 Praktikertjänst



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# AFTER-LIFE REPORT

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## After-LIFE Report

### 1. Preface

This report is part of the EU Life project Hg-Rid-LIFE with the LIFE project number LIFE15 ENV/SE/000465. The project was carried out between 01/09/2016 – 31/08/2019. The project was coordinated by the health and dental care company Praktikertjänst in partnership with Sweden Recycling and the IVL Swedish Environmental Research Institute.

The main purpose of the project was to minimise the emission of dental amalgam at dental clinics in Sweden, and in the longer term throughout the European Union (minimisation of emissions at source).

This was done by a demonstration project for improving awareness and knowledge of existing installation techniques and maintenance routines for reducing emissions of mercury from amalgam separators. Furthermore, the project led to an increased knowledge and competence regarding handling of waste containing mercury, management and procedures of amalgam separators, sanitation of mercury, and more. The project objectives were the following:

- Reduce mercury leakage from examined dental clinics.
- Clinics participating in the demonstration project with mercury levels in sewage waste from suction systems above 1,000 µg/l, will have their mercury levels reduced by 50 %.
- Remove sewage waste containing contamination corresponding to 100 kg mercury contaminated sludge.
- Increased knowledge and know-how on how to mitigate mercury leakage from dental facilities.
- Support the development of national and international guidelines for management of dental mercury by providing a draft proposal of guidelines.

The aim of the project:

- Increased awareness and knowledge how the environmental impact of mercury from dental amalgam can be minimised.
- Development of methods for environmental decontamination which is efficient, user-friendly and cost-effective.
- Support the development of national and international guidelines for management of dental mercury by providing a draft proposal of guidelines.

For more information, please see [www.praktikertjanst.se/life](http://www.praktikertjanst.se/life) and [www.hg-rid.eu](http://www.hg-rid.eu)

## 1. Objectives

The main objectives of the After-LIFE Plan are the following:

- Dissemination
- Technology development
- Continued transfer of technology and know-how across the EU
- Continued dissemination and development of the web-based training tool

## 2. Technology development

There are very few dental clinics that have zero emissions of mercury. The finest particles from removed amalgam fillings are not captured by separators. There is no amalgam separator on the market that capture 100% of the mercury. Proper maintenance is therefore important for minimising the emissions of dental amalgam. A development of a technique to capture dissolved mercury species in water is needed to supplement the amalgam separators, which with present technique mainly captures bigger particles.

### Activities:

- Develop the technology for amalgam separators to improve the effectiveness using reusable filter technology for removing toxic heavy metals from water.

A prototype for a more efficient amalgam separator has been developed outside Hg-rid-LIFE. Atium, which is a Gothenburg-based startup company, is developing a new product where Atium's electrochemical filters complement today's amalgam separators to also capture water-soluble mercury ions. Atium's technology is based on research from Chalmers University of Technology. Today there are no amalgam separators that collect all the amalgam particles. The finest particles pass the separators. Zero emissions of mercury from dental clinics can be reality thanks to an electrochemical filter as a complement to amalgam separators. The prototype will be tested by dental clinics during 2020. Atium and Hg-rid-LIFE established contact during the project and the cooperation will continue.



*Prototype of new technology supporting amalgam separator, with electrochemical filters.*

#### **4. Continued transfer of technology and know-how across the EU**

Once necessary legislation requiring decontaminations is in place, Medentex who is a global specialized service provider supporting dental practices collecting and disposing hazardous waste, can start to build up a scalable organization. They are a one-stop-service provider being able to deliver the full operational chain. The implementation phase will start immediately after the new legislation and the regulations are in place. The first effects will become visible in the countries where the organisation already provides dental services: Germany, Austria, the Netherlands, UK and Ireland. All relevant needs for transport, storage and treatment are in place. The first technician teams are available and training for further sales and technician staff is already planned theoretically.

There is a big risk for humans and nature that non-specialized companies are doing decontamination/disposal work. E.g. in some European countries amalgam waste is treated like a clinical waste and burned in incineration without any mercury filter. Medentex have the expertise and can share that with decision makers to build the right fundamental platform to reduce mercury pollution from dental clinics in Europe.

#### **5. Dissemination**

The project results will continue to raise awareness and knowledge about how emissions of dental amalgam from dental clinics affect the environment and how to minimise the emissions.

