

**EVALUATION OF THE *CHILDREN'S*  
*HEALTH VALUATION HANDBOOK***

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Attachment A: Table of Contents from the *Handbook*

Attachment B: Memorandum from Al McGartland and Ramona Trovato

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## **1. Introduction**

Children and children's health and safety issues have been increasingly emphasized in federal agencies. This is in part due to the 1997 Executive Order (E.O.) 13045, "Protection of Children from Environmental Health Risks and Safety Risks." E.O. 13045 states that "each Federal agency: (a) shall make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." It requires, for each covered regulatory action, "(a) an evaluation of the environmental health or safety effects of the planned regulation on children; and (b) an explanation of why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the agency." A "covered regulatory action" is one that "may (a) be 'economically significant' under Executive Order 12866 (a rule-making that has an annual effect on the economy of \$100 million or more or would adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or Tribal governments or communities); and (b) concern an environmental health risk or safety risk that an agency has reason to believe may disproportionately affect children."

The U.S. Environmental Protection Agency (EPA) frequently conducts economic analyses to address the effects, costs, benefits, and impacts of proposed rules and regulations. The National Center for Environmental Economics (NCEE) and the Office of Children's Health Protection (OCHP), in recognition of the emerging need for assessment of EPA policies that affect health risks faced by children, produced the *Children's Health Valuation Handbook* (U.S. EPA, 2001.) This document was designed to supplement the Agency's recently finalized *Guidelines for Preparing Economic Analyses* (U.S. EPA, 2000). The *Guidelines* document provides guidance on how best to perform benefit-cost assessments of EPA policies and programs in general.

The purpose of the *Handbook* is to inform analysts attempting to estimate the value of changes in risks to children's health caused by environmental improvements or degradations. It is intended to provide information on ways analysts may consider and appropriately account for the economic value of risk reductions to children. It is to serve as a reference tool for analysts conducting economic analyses of EPA policies when those policies are expected to affect risks to children's health.

The *Handbook* is organized into six chapters; the table of contents is provided in Attachment A. The first chapter outlines the motivation for developing the document and the organization of the remaining chapters. Chapter 2 lays out the key distinctions between health risk assessment and health risk valuation for adult and child health effects. It briefly discusses the perspectives that can be taken in estimating values for health risk reductions in children and then describes the economic reasons for potential valuation differences in child and adult health benefits. Chapter 3 focuses on benefit transfer and on the issues and mechanics of transferring value estimates derived for adults to scenarios involving children. Chapter 4 reviews issues associated with applying standard and alternative techniques to children's health effects in original valuation

studies. Chapter 5 describes other important types of analyses that may serve as complements to, or when valuation data are scarce, substitutes for, benefits valuation. The final chapter of the *Handbook* describes a team approach to risk assessment in which economists and risk assessors collaborate early in the benefits quantification process with useful results. There are a few brief recommendations pertaining to the content matter in each of the sections that are intended to assist the users of the document. The *Handbook* also includes three appendices. Appendix A provides a list of common assumptions made during risk assessments. Appendix B is an annotated bibliography of the current literature providing estimates of child health effect values. Appendix C summarizes EPA's response to comments received during an external review of the draft *Handbook*. The *Handbook* is currently presented in a three-ring binder with tab dividers (blank pages with tabs) with the titles on the tabs at the start of each chapter, the reference section, and the appendix section.

While the *Handbook* was principally authored by NCEE and OCHP, representatives from the Office of Air and Radiation (OAR), Office of Prevention, Pesticides, and Toxic Substances (OPPTS), Office of Solid Waste and Emergency Response (OSWER), and Office of Water were all involved in developing it. These representatives served as internal peer reviewers and were consulted regularly regarding the *Handbook's* content and form. Additionally, the document had input from academic experts and benefitted from the deliberations of the Children's Health Protection Advisory Committee's Economics Workgroup. The document was also formally peer reviewed by four experts in health risk valuation.

Enacted in 1993, the Government Performance and Results Act (GPRA) requires strategic planning and performance measurement in the executive branch agencies of the federal government. The purpose of GPRA is to improve federal management and congressional decision-making, service delivery, program effectiveness, and public accountability. Specifically, federal agencies must develop strategic plans and performance goals, and must measure and report on program outcomes based on these goals. In light of GPRA, there is an increased emphasis on performance goal setting and reporting within the Agency. The 2001 performance goal regarding the *Children's Health Valuation Handbook* is to evaluate its effectiveness. This is an outcome-oriented goal as recommended by GPRA. This document describes the conduct and findings of an independent evaluation of the *Handbook*.

Stratus Consulting evaluated the *Handbook* in the summer of 2001 using one-on-one interviews with economic analysts from a number of program offices across the Agency. The intent of the evaluation was to gauge analysts' opinions on whether the document is focused, offers information and recommendations that are potentially relevant to their work, and is clearly written. The *Handbook* is intended to be a living document that is revised periodically as new information becomes available and in response to evolving Agency needs. The results of this evaluation may provide some useful input into future revisions of the *Handbook*, as well as responding to the current GPRA requirements.

This report on the evaluation is organized as follows. Section 2 outlines the evaluation approach, Section 3 identifies the key findings and some specific recommendations made by the

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interviewee analysts for each attribute, and Section 4 summarizes the evaluation and provides recommendations for improving the *Handbook*.

## **2. Approach**

Agency staff were recruited for participation in the one-on-one interviews through a two-step process. To ensure that the evaluation of the document included potential users of the document, the Office Directors from NCEE and OCHP issued a memorandum to program offices informing them of the evaluation and requesting the participation of economic analysts (see Attachment B). The nine analysts subsequently identified by the program offices for participation are listed in Exhibit 1.

