/23bb6643-en. [11]

Dockins, C. et al. (2023), "Valuing a reduction in the risk of chronic kidney disease: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 216, OECD Publishing, Paris, https://doi.org/10.1787/9c93138f-en. [4]

Dussaux, D. et al. (2023), "Valuing a reduction in the risk of infertility: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 215, OECD Publishing, Paris, https://doi.org/10.1787/7242509f-en. [5]

Herrera-Araujo, D. et al. (2026), "Valuing a reduction in the risk of non-fatal cancer: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 274, OECD Publishing, Paris, https://doi.org/10.1787/0345660e-en. [6]

Hunt, A. et al. (2026), "Valuing a reduction in the risk of hypertension: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 270, OECD Publishing, Paris, https://doi.org/10.1787/9da8057a-en. [7]

Kaul, S. et al. (2013), "What can we learn from benefit transfer errors? Evidence from 20 years of research on convergent validity", *Journal of Environmental Economics and Management*, Vol. 66/1, pp. 90-104, https://doi.org/10.1016/j.jeem.2013.03.001. [14]

Kristofersson, D. and S. Navrud (2007), "Can use and Non-use Values Be Transferred Across Countries?", in *The Economics of Non-Market Goods and Resources, Environmental Value Transfer: Issues and Methods*, Springer Netherlands, Dordrecht, https://doi.org/10.1007/1-4020-5405-x_11. [12]

Mourato, S. et al. (2023), "Valuing the avoidance of IQ losses in children: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 219, OECD Publishing, Paris, https://doi.org/10.1787/71574eb4-en. [8]

OECD (2026), *Benefit transfer of willingness-to-pay estimates for avoiding negative chemicals-related health effects*, OECD Publishing, Paris, https://doi.org/10.1787/f11379a0-en. [1]

OECD (2018), *Cost-Benefit Analysis and the Environment: Further Developments and Policy Use*, OECD Publishing, Paris, https://doi.org/10.1787/9789264085169-en. [16]

OECD (2012), *Mortality Risk Valuation in Environment, Health and Transport Policies*, OECD Publishing, Paris, https://doi.org/10.1787/9789264130807-en. [13]

Rosenberger, R. and J. Loomis (2017), "Benefit Transfer", in *The Economics of Non-Market Goods and Resources, A Primer on Nonmarket Valuation*, Springer Netherlands, Dordrecht, https://doi.org/10.1007/978-94-007-7104-8_11. [15]

Ščasný, M., I. Zvěřinová and D. Dussaux (2023), "Valuing a reduction in the risk of very low birth weight: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 217, OECD Publishing, Paris, https://doi.org/10.1787/dfd159a1-en. [9]

Notes

[1] As a reminder, the WTP estimates were derived using sampling quotas and post-stratification weights to ensure representativeness of the targeted sample in each surveyed country.

[2] For skin sensitisation and asthma risk an income-adjusted benefit transfer technique was used (OECD, 2026[1]).

[3] The IQ loss survey is the only exception, as the valuation scenario informs respondents that the government could place a ban on harmful chemicals affecting children's IQ, and that such a ban would increase the price of everyday products.

6 Methodological discussion and areas for future research

There are some methodological limitations of the SWACHE project that highlight areas for future research. This chapter discusses some limitations of the approach in the SWACHE project and of the recommended benefit transfer methodologies, as well as potential areas for additional future work.

6.1. Ensuring quality of the valuation studies

As discussed in previous chapters, the Surveys on Willingness-to-pay to Avoid negative Chemicals-related Health Effects (SWACHE) project aims to establish internationally comparable willingness-to-pay (WTP) estimates by conducting stated preference (SP) studies. While SP studies remain the best available tool for capturing respondents' full WTP, some critique remains. The SWACHE project seeks to address methodological concerns where possible. This section presents the safeguards put in place to ensure the quality and robustness of the valuation studies.

Hypothetical bias is often highlighted as a concern for SP studies (OECD, 2018[1]). The SWACHE surveys implemented several measures and corrective adjustments to help minimise this bias, both during the survey design and administration phases and in the ex-post screening of responses. First, the valuation scenario was designed to be credible, neutral and realistic, ensuring that respondents perceived their answers as consequential and likely to influence risk reduction outcomes. Second, throughout the survey, respondents were reminded to consider their choices as they would in real-life situations and to account for the fact that the stated payment would effectively be deducted from their household budget. In debriefing questions, between 87% and 97% of respondents stated that their answers reflected the choices they would make in real life.

The risk of overestimation was also addressed in a series of additional debriefing questions aimed at assessing whether respondents' stated-preference responses should be taken to represent their true preferences. These debriefing questions, based on common issues in all stated preferences surveys, were designed to identify survey rejection (Johnston et al., 2017[2]). Examples of survey rejection include: respondents who considered the proposed products irrelevant; believed the products were "not effective at all"; judged the description inaccurate; reported their knowledge after the survey as "very poor"; expressed doubt about the information provided; consistently refused risk reduction because they felt they should not bear the cost; rejected risk reduction because they did not trust the mechanism; and admitted they did not take their household budget into account when answering. The empirical analysis systematically excluded respondents identified through these debriefing questions, as well as speeders and those who did not demonstrate an understanding of the probability concepts used in the surveys.[1]

Furthermore, the possibility of anchoring bias, i.e. the risk of imposing a bid reference value, was accounted for by carefully calibrating the bid amounts presented to respondents and through the use of double-bounded dichotomous choice and discrete choice experiments. Notably, the survey instruments were peer-reviewed and tested through cognitive interviews, as well as through pre-survey pilots conducted in every country prior to the main field survey. For example, in the miscarriage study, the starting bids for the cost of the risk reduction were informed by responses collected through one-on-one interviews, including open-ended questions about WTP. These findings were used to design the initial pilot studies, which further allowed for readjustment of bid levels prior to the main survey. In the case of the miscarriage study, the pilot bids were adjusted upward due to a predominance of respondents accepting the risk reduction for both dichotomous choice questions. Moreover, bids for the same level of risk reduction were randomly assigned to respondents to reduce anchoring effects and minimise systematic bias.

To mitigate the potential cognitive burden associated with multi-attribute stated-preference methods such as discrete choice experiments, SWACHE surveys were limited to an average duration of 30 minutes, and attribute variation was kept minimal (OECD, 2018[1]). For instance, in the non-fatal cancer survey, the severity and duration of the disease were fixed to not distract respondents from the risk reduction attributes.

6.2. Validity of benefit transfer analysis approaches

The SWACHE project, with its harmonised approach and coverage of numerous countries and health endpoints, provides a unique basis for testing international benefit transfer methods. Nevertheless, some limitations should be considered when interpreting benefit function transfer-based estimates.

Some health endpoint samples (e.g. asthmatic adults, infertility, very low birth weight, miscarriage) were not designed to represent the general population but only a targeted sub-sample, which affects the applicability of BT. Because BT requires combining national statistics with survey data, an adjustment strategy was used to reduce mismatches between samples and official statistics in study sites. Two main issues drive non-representativeness: income was not a quota variable – leading to gaps between sample and official income averages[2] – and some endpoints show unintended over- or under-sampling of people with the relevant condition. For several conditions, prevalence cannot be validated due to missing official statistics. While quotas for gender, region, education, and age improve representativeness, the absence of reliable prevalence data limits full validation of sample representativeness.

For samples representative of the general population, weighted averages and official statistics align closely. For non-representative samples, a readjustment factor – based on the ratio of sample to official values for age, gender, education, and income – was applied to national statistics across study and policy sites. This relies on the assumption that surveyed samples reflect the target population, which cannot be verified. Ideally, external socio-demographic data specific to the target group would be available, which would allow for more precise WTP transfer estimates. However, SWACHE surveys cannot fully control for factors such as health system structure, disease prevalence, or treatment costs, and survey items are not always comparable to official data, especially when the disease prevalence within the sample deviates from that in the general population.

