Advice in the event of accidental self-injection with fish vaccine
Introduction

PHARMAQ has taken the initiative to update the information provided to vaccinators and doctors regarding self-injection during vaccination. Håkon Lasse Leira, Chief Physician at the Department of Occupational Health at St. Olav’s Hospital in Trondheim has been the technical advisor in this respect.

The use of injectable vaccines in aquaculture has become increasingly widespread over the past twenty years. Before 1991, these were exclusively water-based vaccines containing various formalin-killed bacterial components. Since the introduction of oil-based emulsion vaccines in 1991, this type of vaccine has now become predominant. Among salmon and trout raised in the sea alone, approximately 725 million juvenile fish were vaccinated in 2011 using oil-based vaccines.

Much of the vaccination nowadays is carried out by professional vaccination teams, however a significant amount is also performed manually by other personnel as well as with various types of vaccination machine. Injectable vaccines are also being used in new species and in parts of the world that are new to aquaculture. This means that there is a continuous need to focus on vaccination safety and on how a self-injection incident should be handled.

As a global manufacturer of a range of vaccines for use in the aquaculture industry, PHARMAQ wishes to ensure that information regarding the correct use of vaccines reaches the end-users. The purpose of this pamphlet is to present this information in an accurate and easily understood form.

We wish to thank all those who have contributed to this summary.

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Definition of a vaccine

A vaccine (from the Latin vacca: cow, and vaccinia: cowpox) consists of inactivated or attenuated micro-organisms being introduced into the body in order to induce immunity to subsequent infection by the organism in question. The antigens within the vaccine cause the body to start creating antibodies. While some vaccines provide lifelong protection, many, such as the vaccination against the influenza virus, must be repeated with so-called boosters.

Preventive safety measures

It is important that personnel carrying out the vaccination of farmed fish follow the recommended safety measures which have been designed in order to prevent or at least minimise the risk of accidental self-injection. These measures include the following:

• Provide personnel with effective training in vaccination technique and first aid as well as an introduction to the procedure which must be followed in the event of accidental self-injection.

• Use a well-fitting needle-guard on the syringe in order to protect the fingers and hand from the needle point.

• Use appropriate gloves to ensure a good grip on the fish.

• Take regular breaks and ensure a comfortable working position and good lighting. Make sure the rate at which vaccination is carried out does not affect quality and safety.

• It is extremely important to ensure that the fish are properly anaesthetised. Most accidental self-injections occur when fish wriggle.

• Notify the local doctor prior to the commencement of vaccination.

• Woman in pregnancy should not administer products containing fish vaccine.

• Make sure that first aid equipment is at hand.
PHARMAQ's advice in the event of accidental self-injection

To the vaccinator

If you have been accidentally injected with fish vaccine, seek the assistance of a doctor immediately, even if the injected amount is small. Take the printed information from the vaccine package with you to the doctor. If pain persists for more than 12 hours after medical examination, you must consult the doctor again.

Accidental injection of fish vaccine into the human body can lead to severe pain and swelling, especially if the preparation is injected into a joint or a finger. In rare cases, the loss of an affected finger may result if treatment is not commenced immediately.

Self-injection may result in sensitisation to fish vaccine such that any subsequent self injection may produce an allergic reaction leading to anaphylactic shock. This could be life-threatening without rapid and proper treatment.

To the doctor

The introduction of even a small amount of a fish vaccine product into a person can result in pronounced swelling which may result in ischaemic necrosis at the injection site or even the loss of an affected finger.

The site of injection must IMMEDIATELY be examined by a surgically competent person, and if necessary, incision and irrigation of the affected area must be performed, especially when ligaments or soft finger tissue are involved. However this type of intervention should only be undertaken if the risks associated with it outweigh those of inaction.

Repeated self-injection may reinforce the reaction thereby elevating the risk of anaphylactic shock.
Information regarding self-injection while vaccinating farmed fish has been provided by Håkon Lasse Leira, Chief Physician at the Department of Occupational Health, St.Olavs Hospital, Trondheim, Norway

**Procedure for the vaccinator and doctor in the event of self-vaccination of fish vaccine.**

**General remarks**
Modern fish vaccines contain formalin-inactivated bacterial and/or viral antigens, as well as oil adjuvants. The standard dose is 0.05-0.1 ml, or in some cases, 0.2 ml. The injection is made into the abdominal cavity of the fish, either manually or by machine. Almost 450 million vaccinations of fish were carried out in Norway in 2011, approximately half manually and half by machine.