### **Exhibit 1: Interviewees**

- Will Wheeler, Office of Water
- Mahesh Podar, Office of Water
- Allen Basala, Office of Air & Radiation
- Bryan Hubbell, Office of Air & Radiation
- Trish Koman, Office of Air & Radiation
- Nishkam Agarwal, Office of Prevention, Pesticides, & Toxic Substances
- John Faulkner, Office of Prevention, Pesticides, & Toxic Substances
- Christine Augustyniak, Office of Environmental Information
- Paul Balsarak, Office of Solid Waste & Emergency Response

Four of the participants are current practitioners who conduct economic analysis including benefits valuation, often in support of rulemaking activities. Three are more involved in broader policy issues regarding the conduct of economic analyses at the Agency. The other two currently conduct other types of economic analyses but not benefits valuation. As shown in Exhibit 1, every program office was represented. Given the time constraints and the lack of response from some of the suboffices, it was not possible to obtain representation of all of the suboffices in the Agency. For instance, one of the missing and relevant suboffices is the Office of Ground Water and Drinking Water, which conducts benefits valuation and has rules where children's health is an issue (arsenic in drinking water, disinfection byproducts in drinking water, etc.)

### **2.1 Attributes of Evaluation**

The effectiveness of the *Handbook* was evaluated in terms of its form and functionality. Both the presentation and the content of the *Handbook* contribute to its usefulness. A set of attributes were identified that would best describe the effectiveness of the *Handbook* both for presentation and content. The key attributes examined are shown in Exhibit 2.

<b>Exhibit 2: Key Attributes of Evaluation</b>	
<b>Presentation</b>	
Clarity	Is the content clearly presented and is the language technically appropriate?
Design	Is the document and its layout user-friendly?
Ease of locating topics	Are the topics logically laid out and is it easy to locate information?
<b>Content</b>	
Relevance	Is the <i>Handbook</i> useful? Who are the users and what are the uses of the <i>Handbook</i> ?
Adequacy	Does it adequately cover topics relating to children’s health issues and their valuation?
Context	How would it be used by analysts? Is it a good companion to the <i>Guidelines</i> document and what role does it play in future analysis?
Currency	Is the information up to date?
Accuracy	Are there errors and omissions?
Bias	Is there any bias in presentation of the issues and valuation methods?
Innovation	Would it influence future analysis? Would it serve as a catalyst for future research?

## **2.2 Interviews**

Interviews are useful for understanding impressions or experiences, and getting a range and depth of information.

**Pre-interview:** Potential participants were provided with a copy of the *Handbook* by NCEE as soon as they were identified as potential interviewees. Stratus Consulting staff contacted participants to schedule the interviews and requested them to review the document. Based on their experience and knowledge of rulemaking activities in their offices, the participants were also asked to identify at least one recent rule and one upcoming rule where children’s health valuation was or may be an issue to be considered in the economic analysis. They were asked to review the *Handbook* in light of those rules. They were also contacted the day before the interview to confirm the meeting and the completion of their review of the *Handbook*.

**Interview:** The interview sessions lasted about an hour each. The interviews began with a few questions to obtain the background of the interviewee and information on their experience in conducting economic analysis at the Agency. Attachment C is a sample list of questions used in the interviews to obtain information on the attributes for evaluation identified in Section 2.1. The interviewees often provided information in free-ranging discussions that made some of the questions redundant. The attributes for presentation were discussed for the *Handbook* as a whole, while those for content were discussed for the *Handbook* as a whole and for each chapter. The

questions were tailored as appropriate to each chapter of the *Handbook* during the interviews. Some interviewees provided examples from the different chapters while discussing the document as a whole. In these cases, it was sufficient to have the interviewees highlight any additional comments that they had on the chapters.

The interviewees were asked to evaluate the *Handbook* bearing in mind the rules (both recent and upcoming) that they provided before the interview. However, the discussions were not limited to these cases and interviewees were encouraged to draw on their overall experience in conducting economic analysis and valuing children's health in a variety of situations.

### 3. Findings

The depth of evaluation varied across the interviewees because of the statutory requirements of each of the program offices regarding benefits valuation and because of the current role of the interviewees in their offices. It was found that the Office of Air and Radiation (OAR) and the Office of Water (OW) conduct more benefits valuation than other offices. Therefore, the interviewees from these two offices had more comments based on practical knowledge than most of the others. The Office of Environmental Information (OEI) currently does not conduct benefits valuation. The Office of Pesticide Programs within OPPTS does not evaluate benefits in the same way as the rest of the offices. There the "benefits" are viewed as the effectiveness of a pesticide in controlling the targeted pests. Further, economic valuation of change in health risks is not done. Pesticide registration decisions are based on risk thresholds set by the office.

The current activities of the interviewees had a bearing on their responses. Some interviewees were currently or recently involved in conducting economic analyses in support of rulemaking and therefore had a more hands-on approach. These interviewees tended to provide a more in-depth evaluation of the specifics of the *Handbook*. Other interviewees were more involved in broader policy issues regarding the conduct of economic analyses at the Agency. These interviewees were useful in providing comments on topical areas and the direction of future research.

This section reports the evaluation findings organized according to the individual attributes listed in Section 2.1.

#### 3.1 Clarity

The *Handbook* was unanimously deemed as extremely well written. Interviewees were clear that the objectives of the *Handbook* are to guide users in qualitatively or quantitatively examining the economics of children's health.