6.3. Valuation of multiple health endpoints

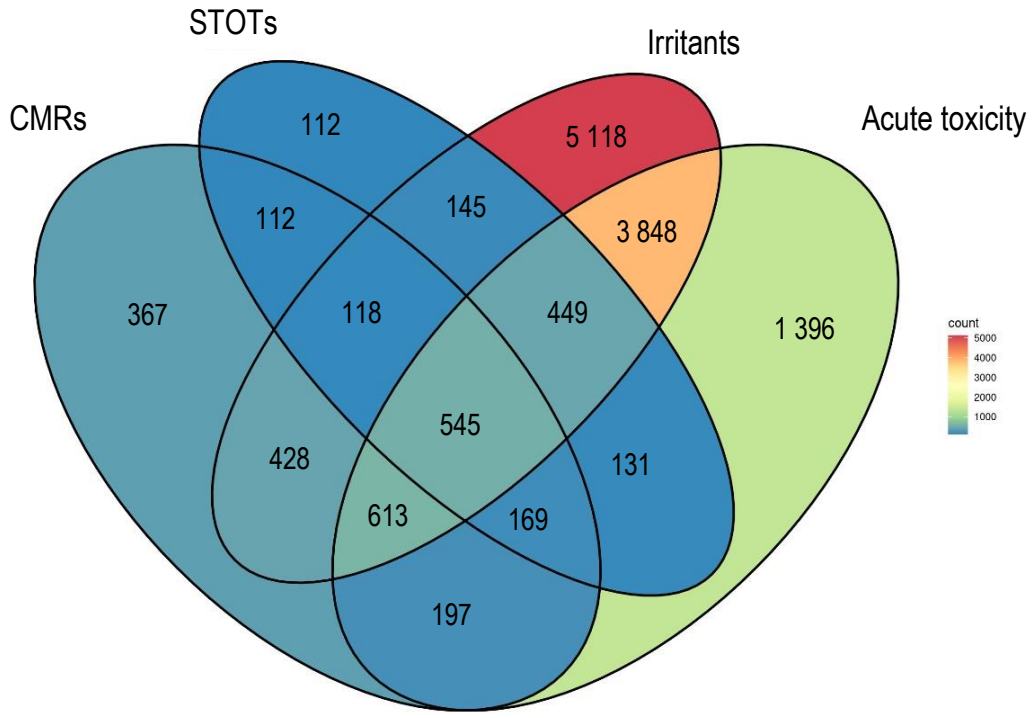
In contexts where a policy affects multiple health endpoints, the aggregation of morbidity values presents methodological challenges. There is a methodological complexity in valuing multiple endpoints that are obtained through separate valuation surveys and that may occur within the same individual. In addition, the valuation and applicability of estimates in cases where the health effect is already pre-existing in the individual is also challenging. This section explores the limitations arising from these issues and highlights potential avenues for future research.

6.3.1. Valuation of multiple health endpoints

A chemical substance or group of chemicals targeted by a chemicals management programme or a policy is often associated with multiple negative health endpoints rather than just one. For example, in the impact assessment from the United Kingdom discussed in Section 4.4 of Chapter 4, it is highlighted that Persistent Organic Pollutants (POPs) are linked to several human health impacts including cancers, birth defects, neurological damage, endocrine disruption and immune system suppression (DEFRA UK, 2025[3]).

The European Union's Classification, Labelling and Packaging of chemicals (CLP) regulation classifies substances that pose risk to human health and many of them fall into multiple hazard categories (European Union, 2025[4]). In a broad classification, hazards are grouped into four classes: (1) Carcinogens, Mutagens, and Reproductive toxins (CMRs), (2) Irritants (eyes, skin, respiratory), (3) Specific Target Organ Toxicity (STOTs), and (4) Acute toxicity. Figure 6.1 illustrates the intersections among these categories. For example, the red area marked "5 118" counts substances classified as irritants only, while the orange area marked "3 848" counts the substances associated with both irritant effects and acute toxicity (adverse effects that occur after a short exposure to a chemical). The light blue area in the centre of the Venn diagram, marked "545", represents substances linked to all four hazard categories confirming that a significant proportion of classified substances have multiple hazards.

Figure 6.1. Classification of substances into four hazard classes



Note: Classification as of June 2025. In a coarse classification, hazards are grouped into four classes: (1) Carcinogens, Mutagens, and Reproductive toxins (CMRs), (2) Irritants (eyes, skin, respiratory), (3) Specific Target Organ Toxicity (STOTs), and (4) Acute toxicity.
Source: Authors' own elaboration.

In view of the numerous ways in which health impacts from chemicals overlap, it is not surprising that providing an accurate economic valuation reflecting this complexity is challenging. The complexity of valuing multiple health endpoints stems from the methodological question of whether the sum of individually attributed values differs statistically from the value placed on the bundle (Garrod and Willis, 1999[5]). The SWACHE surveys are independent valuations that focus on a single endpoint and they do not address the issue of how to consider valuations of chemicals that affect several health endpoints. If the health effects of a policy are independent and affect different individuals, the calculation of total health benefits is straightforward and should reflect the sum of individual health effects attributable to the policy (Robinson, 2019[6]; US EPA, 2024[7]). For instance, in the case of a policy addressing formaldehyde exposure that leads to both childhood asthma and adult cancer cases in Canada, total benefits would reflect the avoided asthma cases in children and the avoided cancer cases in adults.

Complexity arises when multiple health effects may affect the same individual. While it may be possible to combine the SWACHE values for individual health effects, the total value will likely depend on both the probability that the two health effects affect the same individual and the individual's valuation if faced with the prospect of two health impacts. However, information on the probability that the two health effects affect the same individual is often not available. Moreover, as the SWACHE surveys were designed and fielded separately for each endpoint, the project does not directly address these questions.

The total value of an individual's willingness-to-pay, as expressed through a VSC, to avoid two potentially simultaneous health effects is highly likely to fall within a range bounded by the higher of the two VSCs as the lower bound, and the sum of the two VSCs as the upper bound. Empirical evidence indicates that the sum of separately valued endpoints is often higher than the value respondents place on the corresponding overall bundle, which suggests that summing individual health effects is likely to lead to an overestimation

(Travers et al., 2026[8]; Hammerschmidt, Zeitler and Leidl, 2003[9]). For example, VSC estimates for very low birth weight that include respondents who considered co-benefits, such as reduced risk of miscarriage or stillbirth, are approximately 15 % higher than estimates for respondents without these considerations (Ščasný, Zvěřinová and Dussaux, 2023[10]). However, the mean VSC for miscarriage alone is USD 448 000, significantly exceeding the 15% premium suggested from the study on very low birth weight. This indicative comparison suggests that a simple summation of these VSCs may overstate the value respondents place on the combined health outcomes. One explanation is that respondents typically face a maximum budget constraint for health, and the summation of multiple endpoints might exceed this.

Further research could focus on the simultaneous valuation of several health effects assessed in the first two rounds of the SWACHE project, in order to empirically test whether there are differences between the WTP/VSC estimates obtained from isolated valuation and from simultaneous valuation, and, if so, to quantify their magnitude. This could help bring new evidence to the important question of how budget constraints affect stated preferences.

An additional layer of complexity arises from comorbidities associated with certain health conditions. A comorbidity is defined as a distinct medical condition that occurs in addition to a primary diagnosis. SWACHE health endpoint descriptions acknowledge this issue: for example, in the hypertension study, respondents are informed that high blood pressure increases the probability of developing stroke, kidney disease, dementia, and diabetes. A key methodological challenge is therefore to determine which value should be applied when a chemical exposure contributes to both hypertension and associated conditions such as chronic kidney disease, in order to avoid double counting. Careful definition of the scope of the risk assessments is required, with valuation aligned to the selected health endpoint and the underlying causal pathway, so as to prevent double counting across correlated health outcomes (OECD, 2018[11]). The VSC involving two health effects occurring simultaneously is also likely to lie between the higher VSC of the two health effects and the sum of the two VSCs, with the associated uncertainty represented by the question mark in Figure 6.2.

Figure 6.2. Valuation of comorbidity



Source: Authors' own elaboration.

6.3.2. Valuation of pre-existing conditions

In contexts where the health conditions valued in the SWACHE project are already present in individuals, the direct applicability of the SWACHE values is uncertain, given that the first two rounds of the project primarily assessed values for avoiding the development of health effects, with the exception of the asthma and skin sensitisation studies, which also elicited values for reductions in condition worsening. In the surveys, the valuation scenario typically asked respondents their WTP to reduce their risk of developing the disease, irrespective of whether they already had the condition. Additionally, in the chronic kidney

disease, underactive thyroid and non-fatal cancer surveys, respondents diagnosed with the endpoint were excluded from the final sample.

