
From: Schulte, Paul A. (CDC/NIOSH/EID)
To: Hearl, Frank J. (CDC/NIOSH/OD)
CC: Howard, John (CDC/NIOSH/OD)
Sent: 7/8/2010 3:38:12 PM
Subject: FW: Opinion Re Health Risks (EPA Monitoring Data)

From: Schulte, Paul A. (CDC/NIOSH/EID)
Sent: Thursday, July 08, 2010 3:33 PM
To: Howard, John (CDC/NIOSH/OD)
Subject: FW: Opinion Re Health Risks (EPA Monitoring Data)

John,

I discussed this issue with McKernan, Sofge, and Niemeier.

Right now there are too few data to make any kind of meaningful individual risk assessment for clean-up workers. I would not try to make much of the EPA data to assess worker risks directly. Those data need to be seen in light of historic values. It is not even known to what extent those benzene levels relate to the oil release. The best analysis would involve using worker data from NIOSH and OSHA which, so far indicate quite low exposures. However, a quantitative risk assessment of the NCI data might show significant risks (on the order of 1/1000 for leukemia) at levels substantially below our current REL of 0.1ppm but that is just speculation at this point.

Frank was correct in his general assessment that the data are not remarkable (in terms of indicating potential risk). That being said, while Frank's math appears correct, the ultimate interpretation needs denominators so that the absolute risk (eg per 1000) workers above background can be calculated. This is a more difficult issue. We could do a rough calculation but it might be a lightning rod, and it would be better to take some time and do a conscientious analysis. That is what we put in the comprehensive CDC proposal.

At this time, it may be best to say that we are concerned that any exposure to benzene may increase leukemia risk by some small amount. However, at the present time, from the data collected, it appears that clean-up worker exposures are quite low, indicating the risk of benzene-induced leukemia in clean-up workers may be quite small. Given the seriousness of the health effects of benzene and other carcinogens found in oil, it is prudent to continue monitoring worker exposures to these chemicals for as long as the clean-up operations continue.

From: Howard, John (CDC/NIOSH/OD)
Sent: Wednesday, July 07, 2010 3:11 PM
To: Schulte, Paul A. (CDC/NIOSH/EID)
Cc: Hearl, Frank J. (CDC/NIOSH/OD); Kitt, Margaret (CDC/NIOSH/OD)
Subject: RE: Opinion Re Health Risks (EPA Monitoring Data)

Thanks!

From: Schulte, Paul A. (CDC/NIOSH/EID)
Sent: Wednesday, July 07, 2010 3:00 PM
To: Howard, John (CDC/NIOSH/OD)
Cc: Hearl, Frank J. (CDC/NIOSH/OD); Kitt, Margaret (CDC/NIOSH/OD)
Subject: RE: Opinion Re Health Risks (EPA Monitoring Data)

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Will review and get back to you.

From: Howard, John (CDC/NIOSH/OD)
Sent: Wednesday, July 07, 2010 2:55 PM
To: Schulte, Paul A. (CDC/NIOSH/EID)
Cc: Hearl, Frank J. (CDC/NIOSH/OD); Kitt, Margaret (CDC/NIOSH/OD)
Subject: Opinion Re Health Risks (EPA Monitoring Data)

Paul:

Increasingly, various commentators are looking at the EPA data and making a case for potentially harmful effects. I sent Frank earlier today an example of one blogger do just that. Frank examined the data and prepared a short report. I was wondering if you had any views that might be useful? I am set to do several interviews on the oil spill and the issue of the risk from exposure will undoubtedly come up.

Thanks for anything you or your folks have to offer.

JH

From: Hearl, Frank J. (CDC/NIOSH/OD)
Sent: Wednesday, July 07, 2010 12:47 PM
To: Howard, John (CDC/NIOSH/OD)
Subject: RE: EPA Data

Not much remarkable here John.

Background: The NIOSH REL for Benzene is 0.1 ppm **equivalent to 100 ppb** or 0.319 mg/m³ or 319 micrograms/m³.

It appears the first map shows levels mostly around 4-6 ppb, with few 30-70 ppb measurements clustered between Mobile AL and Pensacola FL. The highest value of 72.8 ppb is reported in West Pensacola (Point 37). The relation of these benzene levels to Deepwater Horizon sources is not clear. The benzene at this level could be from land-based sources or not?

The EPA gives a low-level risk to levels below 20 micrograms/m³. That equates to 6.27 ppb (about 6% of the NIOSH REL). At levels above this they say it depends on how much above the limit you are; with no further criteria. The article below has that correct.