*Very well written.*

*Seems to be clearly written, it isn't jargony.*

*The authors are to be commended.*

They understand that it is not a prescriptive cookbook and that it aims to further the research in this area. All interviewees understood that the *Handbook* was written for analysts within the Agency (and associated contractors) conducting economic analysis for the Agency. One of the interviewees from OAR identified an additional audience as industry lawyers who might use the *Handbook* to dispute agency findings.

*It is the company lawyers who read our work. They are one of our main clients for the assessments that we do. It would be a helpful framework for the authors if they . . . [would ] think about who is the recipient of our product both in the public and then in these specialized groups that review our RIAs, both at OMB and private industry. They [these reviewers] tend to pull on a lot of this to kind of beat us at our own game.*

The technical language was generally considered appropriate for this audience. Some interviewees had difficulty in understanding the differentiation between the chapters titled “Benefit Transfer,” “Valuation Methods,” and “Other Important Types of Analyses.” (Chapters 3, 4, and 5, respectively) Their discussions indicated that they did not understand the context in which the methods outlined in each of these sections would be used. The purpose of including methods for analyses other than benefits valuation in the chapter on other important types of analyses was not clear to several interviewees. Some indicated that the message that more needs to be done on valuation of children’s health effects but that lack of data currently hinders that effort needs to be more clearly stated.

Specific recommendations for improving the clarity were as follows:

- A road map or flowchart to guide the user through the contents of the *Handbook* might be useful, a “tell us where we are going, take us there, tell us where we have been” approach.
- Transition paragraphs might be used to highlight the differences and the connections between chapters, allowing for an explicit connection between chapters.
- Clarify the importance of Chapters 3, 4, and 5 and the distinctions between them in the introductory chapter since they constitute the “meat” of the *Handbook*.
- It would be helpful to use simple language in the areas where equations were provided (for example, willingness to pay calculation shown in Box 3.1 and the formula that precedes it).
- Consider expanding abbreviations more frequently to make it easier to read, e.g. “value of statistical life” rather than “VSL.”
- Fuller reference and contact information for examples provided in the *Handbook* would help. Providing direct links to the *Guidelines* document (identification of chapter, section, or page numbers) and to literature on the web (information on web addresses) would keep people from having to search the *Guidelines* or the library for references.
- Summarize the different ways that different offices approach valuation.



### 3.2 Ease of Locating Topics

The majority of interviewees found it easy to locate information. The tabs are user friendly and helpful in finding the different topics. Considering that the document is not very long, most found the table of contents a sufficient tool to locate information. Some interviewees believed that it might be difficult to locate information if users were not completely familiar with the analytical topics. For example, it might be difficult for users to identify topics within the three chapters dealing with valuation — Benefit Transfer, Valuation Methods, and Other Analyses. One interviewee liked the list (Page 1-2) of what the *Handbook* can do, but had difficulty locating the information in the different chapters.

Specific recommendations include:

- Provide page numbers where information relating to the list on Page 1-2 could be found.

### 3.3 Design

All of the interviewees were of the opinion that the document is well designed. Several of them requested more examples highlighted in boxes similar to Box 4.1 with the Cost of Illness example, with nearly everybody citing that example as extremely useful. One interviewee suggested an approach similar to that of the *World Development Reports* from the World Bank, where there is an illustration of how to apply every major concept. Text boxes were also perceived as a useful tool to highlight information in the different sections.

Specific recommendation for improving the design was to:

- Include additional text boxes for illustrating methods and key information.

### 3.4 Relevance

All interviewees found the *Handbook* to be a very useful reference tool. It was seen as systematically laying out the issues that need to be considered in valuing children's health. The book was perceived as a useful checklist of issues and methods.

*One of the things this is good about is pointing out the categories that you want to include [with reference to children's health valuation].*

The size and the content were deemed appropriate, and several interviewees indicated their satisfaction that key topics were addressed without resulting in an intimidating guide. There were differing comments about the recommendations listed in each chapter of the *Handbook*. Some interviewees did not understand the purpose of those recommendations. Others felt that the recommendations were not strong and therefore not helpful. And yet another interviewee suggested that a list of all the recommendations in the *Handbook* should be provided early in the document.

The *Handbook* was criticized by one interviewee as relying too heavily on a theoretical approach. She suggested that it might be helpful to describe what different parts of the agency, and other agencies, are doing to address children's health and its valuation.

Opinions varied about the usefulness of the *Handbook* in developing an analytical blueprint, the initial plan for conducting analysis. Some interviewees indicated that the document is most useful at the planning stages of analysis. One interviewee did recommend a cookbook approach, especially one with indications about what methods were appropriate for different scenarios.

People not intimately familiar with the specific requirements of the E.O. 13045 requested that the *Handbook* be more explicit about it. Some wanted to know how other offices within EPA and other federal agencies were currently addressing the requirements.

The interviewee from OAR who identified lawyers for the regulated industries as a potential audience expressed concern about how they would use the document.

*In our discussions with industry we are constantly being pressed to make ad hoc adjustments if someone has made a random statement that something is too high, then they will say, 'well, cut it in half and show that number.'*

She urged the authors of the *Handbook* to be cautious about making any general statements that could be used to try to pressure EPA analysts to make ad hoc adjustments that do not have a reasonable basis in the literature or other statements that could be used to discredit EPA analysis. She cited an example on page 4-8 where it says, "Care should be taken to use the most up-to-date estimates of medical costs. . ." Her concern was that this could be used to argue that cost of illness studies need to be updated every year, which is not practical.

The primary specific recommendations were as follows:

- Clarify the purpose of the recommendations listed in each of the chapters of the *Handbook*.
- Provide more specific recommendations rather than general recommendations or set priorities for the use of methods.
- Expand on the discussion of E.O. 13045 to explain the specific requirements of the Order.
- Provide additional examples of what EPA offices and other agencies are doing to address requirements of the Executive Order.
- Take account of the fact that the audience for the document includes industry lawyers.