To improve the applicability and accuracy of the survey results, one potential area of future work could include developing approaches for adapting valuation results to account for pre-existing conditions. The key methodological challenge is to derive, from the mean VSC to avoid a disease, an appropriate mean VSC to avoid the worsening of, or to reduce, an existing disease. For each endpoint covered in the SWACHE project, it may be useful to examine in further detail the survey responses concerning disease experience. This analysis could potentially help improve the understanding of how values change depending on an individual's experience of the disease.

6.3.3. Guidance

When facing the possibility of occurrence of multiple health effects within the same individual, it is recommended to consider the two approaches described earlier – the straight-addition approach and the highest-value approach. Recent empirical research on the valuation of multiple health effects, together with recommendations by the US Environmental Protection Agency, suggest that the risk of overestimation from aggregating values is lower when baseline risks for the health effects considered are small, and that WTP is approximately additive across endpoints for small risk changes (Travers et al., 2026[8]; US EPA, 2024[7]). In line with these findings and recommendations, summing values may be appropriate when baseline risks and risk reductions for the health effects considered are relatively low and when the health effects are uncorrelated. However, careful consideration is still required to avoid potential double counting and overlap.

6.4. Methodological challenges linked to distributional outcomes

Finally, this section addresses the methodological challenges related to distributional outcomes in cost-benefit analyses (CBAs). In the SWACHE project, WTP estimates are derived from samples that are representative of the general population in terms of age, gender, education and geographical areas.[3] However, exposure to harmful chemicals and environmental degradation disproportionately affects low-income communities, which are also more likely to suffer from existing comorbidities (OECD, 2024[12]; Navas, D'Alisa and Martínez-Alier, 2022[13]; Drupp et al., 2025[14]). Consequently, the health improvements resulting from policy interventions may be greater for socio-economically disadvantaged groups. Similarly, the value of health improvements occurring to disadvantaged groups may be larger than suggested by standard CBA (Adler, 2016[15]).

As discussed in Chapter 3, WTP values for reduced risk of developing health effects increase with income. This can create a mismatch between WTP values estimated for the general population and the economic benefits that primarily accrue to a specific subgroup. If ignored, this mismatch could lead to a mis-estimation of the economic benefits of a policy intervention. Importantly, it should be noted that adjusting WTP values according to income requires careful consideration as it may raise ethical questions.

An area for future research is a comparative analysis of how differences in policy effects and WTP influence total estimated benefits. For example, this could include a comparison of the estimated benefits of reducing chemicals exposure in a country, region, city, sector with and without taking these differences into account. Weighted cost-benefit analysis is a possible approach for addressing distributional concerns and represents an important avenue for further research (Herrera-Araujo and Kostoupoulou, 2025[16]).

This report has presented a summary of OECD's valuation work for ten health effects related to exposure to chemicals. The report also highlights how these values can be used in practice for assessing the economic benefits of policies, how the values can be used in non-surveyed countries and their applicability to non-chemicals related health outcomes that are also present in the SWACHE valuations. Finally, this

chapter highlighted areas of methodological limitations and areas of future research. Despite the opportunities for further improvements discussed in this chapter, it should be noted that the SWACHE work represents the only known series of studies that conduct valuations for comparable health effects using consistent valuation methodologies across a large number of countries. As such, they represent the most comprehensive valuation work on chemicals-related health effects conducted to date.

References

Adler, M. (2016), "Benefit–Cost Analysis and Distributional Weights: An Overview", *Review of Environmental Economics and Policy*, Vol. 10/2, pp. 264-285, https://doi.org/10.1093/reep/rew005. [15]

DEFRA UK (2025), *Title: 2025 Amendments to the Persistent Organic Pollutants Regulations, Annexes I, IV and V, covering two Statutory Instruments*. [3]

Drupp, M. et al. (2025), "The Economics of Inequality and the Environment", *Journal of Economic Literature*, Vol. 63/3, pp. 840-874, https://doi.org/10.1257/jel.20241696. [14]

European Union (2025), *Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)*, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32006R1907. [4]

Garrod, G. and K. Willis (1999), *Economic Valuation of the Environment: Methods and Case Studies*. [5]

Hammerschmidt, T., H. Zeitler and R. Leidl (2003), "A utility-theoretic approach to the aggregation of willingness to pay measured in decomposed scenarios: development and empirical test", *Health Economics*, Vol. 13/4, pp. 345-361, https://doi.org/10.1002/hec.835. [9]

Herrera-Araujo, D. and M. Kostoupoulou (2025), *Distributional Considerations in Policy Evaluation*, https://valesor.eu/download/18.9ea4e0e19c47c9d0a82b0ce/1771840197955/Distributional-Considerations-in-Policy-Evaluation.pdf. [16]

Johnston, R. et al. (2017), "Contemporary guidance for stated preference studies", *Journal of the Association of Environmental and Resource Economists*, Vol. 4/2, pp. 319-405. [2]

Navas, G., G. D'Alisa and J. Martínez-Alier (2022), "The role of working-class communities and the slow violence of toxic pollution in environmental health conflicts: A global perspective", *Global Environmental Change*, Vol. 73, p. 102474, https://doi.org/10.1016/j.gloenvcha.2022.102474. [13]

OECD (2024), *Environmental Justice: Context, Challenges and National Approaches*, OECD Publishing, Paris, https://doi.org/10.1787/57616eb4-en. [12]

OECD (2018), *Considerations for Assessing the Risks of Combined Exposure to Multiple Chemicals*, OECD Series on Testing and Assessment, No. 296, OECD Publishing, Paris, https://doi.org/10.1787/ceca15a9-en. [11]

OECD (2018), *Cost-Benefit Analysis and the Environment: Further Developments and Policy Use*, OECD Publishing, Paris, https://doi.org/10.1787/9789264085169-en. [1]

Robinson, L. (2019), *Reference Case Guidelines for Benefit-Cost Analysis in Global Health and Development*. [6]

Ščasný, M., I. Zvěřinová and D. Dussaux (2023), "Valuing a reduction in the risk of very low birth weight: A large scale multi-country stated preference approach"*, OECD Environment Working Papers*, No. 217, OECD Publishing, Paris, https://doi.org/10.1787/dfd159a1-en. [10]

Travers, M. et al. (2026), *Policy brief on the WTP to reduce risks arising from a multi-exposure on key VALESOR health endpoints*, https://valesor.eu/download/18.9ea4e0e19c47c9d0a82b0d0/1771840198643/WTP-to-reduce-risks-arising-from-a-multi-exposure-on-key-VALESOR-health-endpoints.pdf. [8]

US EPA (2024), *Guidelines for Preparing Economic Analyses (3rd edition)*, United States Environmental Protection Agency, https://www.epa.gov/environmental-economics/guidelines-preparing-economic-analyses-3rd-edition. [7]

Notes

[1] The survey instruments included a probability quiz.

[2] An overrepresentation of higher income respondents could lead to an overestimation of the WTP, conversely, an underrepresentation could potentially lead to an underestimation of the WTP. In several countries covered by the chronic kidney disease, IQ loss, miscarriage and underactive thyroid surveys, higher-income respondents were overrepresented, whereas in certain countries in the miscarriage survey they were underrepresented. Please refer to the respective working papers for more details.

[3] Refer to Table 5.1 of Chapter 5 for details on the targeted sample of the study site for each survey.

Annex A. Recommended values for policy analysis from the surveys and their confidence intervals

This Annex presents the recommended values for policy analysis derived from the surveys in 2023 USD PPP and 2023 local currency, and also reports their confidence intervals. While confidence intervals are provided for information purposes, the central values presented below are the recommended values for policy analysis.

