DIRECTORATE
OF HEALTH

Chief Epidemiologist for Iceland

EPI-ICE

Volume 7. Issue 1. January – March 2011.

DIOXIN FROM INCINERATORS IN ICELAND

CONTENTS:

DIRECTORATE OF HEALTH
CHIEF EPIDEMIOLOGIST
FOR ICELAND

Austurströnd 5
170 Seltjarnarnes
Tel: +354 510 1900
Fax: +354 510 1920

E-mail: mottaka@landlaeknir.is
Website: www.landlaeknir.is

Dioxin

Dioxin, related compounds and PCB are persistent environmental pollutants usually named dioxins.

They are the product of industrial processes but can also result from natural processes, such as volcanic eruptions and forest fires. Commonly, dioxins are released from uncontrolled waste incinerators into the environment due to incomplete burning. Dioxins are mainly found in soils, sediments and food, especially dairy products, meat, fish and shellfish. Very low levels are found in plants, water and air since the compounds accumulate in fat.

Dioxin in animal products

On 16 December 2010, the Icelandic Food and Veterinary Authority (MAST) received measurements from a milk sample collected by the MS Iceland Dairies from a farm in the Westfjords in Iceland. The amount of dioxin was 3,98 pgWHO-TEQ/g fat while the maximum permitted level is 3. The level of dioxin and PCB combined was 7,4 pgWHO-TEQ/g fat, when the maximum permitted level is 6. Since this farm is in close vicinity to an incinerator used by the town of Isafjordur it was assumed that the contamination was caused by that incinerator.

After the above result from the December measurement was established, MAST banned any distribution of animal products from this farm (sale of milk and slaughter of animals). Further samples were taken from milk, meat and hay from the farm as well as milk from other farms in fjords nearby. The results of these measurements showed that only two samples from the index farm, one from milk and the other from meat, had higher levels than permitted. Hay samples from this farm had a value just under the permitted level.

The incinerator near Ísafjordur

Photo:Hálfdán Bjarki Hálfdánsson

Incinerators and dioxin

There are four incinerators in Iceland releasing too high levels of dioxin. They are located in the Westfjords, cf. above, in the Westman Islands and at Kirkjubæjarklaustur and Svínafell in the South. Dioxin release per cubic metre is highest in the Westman Islands, followed by Kirkjubæjarklaustur and the Westfjords. The release at Svínafell is comparable to that at Kirkjubæjarklaustur. It must be kept in mind that an incinerator with a high release per cubic metre may have a smaller total release than others, depending on the size of the incinerator.

There is no animal husbandry in the vicinity of the incinerator at Kirkjubæjarklaustur. The level of dioxin was not elevated in meat and milk from Svínafell. In newer types of incinerators the maximum permitted levels of dioxin released is 0,1 ng/m^3. However, it is the total amount of dioxin released that matters most.

Cont. p. 2

Considering the modest increase of dioxin in the animal products of one farm in the Westfjords, it may be assumed that the health consequences on humans are limited or negligible.

Effect of dioxin on human health

Dioxin compounds are classified as dangerous toxins. This is based on their effect on laboratory animals, especially rodents. The effect of dioxin on humans has been extensively investigated but the effect on human health is by no means obvious.

An accident occurred in Seveso, Italy, in 1976 causing large environmental contamination due to dioxin. In the aftermath, a follow-up study was conducted investigating the health consequences of the contamination. The results indicate a small increase in the incidence of various cancers. Other studies in Italy, where there is considerable industrial pollution, indicate the same thing. Studies of other effects on humans are still ongoing.

An investigation into American soldiers using herbicides containing dioxin (*Agent Orange*) during the Vietnam War in the nineteen sixties has been ongoing for decades. Certain cancers and diabetes were only significantly associated with dioxin among those veterans most exposed over the longest period of time. Other dioxin-associated effects detected are a decrease in the amount of serum testosterone, but there is also a beneficial effect of a decreased likelihood of benign prostate hyperplasia. Increased levels of serum thyroid stimulating hormone have also been associated with dioxin. Diseases in male reproductive organs or the thyroid gland have not been associated with dioxin.

Other investigations conducted on workers exposed to dioxin due to the production of chemicals in the US have not shown an association between the toxin and cancers. Furthermore, studies on dioxin in breast milk have not shown adverse health effects on the children. Dioxin does not seem to have an effect on human DNA. Chloracne is a skin eruption that may be seen after extensive dioxin contamination.

Measures against possible health effects of dioxin on humans

Considering the modest increase of dioxin in the animal products of one farm in the Westfjords in Iceland it may be assumed that the health consequences on humans are limited or negligible. Nevertheless, the Chief Epidemiologist, in collaboration with experts from the University of Iceland, will undertake a pilot study on the possible exposure of humans to dioxin that may have occurred. The dioxin level will be measured in serum and breast milk. Hair or nail samples will be collected to measure the level of lead, which is a surrogate for dioxin and other pollutants.

Haraldur Briem

View to the town of Isafjordur in the Westfjords. The town's incinerator is situated on the other side of the narrow fjord. Photo: Pernilla Rein.