### 3.5 Adequacy

All interviewees found the *Handbook* useful in qualitatively discussing issues regarding economic valuation of children's health, particularly in discussing potential differences between adults and children in risk characterization and economic valuation. The *Handbook* does not

provide specific monetary values for children's health effects, so none of the interviewees found it particularly useful in developing quantitative estimates of children's health values.

Most interviewees indicated that it is not possible to provide a prescriptive cookbook at this stage since the current state of knowledge and practice is inadequate to support such an endeavor. Some of the interviewees indicated that the *Handbook* was a useful reference tool of methods but was not useful in providing assistance in the actual conduct of analysis.

*I don't think it is possible to be prescriptive . . . there is just too much that we don't know, so far.*

*We are currently looking at how we have structured some of our RIA discussions to try to improve them with regard to children's health, and I am not sure that I have pulled much out of this that would be all that directly relevant. I think there is a tension there. I think it would not be helpful if this were completely prescriptive - so that on the one hand I understand that they are trying to be more general to give flexibility to the different audiences but on the other hand there is not much - when you are trying to actually grapple with how one would do it - here to guide one. I think that some statements sprinkled throughout here saying not to make ad hoc adjustments when there is no data would be very helpful.*

Some interviewees indicated that a prescriptive cookbook is inappropriate. One reservation was that every rulemaking or analytical issue is unique and a cookbook might result in lazy analysis without proper consideration of issues that surround that particular situation. Another reservation was that a practitioner's judgment is necessary in each analysis and a cookbook may discount that judgment. However, one interviewee did indicate that it would be extremely useful for OCHP and NCEE to undertake a pilot project examining the feasibility of developing a prescriptive cookbook that includes expert input from outside the Agency.

Two interviewees indicated that the long-term impacts and irreversibility of health effects from childhood exposures need to be discussed in greater detail.

*On page 4-8, last paragraph, the authors need to think about how disease early in life affects later predisposition to other diseases. Here they could look at Kunsley and Schwartz and how FEV [forced expiratory volume] changes may predispose people to later respiratory disease that then sets them up as a sensitive group.*

One interviewee indicated that the valuation of averting and mitigating behavior needed to be discussed. The interviewee noted that although the *Handbook* (Section 4.1.2) discusses averting behavior study methods for estimating the value of reduced health effects, these and other methods also need to be applied to assess the value of the reduced need for risk mitigation behavior. The interviewee indicated that in valuing risk reduction, the value of reducing risk averting behavior should also be included. For example, children are kept indoors during high

ozone days, and this has a cost associated with it. Reducing ozone levels has a value from reducing the health effect as well as reducing the risk averting and mitigating behavior.

*For children it is especially important because parents are often making mitigating behavior choices for them.*

There was concern expressed that children were addressed as a group from age 0 to 18 without discussing differences among different age groups.

*Within children there are differences, for example, in risk characterizations. Asthma prevalence rates differ between children 5 and 10, and 10 and 18.*

Some interviewees mentioned that meta-analysis or other approaches for combining information from multiple studies were not addressed in the *Handbook*. On page 3-8 of the *Handbook* it says that meta-analysis is not very relevant for children's health because there are seldom multiple studies available. One interviewee noted that this is not accurate for all children's health effects, and thought that meta-analysis and other new benefits transfer approaches, such as preference calibration, should be more fully presented.

There were contradictory perceptions about quality adjusted life years (QALYs). Some people feel there is insufficient emphasis on QALYs. External reviewers had also indicated that the *Handbook* would benefit from a short section on QALYs (Appendix C of the *Handbook*). The authors' response was that NCEE and OCHP had commissioned a white paper on the topic of QALYs and were considering their usefulness in benefits analysis of children's health risk reductions. Some interviewees felt that QALYs should not be included in benefits valuation techniques.

Some interviewees felt that chapters five and six (Other Analyses and Risk Assessment) were not about benefits valuation techniques and therefore did not belong in the *Handbook*. They indicated that these topics might be appropriate if the *Handbook* were about children's health assessment or impacts assessment. There was also some question about how important decreased expected lifetime earnings, increased educational resources expended, and neonatal mortality were as topics in the document. Interviewees noted that the document focuses on VSL point estimates and that a discussion of VSL functions is needed.

In general, the depth of discussion on the different topics was considered sufficient since there were references for users to obtain additional information. However, some interviewees indicated that the *Handbook* did not sufficiently address the existing body of work, within and outside the Agency. There was disappointment that program office activities in children's health benefits valuation were not acknowledged in the *Handbook*, and this was perceived as a disservice to those offices. This complaint was made with reference to the *Guidelines* as well.

*They did fail to recognize the efforts to quantify children's health effects that do exist in some of our analyses. . . . It should be pointed out that there are groups that are*

*measuring children's health effects and have been doing so for a number of years. . . . I pointed this out for the Economic Guidelines document as well. There is a lot of general discussion here, but there is not a lot of cross-referencing to specific analysis.*

One interviewee indicated that there is some relevant academic research that should be added to the *Handbook*. For example, the work of Wallace Oates and Martin Weitzman was cited as missing from the *Handbook*. No specific references were provided.

One interviewee disagreed with the discussion in the *Handbook* about whether research in which the study results do not conform with theoretical expectation should be ignored (page 3-6).

