A joint briefing for IWC 63 by Animal Welfare Institute, BlueVoice, Campaign Whale, Elsa Nature Conservancy, Environmental Investigation Agency, LegaSeaS International, OceanCare, Pro Wildlife, Society for the Conservation of Marine Mammals, World Society for the Protection of Animals, and Whale and Dolphin Conservation Society

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Agenda Item 13 - Environmental and Health Issues

Recent Developments on Human Health Risks from the Consumption of Cetacean Products

Introduction

Toxic substances, such as polychlorinated biphenyls (PCBs), dichloro-diphenyl-trichlorethane (DDT), chlordane, and mercury (Hg) are well known for their negative impact on human health. These contaminants may act as endocrine disruptors, influence male fertility and sex ratio, damage prenatal and neurobehavioral development, reduce immune system function and are suspected to be linked to Parkinson's disease, arteriosclerosis and hypertension.[1] Many cetacean species, like humans, are top predators and accumulate high concentrations of toxic substances through the food web. Accordingly, intake of cetacean products may pose a serious threat to human health, especially when consumed regularly or in large amounts.

In 1998, the International Whaling Commission (IWC) addressed human health concerns related to the consumption of cetacean products through Resolution 1998-11, which invited member governments to submit information and requested further collaboration between the World Health Organization (WHO) and the IWC. The Resolution also encouraged the WHO and other appropriate agencies to "*put this issue on their own agenda*". Resolution 1999-4 followed, urging Parties to collect and provide more data and requesting the IWC Scientific Committee to "*receive, review and collate data on contaminant burdens in cetaceans and forward these as appropriate to the WHO and competent national authorities, and to report on this matter to the Commission*".

Despite repeated requests from member governments, there has been no effective dialogue between the WHO and IWC to help address this issue internationally. In 2010, twelve IWC member governments asked the Secretariat to reactivate cooperation and contact the WHO directly on this issue. The Secretariat has reportedly approached the WHO and through it has obtained information on the Provisional Tolerable Weekly Intake for methyl mercury.

Arctic Assessment

The *Arctic Monitoring and Assessment Programme* (AMAP), a group working under the Arctic Council, published a 2009 assessment of Human Health in the Arctic, which built upon previous assessments in 1998 and 2002.[2] Many indigenous populations in the Arctic region have poorer health than national averages and contaminant burdens play an important role. Epidemiological studies provide evidence for subtle immunological, cardiovascular and reproductive effects due to contaminants in some Arctic populations, indicating that persistent organic pollutants (POPs), mercury and lead can affect the health of people, and especially children at lower levels than previously thought.[3]

While a major dietary shift from traditional to conventional store-bought food is underway in most of the Arctic, traditional foods are considered important for social, cultural, nutritional, economic and spiritual reasons. The 255 page AMAP report notes, however, that: "*Exposure to environmental contaminants from a traditional diet is a potential risk to human health, especially for the developing fetus and young children due to their physiological and anatomical immaturity and rapid development*."[4]

Human exposure to most legacy POPs (such as PCBs, DDE and oxychlordane) and mercury is decreasing in many Arctic populations, reflecting changes in diet, changing levels in environmental contamination, and health advice to critical groups in some areas concerning consumption of potentially harmful foods. However, marine mammals remain a major dietary source of POPs and mercury. Concentrations of PCBs and oxychlordane in Inuit mothers and adults in eastern Canada and Greenland that eat marine mammals continue to be two to ten times higher than levels seen in other Arctic populations. Data for Arctic Russia have also indicated elevated levels of oxychlordane and PCBs in indigenous coastal peoples from Chukotka, linked to their consumption of marine mammals.[5]

While levels of many POPs have declined in the Arctic environment, emerging compounds such as brominated flame retardants and fluorinated compounds are a concern. These chemicals are present in Arctic people and biota, and while it is known that levels globally have increased over the last 15 years, their toxic effects have not been studied in detail.[6]

Greenland

Inuit in North East and North West Greenland in particular consume large quantities of marine mammals. Concentrations of DDT and PCB in the fat tissue of women of fertile age have been found to be around ten times higher than in women from Southwestern Greenland. The same pattern is also seen in relation to heavy metals and POPs in the blood of men and women from those areas.[7] Studies show that cetacean products in particular carry extremely high levels of mercury. While some other contaminants can be avoided by not eating liver, kidney and blubber, mercury (methyl-mercury) in particular accumulates in muscle tissues. The content of heavy metals in one meal exceeded the FAO recommended maximum intake per day in cases where liver, kidney and blubber were included.[8]