Activities:

- Dialogue with authorities in Sweden and in other EU-countries communicating the results of the project, supporting the development of national legislation or guidance.
- Dissemination of the final results: Layman's Report, Power Point presentations, leaflets etc.
- Maintenance of the project web site and web-based training tool: Periodically updates, depending on the information available.
- Seminars for dental students informing about the project, the web-based training tool and how to minimise emissions of mercury from dental amalgam.
- Webinar for dental students in the EU



*Leaflet*



*Layman's Report*

### **5.1 Web-based training tool: continued dissemination and development**

The web-based training tool ([www.hg-rid.eu](http://www.hg-rid.eu)) has been a success factor in the project. It has been perceived as user friendly by the ones that tried it. It helps the project reaching out in as easy way, not only in Sweden, but other countries in Europe as well.



*Webbased training tool*

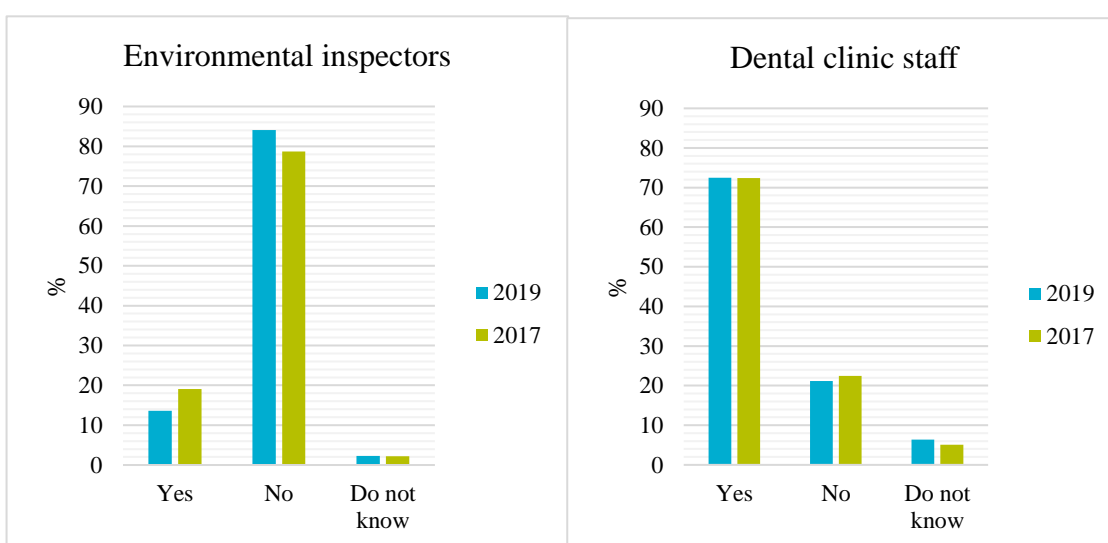
The web-based training tool regarding mercury management in dental facilities will still be active after the project and if possible further developed, hopefully for with good examples from countries outside Sweden. Praktikertjänst will be responsible for the maintenance of it. It will be available for use at least two years after the project lifetime and will be will be available in five different languages (Swedish, English, German, French, Spanish) to maximize dissemination potential across Europe. If and when regulations for decontamination and control of the compliance of the regulation about the use of dental amalgam are in place, there will be legal requirements to apply the described method and it will be easier to disseminate the web-based training tool.

The web-based tool will be continued to be disseminated, especially to dental students, both in in Sweden and in the rest of the EU. More educated dental teams will motivate clinics applying methods that will minimise emissions of mercury from dental amalgam. Contacts established in the project, for example from fairs and conferences, will be reminded to visit the web-based tool and to spread it. Dental clinics in Praktikertjänst will be requested to use the web-based tool.

Perhaps the tool can be translated into more languages to simplify the dissemination in other EU-countries.

The web-based training tool will also be disseminated among environmental inspectors in Sweden. According to a survey performed in the project a majority of the inspectors answered that they haven't received any education about safe handling on mercury waste, compared to dental clinic staff (see Deliverable C1.5.1 Final Results Conclusions and Recommendations).

Among environmental inspectors most (appr 85 percent) said that they haven't received any education on the subject. Whereas among dental staff, over 70 percent answered they have received education.