*I don't think that not conforming would necessarily sink a study. The theory breaks down on a number of fronts — the economic assumptions do not necessarily hold to how we view our children and their health. I would not necessarily reject something because it does not fit the neoclassical widget-making model. For example, some people wouldn't sell at any price and their inability to opt out of this trading risk for money is a fundamental flaw in these studies. This suggests to me that we may need to develop a new theory.*

The recommendations from the different interviewees are as follows:

- Consider a pilot project to develop a more prescriptive cookbook.
- Include more information on meta-analysis.
- Include a discussion on QALYs.
- Discuss VSL functions.
- Remove chapters titled Other Analyses and Risk Assessment.
- Include relevant program office work as examples, and cite relevant SAB guidance.
- Include more discussion on and references to current literature.
- Qualify statements about need for conformance of studies with theoretical expectations.

### 3.6 Context

The *Handbook* was generally perceived as useful in the conduct of economic analysis. Its greatest use was in assisting analysts in identifying issues to be considered with reference to children. It was perceived as a good reference document on the topic and an effective companion to the *Guidelines for Preparing Economic Analyses* (U.S. EPA, 2000). There were suggestions to be more explicit in the linkages between the two documents, with specific references to chapters and sections in the parent document. The primary role of the *Handbook* was seen as that of a checklist of issues and methods to be considered and as providing a basis for qualitative discussion of issues.

- Identify the links to specific sections of the *Guidelines for Preparing Economic Analyses* throughout the *Handbook*.

### 3.7 Currency and Accuracy

The interviewees mostly stated that in their opinion and with their experience, the information was up to date for the subject matter. Some raised the issue of missing references to program office activities and academic research, and this is discussed in Section 3.5, on adequacy. One issue raised was that the COI example in Box 4.1 was outdated because it is based on 1998 rather than the finalized 2000 information.

There were a few errors identified in the document. A specific error was identified in the COI example in Box 4.1, where the present value of expected lifetime earnings for the entire population was \$366,021; this number was considered too small a value for the entire population, but probably was meant to be for the average individual. Two interviewees indicated that it was incorrect to imply that there are not enough studies on children's health effects and that therefore analysts should rely on adjusting adult estimates.

*On page 2-2, there are statements here that I think should be deleted. There is a paragraph that starts out 'lack of child specific risk information' . . . and the next statement that 'children are less often exposed to levels of substances that cause observably harmful effects' — that is simply false. And needs to come out of there. . . It goes on to say 'the limited existing data that demonstrate differential effects on children . . . largely comes from infrequent cases where children experience accidental high exposures that resulted in . . . relatively rare. . . . That is also false. I would point you to the ozone and PM literature: there are a couple of hundred studies of asthma and the criteria pollutants at every day levels all over the country. They may be thinking of cancer, but if so, they are missing a huge set of effects.*

*Table 2-1, page 2-9. They say that children always have a care giver and adults never have a care giver but if you talk with anyone with an aging relative, they will tell you that adults do have a care giver. That last row in the table, 'higher child values for the care giver's time,' is not necessarily the case.*

*In page 2-3, they make the statement, "Finally, analysts should remember that children represent a group that is relatively understudied toxicologically. Historically, pediatric populations have not been the subject of sufficient pharmaceutical trials. . . ." That is not true. It is a broad statement that is not applicable to all media.*

Specific recommendations with regard to accuracy include the following:

- Address inaccuracy issues raised in this section.

- Review the information on the COI example to update it and clarify if it is a per capita value and ensure the accuracy of the number.

### 3.8 Bias

The document was generally considered as unbiased with one exception. Interviewees indicated that the document appears biased (referring to Table 2.1 and associated discussion) toward valuing children’s health higher than adult health, whereas the empirical evidence is insufficient to support that conclusion.

The recommendation that “analysts can legitimately rely on either the parental or the adult-as-child perspectives for representing children’s health values” was challenged. One interviewee disagreed with this statement and felt that the document displayed a bias in choosing these without sufficient justification.

*In [Section] 2.2, valuation differences, I like that they included references and both sides. This is a key area and could use a little more [discussion]. The section on who speaks for the child I found troubling and I disagree with their conclusions. [In my experience,] . . . no one cares more about the children than parents and the statements here mixed up parents’ activities when it is their behavior vs. parents perceptions when it is someone else’s. This is a variation of the theme of voluntary vs. involuntary. . . . The way people think about children does not fit neatly into the economic rational framework. What that implies may be that we need a fundamentally different model.*

Specific recommendations to address the issues on bias are as follows:

- Further review the literature to examine if empirical evidence indicates whether children’s health is valued higher than, lower than, or the same as adult health.
- Justify or modify the recommendation to rely on parental or adult-as-child perspective for representing children’s health values.

### 3.9 Innovation

The document was seen as a useful compendium of the existing knowledge base on children’s health valuation. Interviewees noted that the document did a good job in identifying where there were gaps in knowledge.

*It just confirms for us that there is a lot of research to be done and a lot of lack of actual valuation, and it is not the fault of the manual. They cannot create the data when it doesn’t exist. But it is a lot of issues raised here which basically can’t be resolved.*

Some recommended that it would be useful to have a summary of research needs to serve as a catalyst for future research. The *Handbook* was seen as useful in assisting program offices in considering children's health valuation, but it is unlikely to further research in the area in the program offices since they do not conduct research in broad topical areas. In general, the interviewees had encountered all the analytical methods described in the *Handbook*.

There were a few instances where the *Handbook* motivated the interviewees to revisit their analysis or analytical plans. One interviewee conducted a case study with reference to a finalized rule to examine the impact of incorporating the valuation of children's health. He investigated the assessment of children's health effects by focusing on a case study of the Lower Columbia River performed for the Economic Assessment of the Phase I Pulp and Paper Effluent Guidelines. The conclusion was that the value of benefits would increase substantially but would have no effect on the finalized guidelines since the costs far outweighed the benefits. Two interviewees indicated that they would examine cost of illness and expected lifetime wealth approaches for application to their future analyses after having encountered them in the *Handbook*. They indicated that although they were aware of these methods, the *Handbook* helped identify them as useful in the context of children's health valuation. The interviewees concurred in their opinion that the *Handbook* needs to be a living document that is updated. The recommended frequency of updating varied, with responses such as yearly, once in five years, and as needed based on changes in the literature.