Table A.1. Values of a statistical case of hypertension by country (USD and local currency)

Values are expressed in 2023 USD PPP and 2023 local currency

Country	2023 USD PPP	2023 Local currency
Austria	45 000	EUR 33 000
Belgium	35 000	EUR 26 000
Canada	56 000	CAD 66 000
Finland	44 000	EUR 35 000
Greece	85 000	EUR 45 000
Japan	29 000	JPY 2 720 000
Portugal	74 000	EUR 40 000
Slovenia	48 000	EUR 27 000
United Kingdom	40 000	GBP 28 000
United States	74 000	USD 74 000

Source: (Hunt et al., 2026[1])

Table A.2. Values of a statistical case of hypertension with their confidence intervals (USD)

Values are expressed in 2023 USD PPP

Country	Lower	Mean	Upper
Austria	44 593	45 055	45 516
Belgium	34 525	34 811	35 096
Canada	55 686	56 092	56 498
Finland	43 726	44 144	44 563
Greece	84 706	85 447	86 188
Japan	28 538	28 931	29 325
Portugal	73 864	74 421	74 978
Slovenia	47 659	48 053	48 447
United Kingdom	39 327	39 641	39 955
United States	73 587	74 191	74 796

Note: Confidence intervals were computed using the following formula: $mean(VSC) \pm t_{0.975} * sd/\sqrt{N}$, with $t_{0.975}$ being the t-critical value for a 95% confidence interval, sd is the standard deviation of the VSC in the sample, and N the number of respondents in the analysis.
Source: (Hunt et al., 2026[1])

Table A.3. Values of a statistical case of infertility by country (USD and local currency)

Values are expressed in 2023 USD PPP and 2023 local currency

Country	2023 USD PPP	2023 Local currency
Australia	100 000	AUD 143 000
Canada	102 000	CAD 120 000
Chile	107 000	CLP 45 296 000
Germany	89 000	EUR 60 000
Japan	72 000	JPY 6 803 000
Poland	85 000	PLN 153 000
Portugal	122 000	EUR 65 000
Sweden	102 000	SEK 888 000
United Kingdom	80 000	GBP 57 000
United States	105 000	USD 105 000

Note: values have been updated and converted to 2023 USD PPP and 2023 local currency.
Source: (Dussaux et al., 2023[2])

Table A.4. Values of a statistical case of infertility with their confidence intervals (USD)

Values are expressed in 2023 USD PPP

Country	Lower	Mean	Upper
Australia	99 087	100 435	101 715
Canada	100 377	101 867	103 246
Chile	105 469	106 911	108 435
Germany	87 539	88 576	89 579
Japan	71 448	72 352	73 225
Poland	84 157	85 251	86 301
Portugal	120 230	121 839	123 532
Sweden	100 978	102 299	103 568
United Kingdom	78 735	79 669	80 630
United States	103 480	104 930	106 300

Note: Confidence intervals were computed using the following formula: $mean(VSC) \pm t_{0.975} * sd/\sqrt{N}$, with $t_{0.975}$ being the t-critical value for a 95% confidence interval, sd is the standard deviation of the VSC in the sample, and N the number of respondents in the analysis.
Source: (Dussaux et al., 2023[2])

Table A.5. Values of a statistical case of underactive thyroid by country (USD and local currency)

Values are expressed in 2023 USD PPP and in 2023 local currency

Country	USD 2023 PPP	2023 Local currency
Austria	212 000	EUR 156 000
Canada	149 000	CAD 175 000
Denmark	135 000	DKK 897 000
Estonia	313 000	EUR 183 000
Finland	191 000	EUR 152 000
Greece	236 000	EUR 124 000
Japan	76 000	JPY 7 146 000
Netherlands	212 000	EUR 161 000
Poland	209 000	PLN 375 000
Portugal	276 000	EUR 147 000
United Kingdom	141 000	GBP 101 000
United States	159 000	USD 159 000

Source: (Ahtiainen et al., 2026[3])

Table A.6. Values of a statistical case of underactive thyroid with their confidence intervals (USD)

Values are expressed in 2023 USD PPP

Country	Lower	Mean	Upper
Austria	195 000	212 000	228 000
Canada	136 000	149 000	161 000
Denmark	123 000	135 000	147 000
Estonia	293 000	313 000	333 000
Finland	176 000	191 000	205 000
Greece	218 000	236 000	255 000
Japan	68 000	76 000	84 000
Netherlands	197 000	212 000	228 000
Poland	194 000	209 000	226 000
Portugal	257 000	276 000	294 000
United Kingdom	129 000	141 000	154 000
United States	146 000	159 000	173 000

Note: Confidence intervals were computed using a bootstrap procedure
Source: (Ahtiainen et al., 2026[3])

Table A.7. Values of a statistical case of asthma by country (USD and local currency)

Values are expressed in 2023 USD PPP and in 2023 local currency

Country	Adult asthma		Childhood asthma	
	2023 USD PPP	2023 Local currency	2023 USD PPP	2023 Local currency
Canada	265 000	CAD 311 000	349 000	CAD 409 000
France	300 000	EUR 200 000	407 000	EUR 271 000
Poland	381 000	PLN 683 000	482 000	PLN 865 000
Sweden	276 000	SEK 2 395 000	435 000	SEK 3 779 000
United Kingdom	195 000	GBP 140 000	375 000	GBP 269 000
United States	301 000	USD 301 000	548 000	USD 548 000

Note: values have been discounted, updated and converted to 2023 USD PPP and 2023 local currency.
Source: (Appéré et al., 2023[4])

Table A.8. Values of a statistical case of asthma with their confidence intervals (USD)

Values are expressed in 2023 USD PPP

Country	Adult asthma			Childhood asthma		
	Lower	Mean	Upper	Lower	Mean	Upper
Canada	234 272	265 353	296 433	243 123	348 803	454 483
France	261 838	299 632	337 427	311 925	406 827	501 729
Poland	342 364	380 895	419 427	382 978	481 816	580 654
Sweden	244 034	275 969	307 903	333 960	435 486	537 012
United Kingdom	170 822	195 251	219 681	277 122	375 220	473 317
United States	265 413	300 586	335 759	340 630	548 485	756 341

Note: values have been discounted, updated and converted to 2023 USD PPP. Confidence intervals were computed using the following formula: $mean(VSC) \pm t_{0.975} * sd/\sqrt{N}$, with $t_{0.975}$ being the t-critical value for a 95% confidence interval, sd is the standard deviation of the VSC in the sample, and N the number of respondents in the analysis.
Source: (Appéré et al., 2023[4])

Table A.9. Willingness-to-pay values over one year for one step reduction in asthma by country (USD and local currency)

Country	Adult asthma		Childhood asthma	
	2023 USD PPP	2023 Local currency	2023 USD PPP	2023 Local currency
Canada	500	CAD 580	970	CAD 1 140
Czechia	870	CZK 10 750	1 370	CZK 16 950
France	570	EUR 380	1 020	EUR 680
Poland	750	PLN 1 340	1 330	PLN 2 390
Sweden	560	SEK 4 900	910	SEK 7 860
United Kingdom	520	GBP 370	860	GBP 620
United States	610	USD 610	1 370	USD 1 370

Note: values have been updated and converted to 2023 USD PPP and 2023 local currency.
Source: (Appéré et al., 2023[4])

Table A.10. Willingness-to-pay values over one year for one step reduction in asthma with their confidence intervals (USD)

Values are expressed in 2023 USD PPP

Country	Adult asthma			Childhood asthma		
	Lower	Mean	Upper	Lower	Mean	Upper
Canada	478	496	515	928	973	1 017
Czechia	847	870	893	1 325	1 372	1 419
France	554	575	596	957	1 018	1 079
Poland	723	746	770	1 289	1 334	1 378
Sweden	547	564	581	850	906	962
United Kingdom	499	517	535	827	863	900
United States	593	611	630	1 335	1 372	1 408

Note: values have been converted to 2023 USD PPP. Confidence intervals were computed using the following formula: $mean(WTP) \pm t_{0.975} * sd/\sqrt{N}$, with $t_{0.975}$ being the t-critical value for a 95% confidence interval, sd is the standard deviation of the WTP in the sample, and N the number of respondents in the analysis.
Source: (Appéré et al., 2023[4])

Table A.11. Values of a statistical case of miscarriage by country (USD and local currency)

Values are expressed in 2023 USD PPP and in 2023 local currency

Country	2023 USD PPP	Local currency
Belgium	310 000	EUR 229 000
Canada	439 000	CAD 514 000
Denmark	507 000	DKK 3 370 000
France	325 000	EUR 217 000
Italy	579 000	EUR 358 000
Korea	630 000	KRW 539 531 000
Netherlands	319 000	EUR 242 000
United Kingdom	426 000	GBP 305 000
United States	569 000	USD 569 000