In the event that the entire dose is injected accidentally into the vaccinator’s finger, the injury may become serious if the finger is not treated properly. **The injured operator must be taken urgently to hospital for surgical treatment within the space of a few hours.**

In the past it was recommended that vaccinators should have access to adrenalin as a contingency in the event of anaphylactic shock. However, the risk of shock must be extremely small since in over 20 years no incidence has been reported. Today, this contingency is best provided for by the regular health services. **It is recommended that the municipal health services are notified when vaccination operations commence and of the health risks associated with this procedure. A copy of this advisory leaflet can be provided to the local health care centre.**

Personnel assigned to carry out vaccinations must have thorough training prior to starting work. They must be familiar with safety procedures and the measures to be taken in the event of self-vaccination.

It is the responsibility of the Operations Manager, to prepare a contingency plan which includes notification of the local health services prior to the commencement of vaccination operations.

**Information for the vaccinator**
There is a theoretical risk of anaphylactic shock following self-injection. In such cases the symptoms will become apparent a few minutes after injection. In addition to these local symptoms, the person will feel unwell, and may experience itchiness of the skin or around the eyes or mouth. At the same time he or she may feel warm, and a bright red rash may develop. This is often followed by heart palpitations, anxiety and pronounced listlessness. Irritation of the stomach and intestinal canal may give rise to stomach pains, nausea and vomiting. In especially serious cases, a person may experience difficulties in breathing, become confused and lose consciousness. Involuntary urinary or fecal incontinence may occur.

If shock is suspected, he or she must be taken to a casualty clinic or hospital as soon as possible. Call the local emergency services immediately and notify them that you have a patient who may be of risk of undergoing anaphylaxis following unattended vaccination. Every minute counts!

**Machine vaccination**
In the event of self-injection, most if not all of the dose will be injected into a finger. The injury should be examined by a surgeon within a few hours! As well as the reaction associated with the finger (pain, swelling, discoloration), swelling may also develop further up the arm, accompanied by listlessness, nausea and a high temperature. If the finger receives the proper treatment, these symptoms will normally pass in due course.

Antibiotics (penicillin or similar), anti-inflammatory drugs or painkillers are not sufficient! If the finger is not treated by a surgeon in time, the reaction may be so severe as to require amputation.
INFORMATION

Information regarding self-injection while vaccinating farmed fish has been provided by Håkon Lasse Leira, Chief Physician at the Department of Occupational Health, St.Olavs Hospital, Trondheim, Norway

NB! Never use your fingers to remove fish from the vaccination machine. Use sausage tongs or something similar!

Manual vaccination
If the syringe tip only scrapes the skin, this will result only in local inflammation, and will require no treatment other than painkillers, if required. However, if the vaccinator becomes listless, or experiences nausea or a high temperature, it is likely that a larger proportion of the dose has been injected. In such cases he or she should seek medical advice if the symptoms continue for more than six hours.

If the entire dose has been injected into the finger, the injury must be examined by a surgeon, as described for machine vaccination.

Information for doctors
Modern injected fish vaccines contain formalin-inactivated bacterial and/or viral antigens, as well as a variety of oils used as adjuvants, such as mineral oils. The standard dose is 0.05-0.1 ml. The injection is made into the abdominal cavity of the fish, either manually or by machine. In the event of self-injection, most if not all of the dose will be injected into the vaccinator’s finger.

In the event of self-injection with fish vaccine, there is a theoretical risk of anaphylactic shock which, if it occurs, will require immediate treatment according to standard guidelines.

Any suspected cases of anaphylaxis must be fully investigated and reported afterwards.

In cases of self-injection in which some or the entire dose has been injected, it is the concentration of mineral oil which is the critical factor. Oils used as adjuvants in fish vaccines contain powerful tissue toxins and without surgical intervention (incision and irrigation, etc.) may result in necrosis and subsequent amputation. For this reason it is important that all cases of vaccine self-injection are urgently examined by an experienced surgeon.

In addition to the local reaction at the site of injection, the vaccinator may also experience local pain and oedema, lymphangitis and lymphadenitis of the arm, accompanied by nausea, vomiting and a high temperature.
Antibiotics and anti-inflammatory drugs are insufficient as exclusive treatments in such cases. The finger must be examined by a surgeon! An anti-tetanus injection is not required.

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Adrenalin

There are a variety of alternatives to adrenalin as a treatment for anaphylactic shock. Examples of products available on the market include:

- EpiPen (www.nordic.com, www-alk-epicentre.no)
- Adrenalin ampoule

Contact a doctor to ensure that first aid equipment and adrenalin is at hand in the event of anaphylactic shock.
Contact information

General practitioner...........................................
Local casualty clinic...........................................
Emergency telephone: ...........................................

For further information about PHARMAQ’s pharmaceutical products, contact:
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PHARMAQ shall be notified in the event of the unintended self-injection of PHARMAQ’s products. Håkon Lasse Leira, who is Chief Physician at the Department of Occupational Health at St.Olavs Hospital in Trondheim, Norway also wishes to be informed.