- Summarize data gaps and research needs.

#### 4. Conclusions

The *Handbook* is a thoughtful and useful document that is well designed and well written. It is thoughtful in that it provides background on the key issues surrounding valuation of children's health in an environmental regulation context and provides information on a variety of methods to value children's health. It identifies the benefit transfer methods that are most cost-effective and frequently used in conducting benefits valuation and differentiates them from the methods used in original valuation studies. It also presents alternative and supplemental regulatory analysis methods that may be useful in some applications, especially when a fully quantitative benefits valuation is not feasible. Consistent with the stated purpose of the *Handbook*, it is a useful as a reference tool for analysts who must conduct valuation of children's health given the priorities that have been placed on this issue within the Agency. It provides a number of references for the different methods recommended in the *Handbook* and serves as an excellent supplement to the *Guidelines* document.

The relevant audience for the *Handbook* extends beyond the analysts within the Agency. The *Handbook* is extremely useful as a reference document for contractors in order to promote a consistent approach to valuing children's health. Additionally, the *Handbook* should be made

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available to the academic community to promote research. To increase understanding of Agency analysis needs and research gaps, it would be useful to actively disseminate the document more widely than just to Agency analysts.

The previous section summarizes the comments of the interviewees with respect to the attributes of the *Handbook*. Based on those comments, Stratus Consulting provides some specific suggestions for improvements in this section. Some are more extensive than others and most can be incorporated into planned future revisions of the document. The suggested revisions are organized into two groups. The first group includes revisions that could be done in the near term and are feasible given available information. The second group would be more beneficial after the literature on valuation of children's health has had more time to evolve.

In a few cases, suggestions from the interviewees were actually contradictory. In this section, reasons supporting each of the suggestions are taken into account and a recommended course of action is given. Also, while compiling the results of the interviews, it became clear that some follow-up contact is needed to clarify the intent of some of the comments or to obtain more specific information on examples or references that could be added to the *Handbook*. There was not enough time to conduct these follow-up conversations in preparation for this evaluation report, so they are included as one of recommendations.

One issue with contradictory comments was whether the *Handbook* should provide more of a cookbook approach for valuation of children's health. Although it is clear that this would be appealing and useful for the program offices, several of the interviewees acknowledged that the economics literature is not sufficient at this time to support a prescriptive quantitative approach for valuation of children's health.

Another issue receiving contradictory comments was on the level of detail regarding alternative and supplemental analysis approaches, such as QALY. Interviewees differed on whether this discussion should be expanded or dropped altogether.

### **4.1 Revisions That Could Be Implemented in the Near Term**

There are several recommendations that OCHP and NCEE could act on in the near term using available information. They vary from copy editing the document to eliciting additional information from program offices. The activities are as follows:

- Edit the document for typographical errors, check for incomplete or duplicate references, and clarify information. A list of specific edits identified to date is presented in Exhibit 3.
- Make follow-up requests to selected interviewees to provide:
  - specific examples of how economic valuation of children's health has been addressed in program office analyses

- specific references to academic and Agency research and analysis addressing empirical or theoretical issues related to economic valuation of children's health that may be added to the *Handbook*
- clarification of what alternatives to the parental or societal perspectives might be appropriate for valuation of children's health
- clarification of children's health topics for which meta-analysis may currently be feasible.
- Obtain and provide contacts and web addresses for examples and references.
- Add more specific references to material in the *Guidelines* that addresses the issues being discussed in the *Handbook*. Maintain consistency with recommendations given in the *Guidelines*.
- Add more explanation for when and how the alternative analysis methods might be used. The distinctions between welfare-based economic valuation methods, benefit transfer, and alternative assessment methods need to be made more explicit, starting in the introduction to the report and elaborated at the beginning of each chapter. This would address both the confusions about when they each apply and concerns about their important differences.
- Summarize data gaps and research needs, including potential uses of indicator variables for measuring changes in children's health and valuation of averting behavior as well as actual health effects.
- Identify examples (from within and outside the Agency) of applications of different methods for valuation of children's health using benefit transfer or original research efforts, and incorporate them into the *Handbook* as illustrations, similar to the cost-of-illness example.
- Develop an online version of the *Handbook*.
- Develop flowcharts and text boxes to highlight information and provide road maps. For example, Table 3-1 has much information, and it would be useful to have a diagram to show flow and interconnection.
- Clarify the recommendations presented in the *Handbook* by providing justifications for and the rationale behind the recommendations.
- Revise section on dose-response relationships to reflect that for some pollutants (e.g. criteria air pollutants) there is a large literature on children's effects, and therefore there is no need to adjust from adult information.
- Clarify what is meant by best practice in section on study quality (page 3-5). It is important to not undermine the credibility of available study results because they may have inevitable limitations.
- Consider relaxation of the recommendation to rely only on peer reviewed studies. It takes a while to peer review and publish, and there are studies in the "gray literature" that may be quite useful. It would be good to have some guidance on appropriate use of studies that are unpublished or not formally peer reviewed.
- Consider some additions to the cost of illness (COI) discussion to reflect expected differences between COI and willingness to pay (WTP). Some experts recommend that

COI values should be adjusted upward since they are expected to be lower than WTP values. This could be explored and discussed.