Note: Values for a statistical case of miscarriage come from a pooled econometric model for all countries except the Netherlands and Korea, where a country-specific model performed better. Please refer to the working paper for further details.
Source: (Dockins et al., 2026[5])

Table A.12. Values of a statistical case of miscarriage with their confidence intervals (USD)

Values are expressed in 2023 USD PPP

Country	Lower	Mean	Upper
Belgium	303 952	310 366	316 780
Canada	430 344	438 747	447 150
Denmark	497 254	507 395	517 535
France	318 965	325 235	331 505
Italy	567 140	579 055	590 971
Korea	620 982	630 246	639 510
Netherlands	313 983	318 876	323 768
United Kingdom	418 002	426 036	434 070
United States	558 510	569 018	579 526

Note: Values for a statistical case of miscarriage come from a pooled econometric model for all countries except the Netherlands and Korea, where a country-specific model performed better. Please refer to the working paper for further details. Confidence intervals were computed using the following formula: $mean(VSC) \pm t_{0.975} * sd/\sqrt{N}$, with $t_{0.975}$ being the t-critical value for a 95% confidence interval, sd is the standard deviation of the VSC in the sample, and N the number of respondents in the analysis.
Source: (Dockins et al., 2026[5])

Table A.13. Values of a statistical case of chronic kidney disease by country (USD and local currency)

Values are expressed in 2023 USD PPP and in 2023 local currency

Country	2023 USD PPP	Local currency
Canada	819 000	CAD 960 000
Chile	1 180 000	CLP 499 919 000
Denmark	869 000	DKK 5 769 000
Germany	895 000	EUR 611 000
Italy	1 316 000	EUR 813 000
Norway	917 000	NOK 8 815 000
Türkiye	940 000	TRY 5 721 000
United Kingdom	671 000	GBP 448 000
United States	737 000	USD 737 000

Note: values have been converted to 2023 USD PPP and to 2023 local currency.
Source: (Dockins et al., 2023[6])

Table A.14. Values of a statistical case of chronic kidney disease with their confidence intervals (USD)

Values are expressed in 2023 USD PPP

Country	Lower	Mean	Upper
Canada	809 781	818 828	827 754
Chile	1 165 682	1 179 956	1 194 131
Denmark	859 069	868 768	878 819
Germany	886 267	895 455	904 806
Italy	1 300 692	1 316 343	1 332 005
Norway	907 125	916 605	926 195
Türkiye	922 506	939 943	958 936
United Kingdom	664 386	671 106	677 844
United States	728 980	737 096	745 086

Note: values have been converted to 2023 USD PPP.
Source: (Dockins et al., 2023[6])

Table A.15. Values of a statistical case of non-fatal cancer by country (USD and local currency)

Values are expressed in 2023 USD PPP and in 2023 local currency

Country	2023 USD PPP	2023 Local currency
Canada	1 212 000	CAD 1 421 000
Denmark	870 000	DKK 5 778 000
Estonia	577 000	EUR 338 000
Japan	754 000	JPY 70 886 000
Mexico	559 000	MXN 5 212 000
Norway	697 000	NOK 6 698 000
Slovenia	699 000	EUR 394 000
Spain	1 049 000	EUR 615 000
United Kingdom	1 146 000	GBP 820 000
United States	1 266 000	USD 1 266 000

Note: values have been converted to 2023 USD PPP and 2023 local currency.
Source: (Herrera-Araujo et al., 2026[7])

Table A.16. Values of a statistical case of non-fatal cancer by country and their confidence intervals (USD)

Values are expressed in 2023 USD PPP

Country	Lower	Mean	Upper
Canada	979 789	1 212 041	1 444 293
Denmark	674 943	870 047	1 065 151
Estonia	433 118	576 796	720 474
Japan	510 615	753 873	997 131
Mexico	349 129	559 074	769 019
Norway	539 070	696 515	853 960
Slovenia	519 211	698 625	878 039
Spain	772 102	1 049 005	1 325 908
United Kingdom	932 241	1 146 153	1 360 065
United States	1 030 488	1 266 496	1 502 504

Note: Confidence intervals were computed using the following formula: $mean(VSC) \pm t_{0.975} * sd/\sqrt{N}$, with $t_{0.975}$ being the t-critical value for a 95% confidence interval, sd is the standard deviation of the VSC in the sample, and N the number of respondents in the analysis.
Source: (Herrera-Araujo et al., 2026[7])

Table A.17. Values of a statistical case of very low birth weight by country (USD and local currency)

Values are expressed in 2023 USD PPP and in 2023 local currency

Country	2023 USD PPP	Local currency
Canada	990 000	CAD 1 161 000
Czechia	1 212 000	CZK 14 973 000
Italy	2 086 000	EUR 1 289 000
Mexico	1 635 000	MXN 15 247 000
Netherlands	1 136 000	EUR 864 000
Switzerland	1 342 000	CHF 1 496 000
Türkiye	572 000	TRY 3 481 000
United Kingdom	898 000	GBP 642 000
United States	1 447 000	USD 1 447 000

Source: (Ščasný, Zvěřinová and Dussaux, 2023[8])

Table A.18. Values of a statistical case of very low birth weight with their confidence intervals (USD)

Values are expressed in 2023 USD PPP

Country	Lower	Mean	Upper
Canada	984 174	989 655	995 136
Czechia	1 205 027	1 211 708	1 218 389
Italy	2 073 972	2 085 819	2 097 667
Mexico	1 625 704	1 635 326	1 644 948
Netherlands	1 129 749	1 136 345	1 142 941
Switzerland	1 334 443	1 342 056	1 349 669
Türkiye	568 226	571 868	575 511
United Kingdom	892 681	897 586	902 490
United States	1 438 281	1 446 768	1 455 256

Note: Confidence intervals were computed using the following formula: $mean(VSC) \pm t_{0.975} * sd/\sqrt{N}$, with $t_{0.975}$ being the t-critical value for a 95% confidence interval, sd is the standard deviation of the VSC in the sample, and N the number of respondents in the analysis.
Source: (Ščasný, Zvěřinová and Dussaux, 2023[8])

Table A.19. Willingness-to-pay values over one year to avoid 1 IQ point loss by country (USD and local currency)

Values are expressed in 2023 USD PPP and in 2023 local currency

Country	2023 USD PPP	Local currency
Australia	419	AUD 598
Canada	1 010	CAD 1 184
Denmark	619	DKK 4 112
Korea	830	KRW 710 678
Netherlands	749	EUR 569
Poland	988	PLN 1 773
Portugal	595	EUR 317
South Africa	383	ZAR 2 800
Sweden	684	SEK 5 938
United Kingdom	365	GBP 261
United States	686	USD 686

Note: values have been converted to 2023 USD PPP and to 2023 local currency.
Source: (Mourato et al., 2023[9])

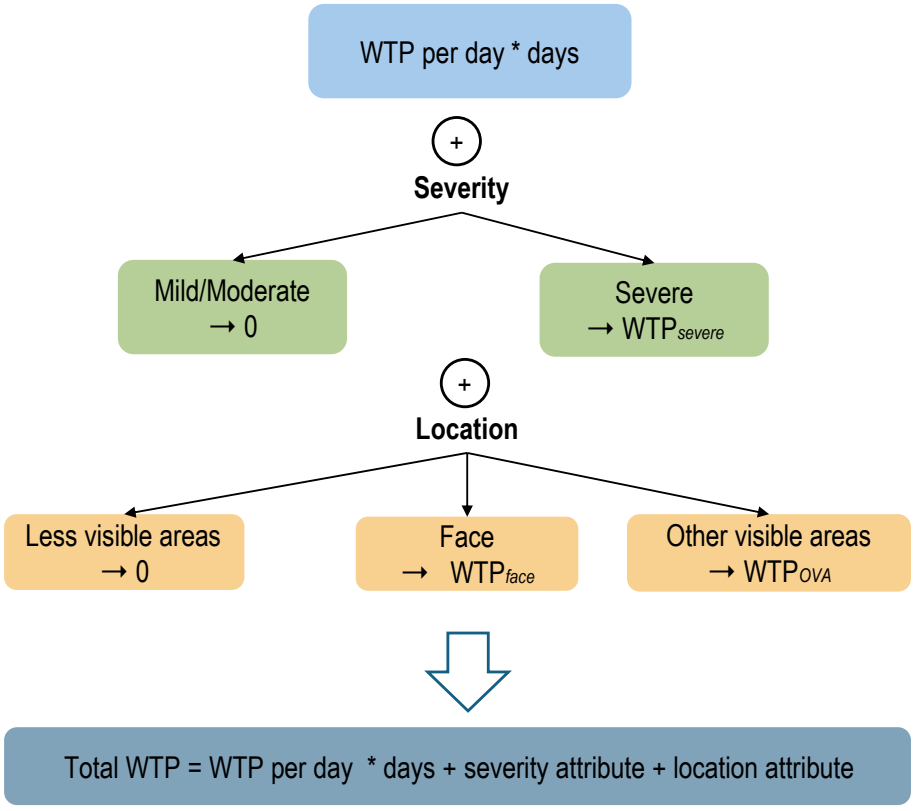
Table A.20. Willingness-to-pay values over one year to avoid 1 IQ point loss with their confidence intervals (USD)