INFLUENZA-LIKE ILLNESS THIS WINTER

The seasonal influenza this winter started in December 2010 (Fig. 1, p. 3). Influenza A (H1N1)2009 was initially identified as the cause of illness but was replaced in early February by influenza B that peaked in mid February (week 8). The number of ILI cases declined in week 9 and 10, but increased unexpectedly again in the middle of March (week 11). Influenza A (H1N1)2009 has been verified in 20 cases and influenza B in 105 cases, according to information from the Department of Virology at Landspitali University Hospital.

The increase in influenza-like illness (ILI) in February is probably explained by influenza B and RSV infections which affected mostly

Cont. p. 3

The increase in ILI in February was due to infections among children and teenagers.

children and teenagers (Fig. 2). In week 8, the increase was observed in the youngest age groups, i.e. in children four years and younger, and in week 11 it was most often observed in 5–9 year-old children. Previous experience indicates that outbreaks of influenza B occur every few years, affecting mainly children and teenagers.

Vaccination against seasonal influenza gives protection against influenza B. Altogether 155.816 individuals have been vaccinated against influenza A(H1N1) 2009 since the vaccination started in autumn 2009 (Fig. 4). Approximately 50% in most age groups were vaccinated except in the age group 20–40 years, where the vaccination coverage was somewhat lower. This was the age group most severely affected by the influenza this winter. A little over 50.000 individuals, mainly belonging to defined risk groups, were vaccinated with the seasonal influenza vaccine 2010/2011. There is no doubt that this high vaccination coverage against influenza A(H1N1) 2009 resulted in a mild outbreak this winter. In January this year, a 30-year old woman was admitted to the ICU, seriously ill from influenza A(H1N1) 2009.

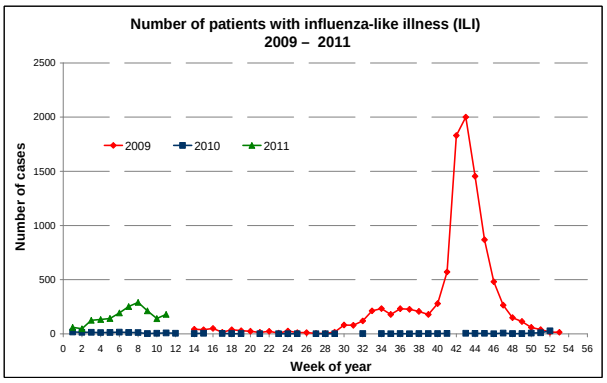

Fig. 1

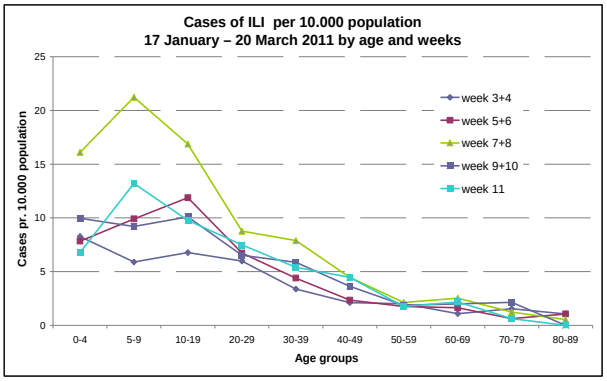

Fig. 2

During the last three months physicians have reported several cases of RSV infection to the Chief Epidemiologist.

RSV infections

During the last three months physicians have reported several cases of Respiratory Syncytial Virus (RSV) infection to the Chief Epidemiologist (Fig. 3). The greatest increase appeared in mid January with a simultaneous increase in the number of laboratory-confirmed RSV infections. The RSV outbreak has now peaked and the number of cases is going down. By the age of two most children have been infected by RSV, which can cause serious respiratory infections in young children. RSV outbreaks occur every winter but differ in severity between years. There is no vaccine available against RSV infection.

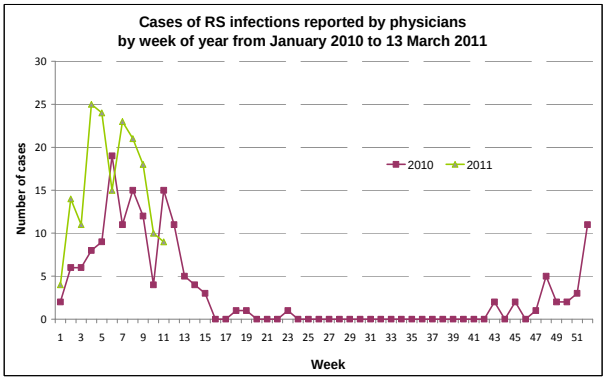

Fig. 3

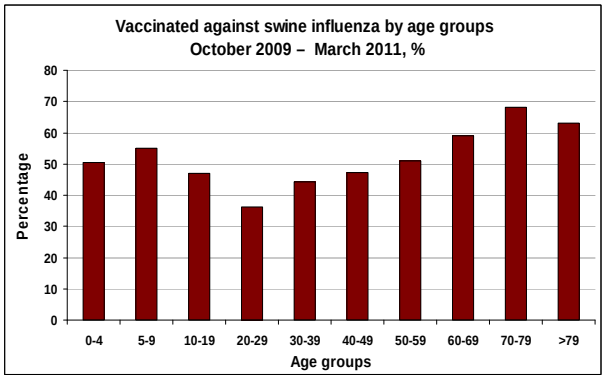

Fig. 4

Gudrun Sigmundsdottir
Thorolfur Gudnason