Research programme 2023–2025
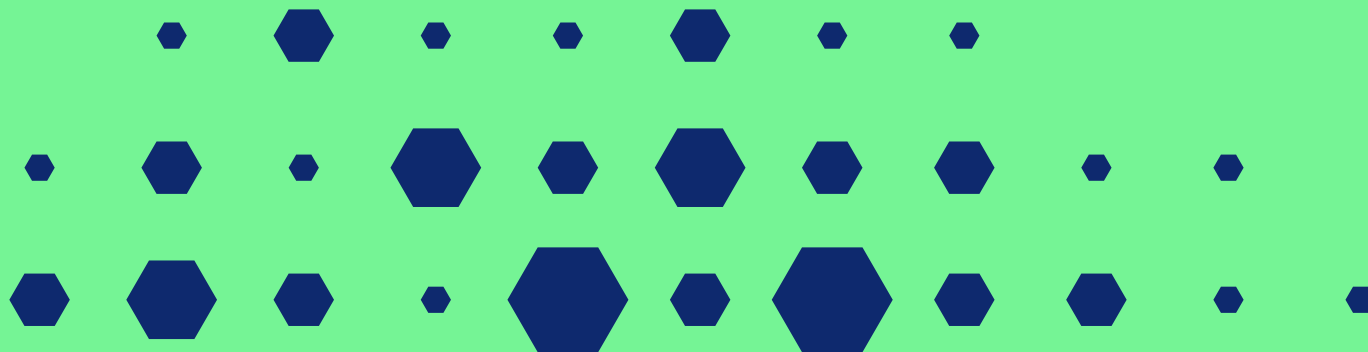
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Lexces Research programme strategy

The national expertise centre for substance-related occupational diseases (Lexces) pools knowledge and expertise in the area of hazardous substances and health risks for workers. In this way, Lexces contributes to the prevention and assessment of occupational diseases with the aim of creating a future in which people no longer become ill from substances they are exposed to in the workplace. Scientific research is an important part of our work. To that end, Lexces has drawn up a research programme.