Values are expressed in 2023 USD PPP

Country	Lower	Mean	Upper
Australia	411	419	427
Canada	991	1 010	1 029
Denmark	608	619	630
Korea	817	830	844
Netherlands	736	749	761
Poland	972	988	1 004
Portugal	585	595	606
South Africa	376	383	390
Sweden	672	684	697
United Kingdom	359	365	372
United States	675	686	698

Note: Confidence intervals were computed using the following formula: $mean(WTP) \pm t_{0.975} * sd/\sqrt{N}$, with $t_{0.975}$ being the t-critical value for a 95% confidence interval, sd is the standard deviation of the WTP in the sample, and N the number of respondents in the analysis.
Source: (Mourato et al., 2023[9])

Figure A.1. Scenario-specific estimates for skin sensitisation



Note: Scenario-specific estimates are constructed by aggregating attribute-level WTP/VSC estimates. For the sensitised sample, WTP estimates should be used, whereas for the non-sensitised sample, VSC estimates should be applied. The WTP/VSC to avoid one additional day of flare-up is multiplied by the total number of days considered. The severity and location attributes are added once per scenario. For scenarios with mild or moderate severity, no additional WTP/VSC is applied. Likewise, no additional WTP/VSC is added when the affected areas are less visible. The attribute-level WTP/VSC estimates – including the WTP/VSC to avoid one additional day of flare-up, the WTP/VSC to avoid a severe case, the WTP/VSC to avoid a case visible on the face, and the WTP/VSC to avoid a case affecting other visible areas – are reported below for the sensitised and non-sensitised samples across the nine surveyed countries.
Source: Authors' own elaboration based on (Contu et al., 2026[10])

Table A.21. Willingness to pay estimates over one year to avoid skin sensitisation attribute among the sensitised sample by country (USD and local currency)

Values are expressed in 2023 USD PPP and in 2023 local currency

Country	WTP to avoid one extra day of flare-up		Severity attribute		Visible on the face attribute		Visible in other areas attribute	
	USD PPP	Local currency	USD PPP	Local currency	USD PPP	Local currency	USD PPP	Local currency
Canada	1.4	1.6	0	0	66.3	77.8	16.6	19.4
Denmark	1.3	8.8	0	0	65.1	432.5	16.6	110.1
Japan	1.6	150.1	40.1	3768.1	69.5	6538.9	16.4	1545.3
Netherlands	1.3	1	24.0	18.2	67.1	51.0	16.5	12.6
Poland	1.2	2.2	19.0	34.0	64.6	115.9	16.6	29.7
Spain	1.3	0.7	23.2	13.6	64.3	37.7	16.7	9.8
Switzerland	1.2	1.4	28.8	32.1	67.5	75.2	16.6	18.5
United Kingdom	1.3	0.9	20.4	14.6	66.3	47.4	16.6	11.9
United States	1.3	1.3	20.5	20.5	69.3	69.3	16.5	16.5

Source: (Contu et al., 2026[10])

Table A.22. Willingness to pay estimates over one year to avoid skin sensitisation attribute among the sensitised sample by country with their confidence intervals (USD)

Values are expressed in 2023 USD PPP

Country	WTP to avoid one extra day of flare-up			Severity attribute			Visible on the face attribute			Visible in other areas attribute		
	Lower	Mean	Upper	Lower	Mean	Upper	Lower	Mean	Upper	Lower	Mean	Upper
Canada	1.0	1.4	1.7	0	0	0	61.7	66.3	71.0	16.5	16.6	16.7
Denmark	1.0	1.3	1.6	0	0	0	60.5	65.1	69.7	16.5	16.6	16.7
Japan	1.3	1.6	1.9	26.8	40.1	53.4	64.5	69.5	74.6	16.3	16.4	16.5
Netherlands	1.1	1.3	1.6	15.2	24.0	32.8	62.8	67.1	71.5	16.4	16.5	16.6
Poland	0.9	1.2	1.6	8.0	19.0	29.9	59.7	64.6	69.5	16.5	16.6	16.7
Spain	1.0	1.3	1.6	12.2	23.2	34.3	59.5	64.3	69.2	16.6	16.7	16.8
Switzerland	0.9	1.2	1.5	17.3	28.8	40.2	63.4	67.5	71.7	16.5	16.6	16.7
United Kingdom	1.0	1.3	1.7	9.2	20.4	31.7	61.2	66.3	71.4	16.5	16.6	16.7
United States	1.0	1.3	1.6	7.8	20.5	33.2	64.7	69.3	74.0	16.4	16.5	16.6

Note: Confidence intervals were computed using the following formula: $mean(WTP) \pm t_{0.975} * sd/\sqrt{N}$, with $t_{0.975}$ being the t-critical value for a 95% confidence interval, sd is the standard deviation of the WTP in the sample, and N the number of respondents in the analysis.
Source: (Contu et al., 2026[10])

Table A.23. Values of a statistical case of skin sensitisation attribute among the non-sensitised sample by country (USD and local currency)

Values are expressed in 2023 USD PPP and in 2023 local currency

Country	VSC to avoid one extra day of flare-up		Severity attribute		Visible on the face attribute		Visible in other areas attribute	
	USD PPP	Local currency	USD PPP	Local currency	USD PPP	Local currency	USD PPP	Local currency
Canada	89	105	729	855	2 832	3 321	1 604	1 881
Denmark	89	589	847	5 625	2 430	16 140	1 599	10 621
Japan	86	8 092	774	72 798	2 736	257 244	1 615	151 811
Netherlands	101	77	920	699	2 789	2 120	1 629	1 238
Poland	82	147	577	1 035	2 700	4 844	1 587	2 848
Spain	91	53	928	544	2 536	1 486	1 552	909
Switzerland	89	99	815	908	2 725	3 037	1 547	1 725
United Kingdom	91	65	859	615	2 784	1 992	1 660	1 188
United States	88	88	686	686	2 529	2 529	1 646	1 646

Source: (Contu et al., 2026[10])

Table A.24. Values of a statistical case of skin sensitisation attribute among the non-sensitised sample by country with their confidence intervals (USD)

Values are expressed in 2023 USD PPP

Country	VSC to avoid one extra day of flare-up			Severity attribute			Visible on the face attribute			Visible in other areas attribute		
	Lower	Mean	Upper	Lower	Mean	Upper	Lower	Mean	Upper	Lower	Mean	Upper
Canada	84	89	95	538	729	919	2 638	2 832	3 026	1 524	1 604	1 684
Denmark	82	89	95	640	847	1 054	2 186	2 430	2 675	1 507	1 599	1 692
Japan	80	86	92	556	774	993	2 520	2 736	2 952	1 533	1 615	1 696
Netherlands	96	101	106	726	920	1 113	2 591	2 789	2 988	1 549	1 629	1 708
Poland	75	82	88	369	577	785	2 504	2 700	2 896	1 511	1 587	1 664
Spain	84	91	98	694	928	1 162	2 301	2 536	2 770	1 454	1 552	1 649
Switzerland	82	89	96	589	815	1 040	2 488	2 725	2 961	1 458	1 547	1 637
United Kingdom	85	91	97	646	859	1 071	2 557	2 784	3 010	1 579	1 660	1 742
United States	81	88	94	454	686	918	2 305	2 529	2 753	1 556	1 646	1 736

