

Sports Medicine and Science Committee  
Conference Call Minutes  
July 14, 2011 7:00 pm Eastern; 4:00 pm Pacific

1. Participants: Jane Moore, chair; Jessica Seaton, vice chair; Bill Ewan, Kristen Heath, Jane Katz, Mary Pohlmann, Diane Rothenberg. Excused: Nadine Day, executive committee; Hannah Caldas, Steven Erickson, Jim Miller.
2. Call began at 4:05 pm Pacific.
3. Discussion of research proposal (copy at end of these minutes) regarding incidence of bladder cancer in Masters swimmers.
  - a. Concerns with study design included lack of quantification of exposure to chlorine – years of membership does not correlate to amount of exposure which depends on consistency of training, amount of training, location of swimming, type of water treatment in pools, indoor versus outdoor pools versus open water training. Study would really only show effect of membership versus non-membership. Another concern was the small size of the sample available; if this study would lead to a larger, more in depth study if an effect were apparent, that would probably be OK.
  - b. Diane Rothenberg moved to approve collaboration with the researcher; Bill Ewan seconded. Motion was approved 5-4 (including email votes from excused members).
4. Sports Medicine Lectures
  - a. Kyle Herrig was a very good speaker at Short Course Nationals but only five people attended. The room was hard to find and set up unsatisfactory. Talk was scheduled during the 50 free so many swimmers could not attend. It was listed in the program and announced several times.
  - b. Jane will check with Sally Guthrie regarding speaker and arrangements for Long Course Nationals.
  - c. Nancy Iverson from PATHSTAR will speak at convention. PATHSTAR is a program that brings Lakota Sioux youth from Pine Ridge Reservation in South Dakota to San Francisco to learn swimming and healthy nutrition to prevent diabetes. The program finishes with a swim from Alcatraz.
  - d. We will discuss future lectures at the September committee meeting.
5. Display/Screening
  - a. Rob Butcher suggested that this committee could request funding from the Swimming Saves Lives Foundation to create an educational display to place in the sponsor area at national championships to provide information to swimmers.
  - b. Swimmers liked the skin cancer screening provided at Mesa. Future events could provide similar screenings. The National Senior Games and the Huntsman Games provide health screenings. These are quite popular. Providing screening would require someone to arrange for local resources to provide screening. Many different types of health providers can provide screenings.
  - c. Committee members thought this would be a more beneficial use of funds than speakers, particularly since swimmers could view the display on their own schedule.

- d. Committee members will each compile a list of potential types of screening and information for a display board. We will discuss ideas and next steps at the September meeting.
6. Other
- a. A swimmer from Florida sent a request to define parameters regarding the use of aerosol sunscreens at USMS sponsored events. She would like use confined to a designated area located away from the pool, areas where swimmers congregate, and indoor areas including locker rooms. Sunscreen vapors can cause bronchial spasms and other breathing difficulties when inhaled.
    - i. A ban on use in certain areas would likely require a rule change. This is a legislation year. A request for such a ban is unlikely to be considered an emergency. A suggestion or recommendation would be easier to put into place.
    - ii. This should apply to any aerosol sprays not just sunscreen. People may be sensitive to many substances. Recommendation should be to forbid aerosols in enclosed areas and suggest a limited, designated area for use of aerosol sprays.
    - iii. Some facilities may already have rules regarding sprays. Concerned swimmers should check facility rules.
    - iv. Committee will collect references to document need for a recommendation to limit use of aerosol sprays. This will be discussed at the September meeting.
7. Next meeting will be at convention Friday September 16 10:30 am – 11:45 am
8. Call completed and meeting adjourned at 4:45 pm.

## **Proposal for a record-based study of bladder cancer incidence among Master Swimmers**

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### **Introduction**

Chlorination of drinking water has a major public health benefit by reducing risk of infection. However, it has long been known that chlorinated by-products in drinking water, such as trihalomethanes (eg., chloroform, bromoform), cause cancer in animals. The EPA has therefore set regulatory limits for trihalomethanes in drinking water (80 microgram/liter), while taking care that levels are sufficient to kill microbes. Recent epidemiologic studies have found higher risk of bladder cancer among humans who consume higher amounts of trihalomethanes in drinking water. For example, Villanueva et al. (2007) in a large study found that those with higher trihalomethanes in drinking water (>49 microgram/liter) had a significant two -fold higher risk of bladder cancer than those with low levels of trihalomethanes (<=8 microgram/liter). Chlorination of swimming pools is routine for the same reason as chlorination of drinking water, to prevent microbial infection. Chlorination of swimming pools does not necessarily result in higher levels of chlorination by-products, such as trihalomethanes, in pool water than in drinking water. However, swimmers absorb more chlorinated by-products via dermal absorption and inhalation than do non-swimmers whose only exposure is via drinking water. Recently, Kogevinas et al. (2010) have studied 50 swimmers in a pool which had a level of trihalomethanes of 49 microgram/liter. These swimmer had a 7 fold increase in trihalomethanes in their exhaled breath after swimming for 40 minutes compared to before swimming. Furthermore, the rate of one type DNA damage increased significantly with increased levels of brominated trihalomethanes the exhaled breath of swimmer. These indications of short-term effects in swimmers have been accompanied by findings from the large bladder cancer study conducted by Villanueva et al. (2007). In that study swimming in pools was associated with a significant 57% increase in bladder cancer risk.