**Exhibit 3: Minor Edits**

- Change wording on pages iv and C-4 from “This page left intentionally blank” to “This page intentionally left blank” as on other pages.
- Edit paragraph on Page 2-3. It currently reads: “Finally, analysts should remember that children represent a group that is relatively understudied toxicologically” This statement is not true for clinical and epidemiology studies of PM and ozone, for example.
- Clarify and update Cost of Illness example in Box 4.1.
- Provide complete citation for Dockins et al.
- Provide distinction between two EPA 2000 citations or delete one.
- On page 1-6, Section 1.3, change “compliments” to “complements.”
- Change Chapter 6 Heading from “Risk Assessment and Economics Analysis” to “Risk Assessment and Economic Analysis.”
- The first bullet of Page 3-4 has a linearity assumption for magnitude changes. This requires a reference.
- Edit discussion of impacts on well-being so that it is in *ex ante* rather than *ex post* terms.
- In page 4-4, clarify intensive and extensive margins with respect to types of behavior.
- Page B-7, last paragraph, change “Analysts should be weary...” to “Analysts should be wary...”
- Define what peer-reviewed means.
- A bulleted list of what the *Handbook* can assist with is provided on Page 1-2. Provide specific information, such as a page number, to show where the reader can find the information in the *Handbook*.
- Consider moving Chapter 6 on Risk Assessment to the beginning since that is where it belongs logically in terms of benefits analysis sequence.
- Provide exact analytical requirements of Executive Order 13045.
- Provide a summary of recommendations in the beginning of the document.
- Explain in the introduction that it is currently not possible to develop a prescriptive cookbook given the present state of the literature.
- Consider removing the list of common assumptions provided in the appendix unless there is a clear motivating factor for keeping it.
- On page B-3, the work by Dickie and Nestor is criticized for “substantial aggregation error” for county level data. However, if the environmental indicator does not have accuracy or precision below that level and the policy analysis is at the county level, are those errors “substantial?”
- On page 3-6 it says there are three elements to consider, but six are listed in the following text.
- On page 3-8 three general benefits transfer approaches (point estimate, function, and meta-analysis) are introduced. The subsequent discussion of lifetime wealth adjustment seems out of place because it comes between the introduction of the three approaches and their discussion in Sections 3.1.3.2 and 3.1.3.3.

- Add an introductory paragraph to each of the appendices.
- Be cautious about suggesting that quantitative adjustments may be appropriate even though supporting literature is very limited. Assertions made in the *Handbook* could cause problems for analysts down the road as they defend their analyses in the regulatory process. Specific suggestions include:
  - Avoid saying that no adjustment of VSL for age should be made since some adjustments have been used in some analyses (see Section 3.2)

- Avoid suggesting that children's health has greater value than adult's health given that the empirical evidence is inconclusive at this point. (See Table 2.1 and associated discussion)
- Recognize that program offices may have to rely on available literature and data reviews, and that the absolutely most recent data is not always feasible or necessary to obtain (see page 4-8).

#### **4.2 Longer Term Activities for Future *Handbook* Revisions**

The longer term activities may be more productive after the literature on valuation of children's health has developed somewhat further. These activities are as follows:

- Develop options for a more prescriptive cookbook approach to children's health valuation.
- Further assess the literature on the economic valuation of children's health, reevaluate whether and how children's health is valued differently from adult's health, and determine if there is sufficient basis for making adjustments from adult values to children's values.
- Prepare a more detailed discussion of QALY analysis and how it may be applied. Consider whether there are specific uses of QALY for children's health, and take into account what the *Guidelines* says about QALY and other alternative analysis approaches.

### **REFERENCES**

U.S. EPA. 2000. *Guidelines for Preparing Economic Analyses*. EPA 240-R-00-003.

U.S. Environmental Protection Agency, Washington, D.C.

U.S. EPA. 2001. *Children's Health Valuation Handbook*. EPA 100-R-01-002. U.S. Environmental Protection Agency, Washington, D.C.

**Attachment A:  
Table of Contents from Handbook**

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**Attachment B:**  
**Memorandum from Al McGartland and Ramona Trovato**



## **MEMORANDUM**

SUBJECT: Release of the Children's Health Valuation Handbook and Request for Assessment

FROM: E. Ramona Trovato, Director  
Office of Children's Health Protection

Al McGartland, Director  
National Center for Environmental Economics

TO: Assistant Administrators  
Deputy Assistant Administrators

It gives us great pleasure to share with you the Final Review Draft of the "Children's Health Valuation Handbook," a document designed to assist EPA economists in valuing benefits and costs of improving children's health. This Handbook offers practical guidance on economic issues that are both important and unique to valuing children's health effects and serves as a companion to the *Guidelines for Preparing Economic Analyses* (2000).

We would like to thank the representatives from various EPA offices that provided invaluable assistance with the development of the Handbook:

Office of Children's Health Protection: Ed Chu  
Office of Policy, Economics, and Innovation: Chris Dockins, Robin Jenkins, Nicole Owens, Nathalie Simon, and Lanelle Wiggins  
Office of Air and Radiation: Allen Basala and Jim DeMocker  
Office of Prevention, Pesticides, and Toxic Substances: Nick Bouwes, Gary Cole, and John Faulkner  
Office of Solid Waste and Emergency Response: Paul Balserak and Jean Schumann  
Office of Water: John Bennett, Christopher Miller, and William Wheeler

The next step in the development of the Handbook involves examining how the Agency's economists can apply it to their benefit-cost analyses. We would like to invite your staff to a one-day workshop in August to participate in examining case studies using the Handbook. Their participation in the workshop and the case studies will allow us to identify future research needs and gather valuable information for the next modification to the Handbook. We plan also to make the workshop a learning opportunity about the application of the Handbook.

