

importance of conducting area-specific assessments, as EPA did in evaluating the adverse respiratory-related impacts likely to result from attaining a more stringent O₃ standard.

Finally, one comment also notes that the Madronich draft analysis considers NMSC, but not other UV-B radiation-related effects, and that EPA should extend this quantitative analysis to estimate incidences of such other effects. The EPA believes that quantitative risk estimates to be used as a basis for NAAQS decision making should not be made based on back-of-the-envelope type approaches, as offered in the comment. Consistent with this view, EPA refrained from developing quantitative risk estimates for a range of adverse respiratory-related effects when it judged that information needed to make credible quantitative estimates was not available.⁶³ To do otherwise with regard to potential beneficial effects would be to apply a lower information standard than was used to assess adverse effects, which EPA declines to do, consistent with the direction from the Court in its remand to apply the "same approach," including the same (neither higher nor lower) "information threshold" to either type of information.

Although the biases and uncertainties outlined above can not be reliably quantified, EPA believes that it is reasonable to presume that any increase in nationwide annual incidences of NMSC associated with attaining a more stringent O₃ standard would likely be substantially smaller than estimated by the draft Madronich analysis. Assuming that it's even as much as one-third of that estimated by Madronich, the EPA judges that a nationwide NMSC incidence rate of this approximate magnitude would be very small from a public health perspective, representing an increase of roughly 0.03 percent in the national baseline incidence rate assumed by Madronich.⁶⁴ As to other

UV-B radiation-related effects, the Madronich draft analysis provides no basis for the development of credible quantitative estimates of such effects. Having chosen not to rely upon simple ratios to develop quantitative estimates of the "pyramid of effects" related to the estimated number of hospital admissions of asthmatics that EPA did quantify in its risk assessment,⁶⁵ EPA declines to use any lower information standard, as suggested by a few commenters, in its evaluation of potential beneficial effects.

In summary, EPA has conducted a provisional examination of the Madronich draft analysis, considering the underlying assumptions and methodology as well as the quantitative results and likely uncertainties and biases in the results. Based on this provisional examination, EPA does not believe that this analysis calls into question, but rather is generally consistent with the conclusions reached in its proposed response: That information is not available at this time that will allow for credible quantitative estimates of potential UV-B radiation-related impacts of attaining a more stringent O₃ standard, and that associated changes in UV-B radiation exposures of concern, using plausible but highly uncertain assumptions would likely be very small from a public health perspective.

C. Consideration of Net Adverse Health Effects of Ground-level O₃

In considering the net adverse health effects of ground-level O₃, EPA has focused on characterizing and weighing the comparative importance of the potential indirect beneficial health effects associated with the attenuation of UV-B radiation by ground-level O₃ (section II.B above) and the direct adverse health effects associated with

breathing O₃ in the ambient air (section II.A above). The same key factors considered by EPA in its 1997 review of the O₃ standard, and in the proposed response, are again considered here in characterizing the information on potential beneficial effects in the record of the 1997 review and in comments received on the proposed response, and in comparatively weighing this information relative to the direct adverse effects. Beyond quantitative assessments of exposure and risk that were central to EPA's 1997 review, these factors include the nature and severity of the effects, the types of available evidence, the size and nature of the sensitive populations at risk, and the kind and degree of uncertainties in the evidence and assessments. Because of the complexity and multidimensional nature of such a comparison, and because many of the effects, both adverse and beneficial, could not be characterized in terms of quantitative risk estimates, EPA has made no attempt to characterize all the relevant effects or associated risks to public health with a common metric.⁶⁶

The available record information on the potential indirect beneficial health effects associated with ground-level O₃ includes information from studies of health effects caused by exposure to UV-B radiation and studies that focus on the consequences of unnaturally high exposures to UV-B radiation due to depletion of the stratospheric O₃ layer, as well as analyses that attempt to focus specifically on the consequences of assumed changes in tropospheric O₃ levels. The nature and severity of the effects of UV-B radiation exposure on the skin, eye, and immune system are discussed above (section II.B.1), as is the nature of sensitive populations at risk for these effects. These effects, especially on the skin and eye, are generally understood to be associated with long-term cumulative exposure to UV-B radiation and to have long latency periods from cumulative exposures, especially those early in life. People with light skin pigmentation make up the primary at-risk population for effects on the skin, especially for NMSC, while at-risk populations for other effects are not as well understood. For NMSC, uncertainties in the evidence generally

⁶³ In the 1997 final rule (62 FR 38868), EPA specifically noted that for many O₃ inhalation-related risks to public health, information was too limited to develop quantitative estimates of risk, including: increased nonspecific bronchial responsiveness (related, for example, to aggravation of asthma), decreased pulmonary defense mechanisms (suggestive of increased susceptibility to respiratory infection), and indicators of pulmonary inflammation (related to potential aggravation of chronic bronchitis or long-term damage to the lungs).

⁶⁴ This judgment is consistent with the judgment made by EPA with regard to its estimate of the incidence rate of O₃-related hospital admissions of asthmatics in New York City, which was one of many adverse public health effects considered as part of the basis for its 1997 O₃ NAAQS decision. In its 1997 final rule, EPA judged that an annual increase of approximately 40 hospital admissions in

New York City alone, representing an increase of about 0.3 percent in total hospital admissions of asthmatics, was "relatively small from a public health perspective" (62 FR 38868). An increase in NMSC incidence of roughly 0.03 percent is an order of magnitude lower than the estimated rate of O₃-related hospital admissions of asthmatics, and such hospital admissions would generally represent a more serious health effect than an incidence of NMSC, which can generally be treated in a doctor's office or outpatient facility. The EPA also notes that based on baseline incidence rates reported on the Skin Cancer Foundation Web site, www.skincancer.org, submitted by a commenter, this increase in NMSC incidence would be roughly only 0.02 percent.

⁶⁵ In its 1997 final rule (62 FR 38868), EPA noted that O₃-related hospital admissions of asthmatics are indicative of a pyramid of much larger numbers of related O₃-induced effects, including respiratory-related hospital admissions among the general population, emergency and outpatient department visits, doctors visits, and asthma attacks and related increased use of medication that are important public health considerations.

⁶⁶ A commenter asserted that the Court's direction to consider O₃'s net adverse health effect in essence presumes the existence and use of a common metric. The EPA notes that while the Court identified the use of a common metric as one approach that EPA could use, in no way did the Court require EPA to use such an approach, nor does EPA believe that such an approach would provide a more meaningful basis on which to evaluate O₃'s net effects.