Canada

Inhabitants of Arctic Canada show the second highest contamination levels for mercury and several POPs in the Arctic, next to Greenland.[9] Concentrations of contaminants are linked to the high proportion of marine mammals, e.g. beluga whales, in their diet. In several Inuit communities, plasma levels of most POPs were up to ten times higher and mercury levels around five times higher than in Dene, Metís and Caucasian people, whose diets do not include marine mammals.[10] In recent years, the Inuvialit have reduced their consumption of marine mammal blubber (especially from beluga) by a factor of three. This seems to be a direct consequence of health warnings regarding contamination of fat tissues.[11] A recent study among Inuit in Nunavik confirmed the negative impact of mercury on blood pressure.[12] At present, a cohort study on the effects of POP contamination involving 300 children is being carried out in 14 Nunavik communities.[13]

Russian Federation

In the Chukotka Peninsula, the consumption of marine mammals significantly increased between 1985 and 2000.[14] Although the intake of whale meat and blubber is now higher than in East Greenland, human plasma levels of PCB and DDT are lower, indicating that marine mammals in Russian waters are less contaminated.[15] Compared to other Russian regions, chlordane levels in pregnant women are up to 30 times higher in the Chukotka Peninsula, and PCB levels are two to three times higher.[16] The *Russian Persistent Toxic Substances Study* of 2001-2004 found that women with higher PCB or chlordane levels in their blood serum had a significantly higher risk for premature birth, stillborn cases and newborn children with birth defects.[17] The level of PCBs in the blubber of gray whales (87-232ng/g) was found to be lower than the Russian Food Safety limit of 300ng/g, while DDT and HCH (ß-Hexachlorcyclohexan) levels only slightly exceed these limits.[18] Nevertheless, people in northern Chukotka are advised to limit the consumption of whale blubber (including muktuk) to 300-400 g/day, while liver and kidney should be avoided.[19] New data from Arctic Russia also indicate that dichlorodiphenyldichloroethylene (DDE) and DDT are also elevated in both indigenous and non-indigenous populations.

Alaska

A study comparing concentrations of contaminants in maternal blood in different indigenous groups showed higher levels of many organochlorines and heavy metals in those groups whose diet relied more on marine species feeding at higher trophic levels. In particular, blubber and muktuk from marine mammals carry high levels of PCBs, DDT and chlordane.[20] Tolerable Daily Intake limits have been set, with the most restrictive being 78g of muktuk and 32g of blubber from beluga and 300g of muktuk and 67g of blubber from bowhead whale. Safety limits for seal blubber are more than ten times higher.[21] Beluga and pilot whales were the most relevant sources for mercury burden other than polar bears. Bowhead and grey whales, which are at a lower trophic level, show lower contamination levels.[22]

Faroe Islands

Human health effects from the consumption of pilot whales have been studied since the early 1980s in the Faroe Islands, leading to increasingly stringent advice on consumption limits. In August 2008, the Chief Medical Officer of the Faroe Islands recommended, in an open letter to his government, that pilot whale meat should no longer be used for human consumption, due to the high risks for human health.[23] Unfortunately, despite these recommendations, in June 2009 the Ministry of Foreign Affairs advised Faroese consumers to continue to be guided by 1998 dietary guidelines which recommend reduction, rather than elimination, of whale products from the diet. The Ministry also called for "*a broad and independent evaluation of these findings*" and urged "*also drawing on appropriate external expertise*."[24]

More than 2,000 families have participated in past cohort studies in the Faroe Islands and residents are generally aware of the health risks. This is thought to be contributing to a considerable reduction in

demand for pilot whale products. Further cohort studies are ongoing, focused on effects in older people and on reproductive health.[25] In 2011 the Faroese Government issued revised guidelines limiting adult consumption of pilot whale to 250g of meat and 50g of blubber each month, with women planning pregnancy, already pregnant or breastfeeding advised to not eat it at all.[26]

Japan

Japan has provisional regulatory limits for mercury and methyl-mercury (MeHg), and PCBs in seafood of 0.4ppm (parts per million), 0.3ppm and 0.5ppm respectively, however these limits are not applied to cetacean products.[27] Data reported to the IWC's 2009 JARPNII review workshop revealed that PCB levels in the blubber of common minke whales averaged 0.76±0.50ppm in a data set of 347 whales over the course of 5 years (2002-2007), the highest level being eight times higher than Japan's provisional regulatory limit of 0.5ppm.[28] While mercury levels are generally below Japan's provisional regulatory limits in common minke whales, tests from five sperm whales showed average levels of 1.5ppm.[29]

A study published late 2009 revealed mercury levels in the hair of 50 Taiji citizens along with mercury/methyl-mercury levels in samples of red meat from short-finned pilot whale, Risso's dolphin and striped dolphin.[30] According to the authors, "*the contamination level of Hg in the red meat of short-finned pilot whales sold in Japan has been shown to be several times higher than that of long-finned pilot whales consumed in the Faroe Islands*." The average levels found in the cetacean products were: 9.6ppm Hg / 5.9ppm MeHg in short-finned pilot whales; 4.0ppm Hg / 2.2ppm MeHg in striped dolphin; and 4.4ppm Hg/ 3.1ppm MeHg in Risso's dolphins.