### **Aim of proposed study**

Given this background, it would be worthwhile investigating whether Master Swimmers have an increased risk of bladder cancer. This can be done using records of membership in the Masters Swimmers and linking these records with cancer registry data. The goal would be to compare the rate of bladder cancer among Masters Swimmers with the rate of the general population, after adjusting for age, sex, and calendar time.

### **Study design**

This would be a record-based study 'cohort' study, in which rates of bladder cancer in swimmers would be compared with rates of bladder cancer in the US population. There would be no contact with members of Master Swimming. Rates of bladder cancer (and other cancers) would be determine by identifying cases among swimmers by matching with state cancer registry coverage in the US is largely complete from about 1995 for most states, although some states go much further back (eg California 1988, New York 1976).

All data would be held confidential in accordance with standard Emory Institutional Review Board (IRB) regulations. The study would need to be approved by the Emory IRB beforehand.

Once the matching with state registries was done, we would construct bladder cancer disease rates (from the Cancer Registry and also using bladder cancer mortality data from the National Death Index) for the Masters swimmers. These rates would then be compared to US national rates for bladder cancer, adjusted for age, race, sex, and calendar time. This is a fairly standard research design for what we call a 'cohort' study, where the Masters swimmers form the cohort.

We may also be able to estimate years of membership by determining how long members stay on the membership rolls. If so we would then also compare bladder cancer rates for those with more years membership to those with less years of membership. It would also be possible, with this research design, to analyze for any cancer, and for any cause of death – but the a priori outcome of interest would be bladder cancer.

### **Feasibility**

The feasibility of a study depends on 1) the availability of records with personal identifiers for matching with state cancer registries and 2) on there being enough expected bladder cancers to allow detection of any excess risk for swimmers, should there be any (ie, enough 'statistical power').

#### a) Membership records.

The number of Masters swimmers over time is available on the USMS website. These data indicate membership of 12,000 in 1982 to 55,000 in 2010. Conversations with those familiar with the data indicate that electronic files of members exist back in time, although they were not comprehensively collected in a single national data base until the late 1990s. These same contacts suggested that the electronic files (spreadsheets) before 1998 were likely to be about 75% retrievable.

Key variables from membership lists to be used as identifiers for matching with state cancer registries (as well as with the National Death Index to identify deaths) include name, gender, date of birth, and address.

#### b) Number of expected cancers

Based on the numbers of swimmers by year, as well as data on the age structure of Masters Swimmers, I have estimated the number of bladder cancers expected in a Masters Swimmers cohort over time, though 2010. Expected numbers of bladder cancers are important because without a sufficient number the statistical 'power' of a study may be too small and hence not worth doing.

I restricted my calculations using males because names for women may have changed from maiden name to married name over time, making matching with cancer registries more difficult. There is no reason to expect that possible increased bladder cancer risk in relation chlorination by-products would be different in men vs. women.

Details of these calculations are available on an Excel spreadsheet. I estimated the number of 'years at risk' under and over age 65, and then multiplied the 'years at risk' by the yearly bladder cancer incidence rate for these age groups based on national cancer registry data for 1997-2001. The rate of bladder cancer among males during this period was 10/100,000 for males under 65, and 226/100,000 in males 65 and over. I also assumed follow-up ended at age 80, which is life expectancy in the US. These procedures and assumptions are fairly standard. They provide a broad approximation of the number of bladder cancers expected.

The expected numbers of bladder cancers was 267 for males 65+, and 37 for males under age 65. Under the more restricted assumption that no membership data were available before 1998, the number of bladder cancers expected was 60 for males 65+ and 13 for males under 65. These numbers are more than sufficient to provide adequate statistical 'power' for a study. For example, with 304 bladder cancers expected, one can expect to be able to detect an increase of risk as small as 15% in the bladder cancer rate of swimmers vs. the US population (80% probability of detection). For the more restricted assumption of no data available before 1998, one can still expect to detect an increased risk of 30%.

### **Next steps**

If USMS has some interest in this proposal, it might be advisable to arrange for either a phone call or even a face-to-face meeting to discuss it further. Ultimately the USMS should decide whether they wish this study to be done, and if so, to determine how to best work collaboratively. Financing for this study would be via a grant application that I would make to the NIH, or any other pertinent granting agency. Although one cannot predict success, this subject is an important one and the study is feasible, so I expect our chances would be reasonable. The process of obtaining funding is likely to take 1-2 years. Conducting the study itself would take about 2-3 years.

### **My background**

I am an epidemiologist with long experience conducting these types of studies. I worked for the Centers for Disease Control for 20 years prior to coming to Emory in 2002. I have attached my curriculum vitae along with this proposal.

### **References**

Kogevinas M, Villanueva CM, Font-Ribera L, Liviach D, Bustamante M, Espinoza F, et al. 2010. Genotoxic effects in swimmers exposed to disinfection by-products in indoor swimming pools. *Environ Health Perspect* 118:1531–1537.

Villanueva CM, Cantor KP, Grimalt JO, et al. Bladder cancer and exposure to water disinfection by-products through ingestion, bathing, showering, and swimming in pools. *Am J Epidemiol* 2007; 165: 148-156.