

# **Comments on the CASAC Review of US EPA's Integrated Science Assessment for Sulfur Oxides – Health Criteria (External Review Draft – November 2015)**

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Thank you for the opportunity to provide comments on the CASAC review of EPA's *Integrated Science Assessment for Sulfur Oxides – Health Criteria (External Review Draft – November 2015)*. Today I would like to present a few observations for your consideration based on the discussion at the CASAC meeting in January.

I first want to point out that concern with data integration among chapters, including a lack of consistency across chapters, was an overarching issue raised at the CASAC meeting. The CASAC letter touches on this in its discussion of individual sections, but it might be helpful for the letter to discuss this as a global issue in the overall conclusions. Emphasizing the need for consistency and data integration upfront will also help ensure the ISA is more accessible to policy makers.

There was also considerable discussion at the CASAC meeting about how to improve the discussion on ambient chemistry and ambient concentrations. It would be helpful if the chapter also discussed how monitors reporting levels that are below the limit of detection are treated in analyses. As indicated during the CASAC meeting, these data may be treated differently depending on the state or jurisdiction.

I also note that the CASAC letter encourages a thorough discussion of exposure models and measurement error as it relates to epidemiology study interpretation in Chapter 3 of the ISA, but the letter only briefly mentions this point when discussing Chapter 5. CASAC should consider emphasizing this point in its discussion of Chapter 5, as the ISA should systematically evaluate this issue before presenting and evaluating any individual study results.

Regarding Chapter 4, several CASAC members expressed doubt about the presented MOA for extrapulmonary effects due to the high concentration of ingested sulfur compounds, and that additional discussion on the strength of evidence and data gaps for key events would help direct future research efforts in this area, and increase confidence in the proposed MOAs. The CASAC letter should also suggest that the ISA would benefit from more discussion of how, and to what degree, the MOA evidence supports the epidemiology evidence in the health effects chapter.

The CASAC letter indicates that Chapter 5 can be improved by focusing on key studies and by providing a more rigorous assessment of study quality. The letter should also indicate that the ISA should be specific about which studies are the strongest and are given the most weight and why, and to make clear which studies are suggestive and which are inadequate. As discussed during the CASAC meeting, the letter should also include a more rigorous analysis of the concentration-response curve at low doses to determine whether there is sufficient evidence to conclude there is no threshold.

Finally, the CASAC letter discusses the need for greater clarity in Chapter 6. Dr. Speizer and a few other CASAC members expressed concern over the way the information was presented in this chapter. Dr. Speizer specifically indicated that this chapter was not comprehensive regarding study inclusion, that findings from individual studies were not always accurately represented, and that evidence from individual studies was not presented in a consistent manner. He went so far as to suggest that this chapter could be deleted. The CASAC letter should reflect this point of view. At the very least, the letter should indicate that if this chapter is to be included, it should be researched and written with the same rigor as other chapters.

Thank you very much for your time and I welcome any questions.