Note: Confidence intervals were computed using the following formula: $mean(VSC) \pm t_{0.975} * sd/\sqrt{N}$, with $t_{0.975}$ being the t-critical value for a 95% confidence interval, sd is the standard deviation of the VSC in the sample, and N the number of respondents in the analysis.
Source: (Contu et al., 2026[10])

References

Ahtiainen, H. et al. (2026), "Valuing a reduction in the risk of an underactive thyroid: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 272, OECD Publishing, Paris, https://doi.org/10.1787/4af8f3aa-en. [3]

Appéré, G. et al. (2023), "Valuing a reduction in the risk and severity of asthma: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 218, OECD Publishing, Paris, https://doi.org/10.1787/f289d29e-en. [4]

Contu, D. et al. (2026), "Valuing a reduction in the risk of skin sensitisation: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 277, OECD Publishing, Paris, https://doi.org/10.1787/fc305de9-en. [10]

Dockins, C. et al. (2026), "Valuing a reduction in the risk of miscarriage: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 271, OECD Publishing, Paris, https://doi.org/10.1787/23bb6643-en. [5]

Dockins, C. et al. (2023), "Valuing a reduction in the risk of chronic kidney disease: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 216, OECD Publishing, Paris, https://doi.org/10.1787/9c93138f-en. [6]

Dussaux, D. et al. (2023), "Valuing a reduction in the risk of infertility: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 215, OECD Publishing, Paris, https://doi.org/10.1787/7242509f-en. [2]

Herrera-Araujo, D. et al. (2026), "Valuing a reduction in the risk of non-fatal cancer: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 274, OECD Publishing, Paris, https://doi.org/10.1787/0345660e-en. [7]

Hunt, A. et al. (2026), "Valuing a reduction in the risk of hypertension: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 270, OECD Publishing, Paris, https://doi.org/10.1787/9da8057a-en. [1]

Mourato, S. et al. (2023), "Valuing the avoidance of IQ losses in children: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 219, OECD Publishing, Paris, https://doi.org/10.1787/71574eb4-en. [9]

Ščasný, M., I. Zvěřinová and D. Dussaux (2023), "Valuing a reduction in the risk of very low birth weight: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 217, OECD Publishing, Paris, https://doi.org/10.1787/dfd159a1-en. [8]

Annex B. Recommended values for 38 OECD Member countries and South Africa

Table B.1. Recommended values for all 38 OECD Member countries and South Africa for 9 health effects

For non-surveyed countries, the recommended values are obtained using a benefit transfer function and are presented below with a white background. Values for surveyed countries are shown with a blue background.

Countries	Asthma severity in adult*	Asthma severity in childhood*	Infertility	Very low birth weight	IQ loss	Chronic kidney disease	Miscarriage	Hyper-tension	Non-fatal cancer	Under-active thyroid
	Mean WTP	Mean WTP	Mean VSC	Mean VSC	Mean WTP	Mean VSC	Mean VSC	Mean VSC	Mean VSC	Mean VSC
Australia	516	1 179	100 000	843 000	419	1 112 000	444 000	68 000	989 000	241 000
Austria	514	1 223	122 000	825 000	499	1 141 000	428 000	45 000	923 000	212 000
Belgium	497	1 155	113 000	791 000	502	1 097 000	310 000	35 000	908 000	227 000
Canada	496	973	102 000	990 000	1 010	819 000	439 000	56 000	1 212 000	149 000
Chile	399	933	107 000	662 000	365	1 180 000	381 000	51 000	645 000	187 000
Colombia	416	972	102 000	682 000	377	847 000	365 000	50 000	612 000	188 000
Costa Rica	332	771	91 000	596 000	315	691 000	380 000	47 000	652 000	181 000
Czechia	870	1 372	107 000	1 212 000	369	1 028 000	356 000	57 000	704 000	199 000
Denmark	444	1 035	109 000	734 000	619	869 000	507 000	54 000	870 000	135 000
Estonia	399	940	98 000	649 000	342	983 000	322 000	48 000	577 000	313 000
Finland	479	1 117	114 000	774 000	452	1 089 000	398 000	44 000	883 000	191 000
France	575	1 018	118 000	804 000	482	1 084 000	325 000	66 000	905 000	219 000
Germany	501	1 204	89 000	781 000	454	895 000	413 000	67 000	895 000	223 000
Greece	428	1 031	110 000	714 000	375	1 013 000	362 000	85 000	735 000	236 000
Hungary	387	944	96 000	623 000	317	920 000	310 000	48 000	613 000	193 000
Iceland	454	1 034	110 000	757 000	482	1 004 000	405 000	57 000	846 000	221 000
Ireland	557	1 277	117 000	862 000	639	1 118 000	501 000	62 000	1 110 000	255 000
Israel	536	1 212	118 000	852 000	600	1 079 000	460 000	70 000	1 037 000	244 000
Italy	486	1 210	123 000	2 086 000	422	1 316 000	579 000	61 000	842 000	209 000
Japan	475	1 095	72 000	777 000	465	1 058 000	387 000	29 000	754 000	76 000
Korea	463	1 060	109 000	757 000	830	972 000	630 000	60 000	868 000	218 000
Latvia	407	972	100 000	661 000	338	985 000	332 000	47 000	683 000	191 000
Lithuania	418	979	94 000	644 000	371	967 000	335 000	52 000	738 000	206 000
Luxembourg	491	1 122	113 000	818 000	579	1 053 000	476 000	64 000	1 065 000	247 000
Mexico	430	1 017	105 000	1 635 000	365	843 000	403 000	57 000	559 000	192 000
Netherlands	476	1 107	113 000	1 136 000	749	1 083 000	319 000	62 000	898 000	212 000
New Zealand	460	1 069	107 000	727 000	424	983 000	371 000	67 000	778 000	212 000
Norway	467	1 076	113 000	783 000	495	917 000	428 000	56 000	697 000	223 000
Poland	746	1 334	85 000	681 000	988	983 000	360 000	56 000	713 000	209 000
Portugal	466	1 132	122 000	766 000	595	1 071 000	410 000	74 000	826 000	276 000
Slovak Republic	490	1 181	113 000	747 000	394	1 085 000	388 000	56 000	815 000	199 000

Slovenia	458	1 081	111 000	742 000	420	1 035 000	385 000	48 000	699 000	209 000
Spain	478	1 133	115 000	782 000	449	1 063 000	424 000	60 000	1 049 000	212 000
Sweden	564	906	102 000	769 000	684	1 031 000	386 000	54 000	851 000	210 000
Switzerland	545	1 277	125 000	1 342 000	584	1 146 000	490 000	66 000	1 092 000	239 000
Türkiye	214	505	45 000	572 000	174	940 000	166 000	26 000	203 000	206 000
United Kingdom	517	863	80 000	898 000	365	671 000	426 000	40 000	1 146 000	141 000
United States	611	1 372	105 000	1 447 000	686	737 000	569 000	74 000	1 266 000	159 000
South Africa	271	623	90 000	576 000	383	679 000	300 000	40 000	469 000	160 000

Note: All values have been converted and are expressed in 2023 USD PPP, using PPP for actual individual consumption data for all OECD countries. As PPP for actual individual consumption is not available for South Africa, PPP for household final consumption expenditure is used instead. These values represent mean WTP/VSC estimates. The values in blue represent those from surveyed countries and report the recommended values estimated in the working papers. The other values represent those from non-surveyed countries and come from the benefit function transfer.

* Use of a readjustment factor based on the total population, assuming that the ratio of asthmatic adults and asthmatic children's socio-economic characteristics relative to the general population observed in surveyed countries also apply to non-surveyed countries.

Source: Values for non-surveyed countries are compiled by the OECD (OECD, 2026[1]). Values from surveyed countries come from (Dockins et al., 2023[2]; Dussaux et al., 2023[3]; Herrera-Araujo et al., 2026[4]; Hunt et al., 2026[5]; Mourato et al., 2023[6]; Ščasný, Zvěřinová and Dussaux, 2023[7]; Ahtiainen et al., 2026[8]; Dockins et al., 2026[9])

Table B.2. Recommended values for all 38 OECD Member countries and South Africa for asthma risk and skin sensitisation

For the non-surveyed countries, recommended values are derived from income-adjusted transfers and are presented below with a white background. Values for surveyed countries are shown with a blue background.