**Figure: Have you received any education about safe handling on mercury waste? Answers from Environmental inspectors and Dental clinic staff 2017 and 2019 (%).**

Most of the environmental inspectors who answered the survey think they need more knowledge in this area. They state that they need knowledge about:

- Assessment on how to evaluate new regulations for decontamination.
- Sampling of the wastewater from different systems to obtain a representative sample.
- Information on amalgam separators.
- Proficiency for the operator.
- How supervision should be conducted (specific requirements to be set).
- How the mercury accumulates in pipes.
- Methods on decontamination and purification technique
- Environmental and health aspects of mercury.
- Needed measures for high levels of mercury in outgoing water



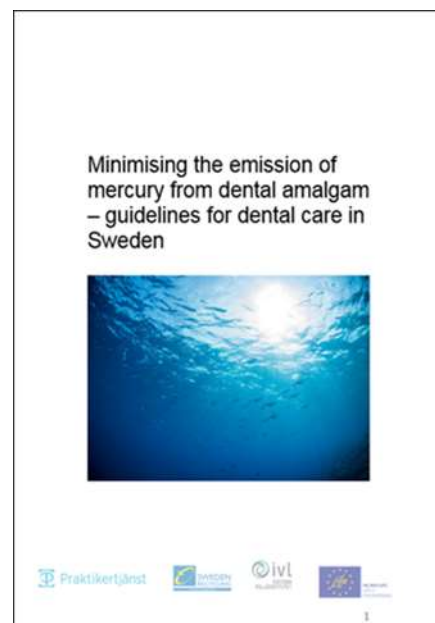
## 5.2 Updating of guidelines

Recommendations for improved routines at dental facilities in Sweden (Deliverable B1.1.2 Guidelines for optimal and efficient maintenance and use of amalgam separators) were developed in cooperation with Praktikertjänst and Sweden Recycling. The draft of the guidelines was discussed at several dialogue meetings/workshops with dental teams, dental service technicians and environmental offices in the county's municipalities. The guidelines will be revised continuously and published on the project's webpage [www.praktikertjanst.se/life](http://www.praktikertjanst.se/life) and on [www.hg-rid.eu](http://www.hg-rid.eu) after the project.

The draft proposals will hereafter be used as internal guidelines for mercury management by the beneficiaries. The guidelines will be possible to use as a basis for the development of national and possibly EU-wide guidelines for mercury management.

### Content:

- ✓ Requirements for dental amalgam separators
- ✓ Number of dental amalgam separators
- ✓ Installation of suction system
- ✓ Installation of wet suction system
- ✓ Installation of dry suction system
- ✓ Suction tubes
- ✓ Sink amalgam separators (amalgam separators connected to sinks)
- ✓ Disinfection
- ✓ Patient treatment routines
- ✓ Labelling
- ✓ Waste water sampling
- ✓ Cleaning and emptying of water locks and drains
- ✓ Upkeep of amalgam separator at dental practices
- ✓ Self Inspection
- ✓ Handling of amalgam waste
- ✓ Environmental maintenance service
- ✓ Records and transport documents
- ✓ Decontamination of pipe system



*Guidelines for minimizing emissions of mercury from dental amalgam*

- ✓ Requirements on enterprises which carry out decontamination
- ✓ Incident Management (deviations and improvement proposals)
- ✓ Expertise

## 6. Action-plan After-LIFE

Action Dissemination	Responsible	Source of finance
Dialogue with authorities in Sweden	PTJ & SRAB	Own budget
Dialogue with authorities in EU	PTJ, Medendex, IVL	Own budget
Final results: Layman´s Report, Power Point presentations, reports etc. (Media, press, conference´s)	IVL, PTJ, SRAB, Medendex	Own Budget
Maintenance of the project web site and web-based training tool: Periodically updates (good examples from EU if possible)	PTJ	Own Budget
Seminars for dental students Sweden	PTJ, SRAB	Own Budget
Webinar for dental students EU	PTJ	Own Budget
Web-based training tool: continued dissemination and development	PTJ	Own Budget
Updating of guidelines	PTJ	Own Budget
Action Technology development	Responsible	Source of finance
Development of the technology for amalgam separators	PTJ	Own Budget
Continued transfer of technology and know-how across the EU	Medendex	Own Budget
Share the expertise with decision makers to build the right fundamental platform to reduce mercury pollution from dental clinics in Europe	Medendex	Own Budget

Abbreviation	Explanation
PTJ	Praktikertjänst AB
SRAB	Sweden Recycling AB
IVL	IVL Svenska Miljöinstitutet AB