What is the cancer risk of exposures at these ppb levels? From EPA's IRIS Database I found:

<http://www.epa.gov/ncea/iris/subst/0276.htm>

Wong (1983, 1987) reported on the mortality of male chemical workers who had been exposed to benzene for at least 6 months during the years 1946 to 1975. The study population of 4602 persons was drawn from seven chemical plants and cumulative exposures to benzene were determined for all subjects. The control subjects (3074 persons) held jobs at the same plants for at least 6 months but were never subjected to benzene exposure. Dose-dependent increases were seen in the risk of leukemia and the risk of lymphatic and hematopoietic cancer. Chemical workers with a cumulative exposure to benzene of 720 ppm-months were subject to a borderline significant relative risk of 3.93 ($p = .05$) for lymphatic and hematopoietic cancer.

A 70-year continuous exposure at 70 ppb results in 243 ppm-months of dose (converted to 24 hr - 7 day exposure by a factor (168 hrs per week / 40 work-hours per week) .

The IRIS article also reports an NCI study of Chinese workers exposed to Benzene and found:

Workers in a variety of jobs in painting, printing, footwear, rubber, chemical, and other industries were

followed for vital status for an average period of time of less than 12 years. Less than 0.3% were lost to follow-up. Employee work histories were linked to benzene exposure data in order to derive individual time-specific estimates for each worker (Dosemeci et al., 1994). This large cohort mortality study produced a significantly elevated risk of hematologic neoplasms (RR = 2.2, 95% C.I. = 1.1-4.2) in workers exposed to benzene at an average level of less than 10 ppm. A combination of ANLL and MDS produced a risk of 3.2 (95% C.I. = 1.0-10.1). For exposure to a sustained concentration of 25 ppm benzene, the risk of ANLL and MDS increased to 7.1 (95% C.I. = 2.1-23.7). The risk of other leukemias (other than ANLL), including chronic myeloid and monocytic leukemia, was not significantly elevated (RR = 2.0). Additionally, the risk of non-Hodgkin's lymphoma was significantly elevated (RR = 4.2 with 95% C.I. = 1.1-15.9) for those with a sustained exposure to benzene that occurred at least 10 years prior to diagnosis.

<Frank>

Frank J. Hearl, PE

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From: Howard, John (CDC/NIOSH/OD)

Sent: Wednesday, July 07, 2010 11:42 AM

To: Hearl, Frank J. (CDC/NIOSH/OD)

Subject: EPA Data

Frank:

Can you take another look at the EPA data. It seems others are. See below.

July 7, 2010

BP'S Benzene Blows ashore in the Gulf.

Chris Landau (Geologist/meteorologist)

Please open the link to see a map of benzene locations I have plotted, for 114 points using data from the EPA web site. I have used values above 4 parts per billion for data gathered by the mobile testing stations for the period June 24-29. Some data may have been omitted. It was not intentional and I hope to improve on data translation to 2-d maps which are easier to assimilate. What we are all looking for is the big picture. We need to look after ourselves. I hope you find it useful.

<http://www.gpsvisualizer.com/display/data/1278445388-02218-76.115.131.57.html>

EPA has a table that makes recommendations for levels of certain volatile organic compounds in micrograms/m³. At code yellow, they express a level of health concern for the public. They do not have figures for code red.

<http://www.epa.gov/bpspill/vocs.html>

Benzene levels have risen in some places to EPA Code yellow or 20 micro grams/m³. 1000 ppb= 3.19 micro grams per cubic meter or 1 ppm benzene = 3.19 mg/m³. The highest level recorded for the few days, I took the data was about 72.831 ppb. That translates to 232.33 micro grams/m³. I wonder what code red is?

232.33micro grams/m³ is more than 10 times higher than the code yellow concern level of 20 micro grams/m³.

I will limit my discussions to the carcinogen benzene whose levels are rising. At 1000 parts per billion (ppb) or 3190 micro grams per cubic meter (g/m³), this chemical causes cancer and or leukemia for long term daily exposure at this level. One part per million is the same as 1000 parts per billion. The reported limit for June 24, 2010 was 23 micrograms/m³ or 7.21 ppb. It is still for this test taken, 138 times below the EPA reported long term danger level. It bears further watching.

The EPA table link is below showing the levels of some volatile organic compounds for EPA Air Sampling June 1 - June 26, 2010; Alabama, Florida, Louisiana, and Mississippi

http://www.epa.gov/bpspill/data/air_sampling_update.pdf