Countries	Asthma risk among adults*	Asthma risk among children*	Skin sensitisation among skin-sensitised**				Skin sensitisation among non-skin-sensitised**			
	Mean VSC		Mean WTP over one year				Mean VSC			
			One extra day of flare-up	Severity attribute	Face attribute	Other visible areas attribute	One extra day of flare-up	Severity attribute	Face attribute	Other visible areas attribute
Australia	253 000	475 000	1.2	21.0	58.7	14.5	80	804	2 439	1 424
Austria	270 000	507 000	1.3	22.4	62.6	15.4	85	858	2 602	1 519
Belgium	260 000	488 000	1.2	22.0	61.6	15.2	84	845	2 561	1 495
Canada	265 000	349 000	1.4	0	66.0	17.0	89	729	2 832	1 604
Chile	127 000	239 000	0.6	10.0	28.0	6.9	38	383	1 162	679
Colombia	81 000	153 000	0.3	6.1	17.0	4.2	23	233	705	412
Costa Rica	96 000	181 000	0.5	8.8	24.7	6.1	33	338	1 025	599
Czechia	215 000	403 000	1.0	17.0	47.6	11.7	65	652	1 979	1 155
Denmark	286 000	538 000	1.3	0	65.0	17.0	89	847	2 430	1 599
Estonia	214 000	401 000	0.9	15.8	44.1	10.8	60	604	1 830	1 069
Finland	237 000	446 000	1.2	20.9	58.4	14.4	79	800	2 425	1 416
France	300 000	407 000	1.1	19.0	53.3	13.1	72	730	2 213	1 292
Germany	270 000	507 000	1.3	22.4	62.8	15.5	85	860	2 608	1 523
Greece	144 000	271 000	0.7	12.0	33.6	8.3	46	461	1 397	816
Hungary	191 000	359 000	0.7	13.2	36.9	9.1	50	505	1 532	895
Iceland	269 000	506 000	1.2	21.6	60.3	14.8	82	826	2 505	1 463
Ireland	504 000	947 000	2.4	42.0	117.5	28.9	159	1 611	4 884	2 852
Israel	193 000	362 000	0.9	16.2	45.3	11.1	61	620	1 881	1 098
Italy	208 000	391 000	1.0	18.1	50.6	12.5	69	693	2 102	1 227
Japan	176 000	331 000	1.6	40.0	70.0	16.0	86	774	2 736	1 615

Korea	191 000	360 000	1.0	17.2	48.2	11.9	65	660	2 001	1 168
Latvia	170 000	320 000	0.8	13.4	37.4	9.2	51	513	1 556	908
Lithuania	221 000	416 000	0.9	16.5	46.1	11.3	62	631	1 914	1 117
Luxembourg	585 000	1 100 000	2.7	48.0	134.1	33.0	182	1 838	5 573	3 254
Mexico	88 000	166 000	0.4	7.3	20.5	5.0	28	281	852	498
Netherlands	294 000	553 000	1.3	24.0	67.0	17.0	101	920	2 790	1 630
New Zealand	201 000	378 000	1.0	17.4	48.6	12.0	66	666	2 019	1 179
Norway	386 000	726 000	1.9	33.0	92.3	22.7	125	1 265	3 836	2 240
Poland	381 000	482 000	1.2	19.0	65.0	17.0	82	577	2 700	1 587
Portugal	166 000	313 000	0.8	13.7	38.2	9.4	52	523	1 586	926
Slovak Republic	172 000	324 000	0.8	13.7	38.4	9.5	52	526	1 596	932
Slovenia	204 000	384 000	0.9	16.4	45.9	11.3	62	629	1 909	1 114
Spain	187 000	352 000	1.3	23.0	64.0	17.0	91	928	2 536	1 552
Sweden	276 000	435 000	1.3	22.5	63.0	15.5	85	864	2 619	1 529
Switzerland	319 000	601 000	1.2	29.0	68.0	17.0	89	815	2 725	1 547
Türkiye	392 000	737 000	0.4	7.3	20.4	5.0	28	279	846	494
United Kingdom	195 000	375 000	1.3	20.0	66.0	17.0	91	859	2 784	1 660
United States	301 000	548 000	1.3	21.0	69.0	17.0	88	686	2 529	1 646
South Africa	57 000	108 000	0.3	4.9	13.7	3.4	19	187	568	331

Note: All values have been converted and are expressed in 2023 USD PPP, using PPP for actual individual consumption data for all OECD countries. As PPP for actual individual consumption is not available for South Africa, PPP for household final consumption expenditure is used instead. The values in blue represent those from surveyed countries and report the recommended values estimated in the working papers.

* For asthma risk, values in white cells are derived from an income-adjusted transfer from the United States for asthma risk among adults and from France for asthma risk among children.

** For skin sensitisation, values in white cells are derived from an income-adjusted transfer from the Netherlands, which is the best donor country to minimise on average transfer errors between primary and transferred WTP to avoid one extra day of flare up among skin sensitised. Values in blue represent those from surveyed countries and report the recommended values estimated in the working papers.

Source: Values for non-surveyed countries are compiled by the OECD (OECD, 2026[1]). Values from surveyed countries come from (Appéré et al., 2023[10]; Contu et al., 2026[11])

References

Ahtiainen, H. et al. (2026), "Valuing a reduction in the risk of an underactive thyroid: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 272, OECD Publishing, Paris, https://doi.org/10.1787/4af8f3aa-en. [8]

Appéré, G. et al. (2023), "Valuing a reduction in the risk and severity of asthma: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 218, OECD Publishing, Paris, https://doi.org/10.1787/f289d29e-en. [10]

Contu, D. et al. (2026), "Valuing a reduction in the risk of skin sensitisation: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 277, OECD Publishing, Paris, https://doi.org/10.1787/fc305de9-en. [11]

Dockins, C. et al. (2026), "Valuing a reduction in the risk of miscarriage: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 271, OECD Publishing, Paris, https://doi.org/10.1787/23bb6643-en. [9]

Dockins, C. et al. (2023), "Valuing a reduction in the risk of chronic kidney disease: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 216, OECD Publishing, Paris, https://doi.org/10.1787/9c93138f-en. [2]

Dussaux, D. et al. (2023), "Valuing a reduction in the risk of infertility: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 215, OECD Publishing, Paris, https://doi.org/10.1787/7242509f-en. [3]

Herrera-Araujo, D. et al. (2026), "Valuing a reduction in the risk of non-fatal cancer: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 274, OECD Publishing, Paris, https://doi.org/10.1787/0345660e-en. [4]

Hunt, A. et al. (2026), "Valuing a reduction in the risk of hypertension: A large-scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 270, OECD Publishing, Paris, https://doi.org/10.1787/9da8057a-en. [5]

Mourato, S. et al. (2023), "Valuing the avoidance of IQ losses in children: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 219, OECD Publishing, Paris, https://doi.org/10.1787/71574eb4-en. [6]

OECD (2026), *Benefit transfer of willingness-to-pay estimates for avoiding negative chemicals-related health effects*, OECD Publishing, Paris, https://doi.org/10.1787/f11379a0-en. [1]

Ščasný, M., I. Zvěřinová and D. Dussaux (2023), "Valuing a reduction in the risk of very low birth weight: A large scale multi-country stated preference approach", *OECD Environment Working Papers*, No. 217, OECD Publishing, Paris, https://doi.org/10.1787/dfd159a1-en. [7]

Economic Valuation of Chemicals-Related Health Effects

A Practical Guide to Quantifying Morbidity Effects in Environmental Cost-Benefit Analysis

While chemicals play an important role in daily life, they must be soundly managed to limit risks to human health and the environment. Cost-benefit analysis is often used by regulators to compare the societal benefits of regulating chemicals against the costs of policy implementation. However, data on the economic benefits of potential policies are often lacking.

Across ten health effects, this report quantifies the monetary benefit of reducing non-fatal impacts from exposure to chemicals, which include the physical, emotional, social and economic burden. It does so by synthesising evidence from 96 surveys collected across 116 000 respondents in 28 countries as part of the OECD Surveys on Willingness-to-pay to Avoid negative Chemicals-related Health Effects project. It subsequently includes guidance for the use of the derived estimates in cost-benefit analysis as well as their transfer to non-surveyed countries and policy contexts. The estimates presented in this report are intended to improve the basis for assessing chemicals management options and environmental policies.

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