To this end, we invite you to identify analysts in your office who have had direct experience conducting economic analysis at EPA to participate in the workshop in August. It would be preferable if their economic analysis experience involved assessing children's health effects and/or human health effects. Please let Ed Chu know who will attend by July 20, 2001. Our staff will contact them with more information.

Thank you for supporting this effort. If you have any questions about the new Handbook or our follow-up efforts, please call Ed Chu at 564-2196.

Attachment

**Attachment C:  
List of Interview Questions**

## Sample Questions

### Presentation (Addresses the handbook as a whole)

#### 1. Clarity

- i. The handbook is designed to encourage the consideration of children's health in economic analyses done in the Agency. It guides users in qualitatively or quantitatively examining the economics of children's health but is not a prescriptive cookbook. It aims to further the research in this area. Are these objectives clear?
- ii. Is the language technically appropriate for your use? Your perceived audience's use?
- iii. Is the information clearly presented so that the content is easily understood?
- iv. What changes would you suggest, *if any*, to increase the clarity of the document?

#### 2. Ease of locating topics

- i. Are the topics logically laid out?
- ii. Does the design of the document make it easy to locate the information?
- iii. What are specific tools that might aid you in locating information (index, tabs, boxes...)?
- iv. What changes would you suggest? And why?
- v. Were you able to identify the major issues in each section? If no, what changes would you recommend?

#### 3. Design

- i. Is the document easy for you to use? If yes, how? If no, why not?
- ii. Do you like the layout of information?
- iii. What design changes, *if any*, would you suggest? And why?

### Content (Addresses the handbook and each section within)

#### 1. Relevance

##### Handbook:

- i. Given the Agency requirements to address children's health, is it useful to have a handbook that consolidates current state of the knowledge on the topic?
- ii. How would you use this handbook to meet Agency requirements to address children's health issues? Provide specific examples.
- iii. How relevant is the document in assisting Agency analysts explicitly consider (qualitatively or quantitatively) children's health in rulemaking?
- iv. Does it help in structuring the analytical blueprint for rulemaking?
- v. Who do you perceive as the users (audience) of this handbook?

##### Each section:

- vi. Are issues and methodologies discussed of sufficient importance to warrant being included?
- vii. Would it help if caveats and considerations were prioritized?

## 2. Adequacy

### Handbook:

- i. Does the handbook adequately cover topics on children's health valuation? If not, please expand and provide examples.
- ii. Does the document cover all of the major special considerations that arise when valuing health effects for the subpopulation consisting of children? If not, what other considerations should be included and why?
- iii. Bearing in mind that this handbook is a first attempt to address the analytical treatment of children's health benefits, what additional information would you like to see in this document?
- iv. Do you believe that it is currently possible to put together a prescriptive cookbook for valuing children's health for the Agency? Please provide specific and practical recommendations.
- v. How useful is the handbook in helping you prepare quantitative estimates for use in an economic analysis?
- vi. How useful is the handbook in helping you prepare qualitative estimates for use in an economic analysis?

### Each section:

- vii. Have all pertinent substantive issues relating to this section been identified and addressed? Have all the relevant analytical methods been identified and addressed?
- viii. How well does the handbook meet your need to identify issues surrounding children's health valuation and to explore alternative valuation methodologies? Your perceived audience's needs? Provide specific examples. Please provide recommendations, if any.
- ix. What general additions and deletions would you recommend in topical areas? In analytical methods?

## 3. Context

### Handbook:

- i. How useful is the handbook in the conduct of economic analysis?
- ii. What role do you see this handbook playing in future analysis?
- iii. This handbook was developed as a companion to the Economic Guidelines document. Have you read/used that document? What are your perceptions of the handbook as a companion to the guide?

### Each section:

- iv. How useful is this section in the development of economic analysis, analytic blueprint or other technical document for your office?
- v. Is the discussion of the methodologies and the associated difficulties clearly presented?
- vi. Is the information logically presented?
- vii. Are the tables useful? Do you think there is sufficient and clear discussion of the table contents in the main body of the report?

#### 4. **Currency**

##### Handbook and each section:

- i. Is the information up to date for the subject matter? (For example, is the document successful in reflecting the conclusions of the most recent economics research regarding valuing statistical lives and statistical injuries and transferring benefit estimates from one population to another? If not, where does the document fail and how can it be improved?)

#### 5. **Accuracy**

##### Handbook and each section:

- i. Are there any obvious errors or omissions (technical or non-technical)? What are they?
- ii. Is the information consistent with other published material on the topic? If not, please provide examples.

#### 6. **Bias**

##### Handbook and each section:

- i. Do you perceive any bias in presentation of the issues and valuation methodologies? If yes, please identify the perceived bias.

#### 7. **Innovation**

Handbook and relevant sections: This document has several purposes - not only to provide guidance for analysts when conducting economic analyses but also to stimulate further work on valuing children's health.

- i. Is this handbook useful in bringing together the existing knowledge base?
- ii. Does it serve as a catalyst for future research in the area? If yes, in what areas?
- iii. Would it further the analytical research in the topic within your group? If yes, in what areas?
- iv. Are there issues discussed that you had not considered in the past that are useful? If yes, what issues?
- v. Did the handbook lead you to consider analytical treatments you had not previously considered? If yes, please identify.
- vi. Do you think this document will influence how you prepare economic analyses in the future? If yes, how so?
- vii. Comment on whether or not the document is forward looking and asks relevant new questions for which answers might not yet exist. If the document is not successful in this regard, please specify how this can be remedied.
- viii. How would you like the document to evolve?