Of the 50 residents tested, 39 residents ate small cetacean red meat at least once every few months, and 11 residents did not eat 'whale meat' at all. The most popular species eaten was short-finned pilot whale, the most contaminated of the species tested. The residents also ate albacore and/or yellowfin tuna more than once each week. The results showed extremely high levels of mercury in some of the residents, which were clearly correlated with the consumption of whale and dolphin meat. The total Hg concentrations in three residents who ate whale meat more than once each month exceeded the WHO's NOAEL of 50µg/g.[31] Average total mercury (T-Hg) in residents according to their consumption of cetacean products was as follows: 4.3ppm in 11 people that ate no pilot whale or dolphin meat; 15.5ppm in 11 people that ate cetacean products once every few months; and 24.6ppm in 28 people that ate cetacean products more than once a month. The average T-Hg levels of the 50 Taiji residents was markedly higher than that observed in the Japanese population overall.

At the request of the local government of Taiji, the *National Institute for Minamata Disease* (NIMD) began an investigation in 2009 to study mercury levels in the hair of Taiji residents, also finding a correlation between eating whale meat and mercury concentration in hair samples. 1,017 residents were tested in June-August 2009 and 372 residents in February 2010, with 252 overlapping subjects. The average mercury concentration in males was 11.0ppm (0.74-139ppm) and 6.63ppm for females (0.61-79.9ppm). This is more than four times higher than levels normally found in Japanese people, which according to the NIMD report is 2.47ppm in males and 1.64ppm in females. The study shows that Taiji hair mercury levels are significantly higher than levels of mercury in the hair of Faroese whaling men (7.31µg/g).[32] Just over 3% of the summer study's subjects exceeded the WHO's 50ppm lower limit for neurological symptoms. 182 subjects that had relatively high mercury concentrations were administered a standard two-point discrimination test and upper limb functionality exercise tests. However according to the NIMD report, it was not possible to prove a case for mercury poisoning. The NIMD will carry out further investigation on hair samples, neurological tests and effects on children and circulatory systems; however the results of its first investigation were strongly criticised by health experts for the lack of meaningful standard tests to detect neurological damage.[33]

A further Japanese study investigated several metals including mercury in maternal and umbilical cord red blood cells (RBCs) at parturition in 81 Japanese women aged 21 to 39. The study found that fetal exposure to these metals (excluding cadmium) strongly reflected maternal exposure levels. However, in the case of methylmercury, placental transfer was particularly high. The authors stated that "*Hg, in particular, showed higher accumulations (approximately 1.6-fold) in cord RBCs than in maternal RBCs. This higher MeHg accumulation in fetuses than in mothers during the gestation when the fetal brain is most vulnerable has become an important public health issue, especially in Japanese and other populations whose diet includes fish and sea mammals*." [34]

In March 2011, mercury analysis of 23 cetacean products purchased largely from internet shopping sites found that 65% exceeded Japan's 0.4ppm limit for mercury, with an average level of 2.55ppm. The highest level (21ppm) was found in a product labelled "whale stewed giblets" originating from Taiji.[35] In June 2011, news reports revealed that radioactive caesium had been detected in whales landed in

Kushiro City, Hokkaido, 650 km from the damaged Fukushima Daiichi nuclear plant. Radioactive caesium at levels of 31 becquerels and 24.3 becquerels per kg were found in two of six whales examined.[36]

Recommendations

We urge IWC member governments, recalling Resolutions 1998-11 and 1999-4, to:

1. Continue and expand cooperation with the WHO on this important public health issue;
2. Include human health concerns as a priority issue in the Future of the IWC discussions;
3. Propose the establishment of a working group on human health concerns;
4. Propose the development of an IWC workshop on human health concerns associated with the consumption of cetacean products;
5. Urge nations that consume whale or dolphin products to provide relevant information on levels in these products and human health aspects to the IWC and the WHO;
6. Urge whaling nations to communicate their scientific findings on human health risks from the consumption of cetacean products to their public.

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