AMAP ASSESSMENT 2018

BIOLOGICAL EFFECTS OF CONTAMINANTS ON ARCTIC WILDLIFE & FISH

SUMMARY FOR POLICY-MAKERS

WHY THIS MATTERS

The Arctic and its inhabitants harbor elevated levels of environmental pollutants, most of which originate from the industrialized centers and agricultural regions of lower latitudes. Chemical pollutants transported via the atmosphere, oceans and rivers are deposited in Arctic ecosystems, where they bioaccumulate in organisms and biomagnify through food webs. New Information documents that a number of the chemicals found in the Arctic have been associated with effects on animal and human health. Therefore, wildlife and fish species endemic to the Arctic, and the indigenous communities that rely on them as part of a traditional diet, remain vulnerable to the potential detrimental effects associated with these chemicals.

NEW AND LASTING IMPACTS OF CHEMICAL EXPOSURES IN ARCTIC WILDLIFE AND FISH

KEY MESSAGE 1: Legacy chemicals and mercury continue to pose a significant concern for Arctic biota.

Despite global initiatives to restrict the production of legacy chemicals such as persistent organic pollutants (POPs) and mercury, levels in some Arctic top predator species remain elevated and may no longer be declining in response to restrictions in use. There remains a significant exposure concern for many Arctic biota, including polar bears, killer whales, pilot whales, seals, and various seabird, shorebird, and bird-of-prey species. The levels of these chemicals put these species at higher risk of immune, reproductive and/or carcinogenic effects.

KEY MESSAGE 2: The suite of environmental contaminants found in many Arctic top predators is expanding and may require new investigations of their potential biological effects.

A number of new chemicals previously undetected in the Arctic are now being found in circumpolar wildlife and fish and may contribute to adverse effects in these organisms. These Chemicals of Emerging Arctic Concern (CEACs) are currently low in comparison to POPs and mercury levels. The lack of information on their effects and potential health and population impacts enhances the need for future focus on the biological effects of CEAC to improve the ability to estimate risks to Arctic biota.

WILDLIFE HEALTH IN A COMPLEX AND CHANGING ARCTIC

KEY MESSAGE 3: Improved predictions of contaminant-related risks to Arctic biota will require methods that account for the combined toxicity of real-world, complex, multi-chemical exposures.

Arctic wildlife and fish are exposed to a complex cocktail of environmental contaminants that, in combination may act to increase the risk of biological effects. Yet, most data and methods currently are based on single-chemical exposures. In order to improve the accuracy of risk evaluations, a better understanding of impacts of multi-chemical exposures is needed. New experimental approaches and targeted research involving complex contaminant exposures are required to address this need.

KEY MESSAGE 4: The impact of contaminant exposure in Arctic biota needs to be considered in combination with other natural and anthropogenic stressors.

Apart from being exposed to a complex mixture of environmental contaminants, Arctic biota are subject to numerous natural and anthropogenic stressors. These may significantly increase the risk of health effects and population impacts. The need for cross-disciplinary studies including indigenous knowledge, environmental data, and the development of new tools, such as computer models, to integrate data collected from the field into a larger, holistic picture of Arctic wildlife health, is crucial.

INTERCONNECTIONS BETWEEN ARCTIC WILDLIFE, HUMAN, AND ECOSYSTEM HEALTH

KEY MESSAGE 5: The high contaminant levels observed in some Arctic wildlife could pose a concern for the health of indigenous communities reliant on subsistence harvests as part of a traditional diet.

Many indigenous communities of the Arctic rely on locally harvested fish, seabirds, and marine mammals as part of their traditional diets. These Arctic species contain levels of PCBs and mercury sufficient to place them at a higher risk for human consumption and health. We need to promote awareness of public health concerns and to support healthy communities.

KEY MESSAGE 6: Strengthened collaborations between research scientists, indigenous communities and knowledge holders, medical doctors and veterinarians are needed to facilitate a broader understanding the factors impacting wildlife and human health in a rapidly changing Arctic.

Environmental changes are expected to promote the emergence of new pathogens and the northward spread of insects and other vectors of disease into the Arctic. Wildlife already compromised by chemical contaminants and other changing ecosystem dynamics, may be at heightened risk for infection and contribute to the spread of zoonotic diseases through the Arctic environment and to its human inhabitants. Improving the ability to anticipate and respond to health crises in an increasingly changing Arctic is crucial.

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