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A long-term strategy has been developed for the research programme. This strategy has three main themes (see Figure 1):
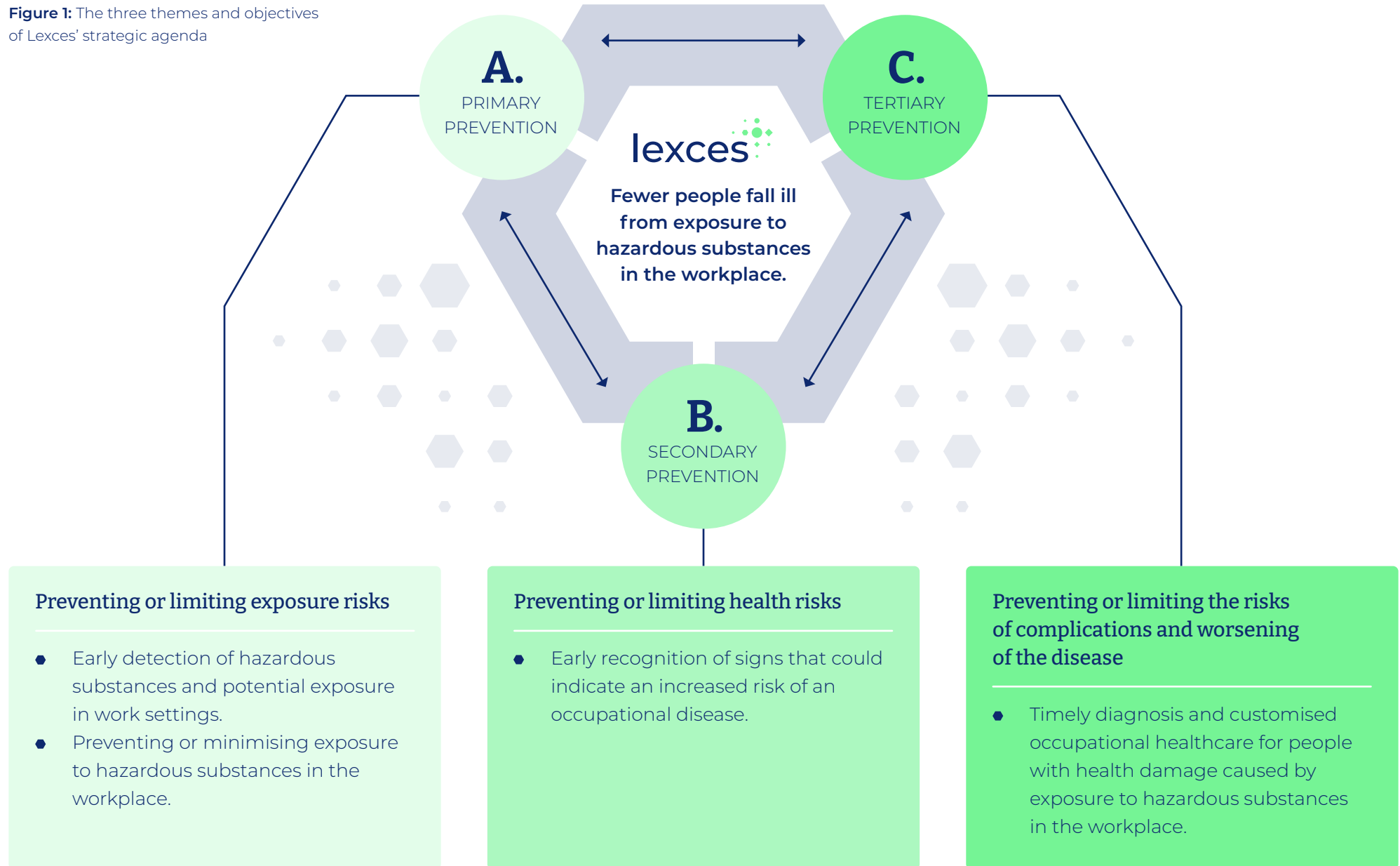
A. **Primary prevention:** preventing or limiting exposure to hazardous substances in work settings, before anyone falls ill.
B. **Secondary prevention:** early intervention at the first signs of damage to health.
C. **Tertiary prevention:** preventing or limiting the risks of complications or worsening of the disease, and – if possible – ensuring people who have developed an occupational disease can remain in their jobs.

For each of these three main themes, Lexces has formulated specific long-term objectives to contribute to the mission, vision and core values.

Based on these objectives, a number of priority research projects have been developed. These projects constitute Lexces' research programme for the period 2023–2025.

In addition to the theme-based projects, the research programme includes two overarching projects. These focus on data landscape exploration and on academic collaborative centres (the Lexces Academy).

Figure 1: The three themes and objectives of Lexces' strategic agenda

A.
PRIMARY PREVENTION

C.
TERTIARY PREVENTION

B.
SECONDARY PREVENTION

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Fewer people fall ill from exposure to hazardous substances in the workplace.

Preventing or limiting exposure risks

- Early detection of hazardous substances and potential exposure in work settings.
- Preventing or minimising exposure to hazardous substances in the workplace.

Preventing or limiting health risks

- Early recognition of signs that could indicate an increased risk of an occupational disease.

Preventing or limiting the risks of complications and worsening of the disease

- Timely diagnosis and customised occupational healthcare for people with health damage caused by exposure to hazardous substances in the workplace.

Theme A – Primary prevention: preventing or limiting exposure to hazardous substances

Prevention of substance-related occupational disease begins with avoiding exposure to hazardous or potentially hazardous substances. When exposure cannot be avoided, the objective is to minimise it. To achieve this, we focus on early detection of such exposure in work settings.

Lexces has set two objectives under the primary prevention theme:

> **Objective:** Early detection of hazardous substances and potential exposure in work settings.

To achieve this objective, Lexces investigates the following:

- What new or existing substances constitute a health risk in work settings, and to what extent.
- What substances are used by what occupations, and to what extent and in what form they are used in work settings.
- Where and to what extent workers are or have been exposed to these substances, now and in the past.
- With what methods and techniques (including alternative methods and techniques) potentially hazardous substances and exposure to these substances can be detected in the workplace, in a timely manner and in the lowest possible concentrations.

> **Objective:** Preventing or minimising exposure to hazardous substances in the workplace.

To achieve this objective, Lexces focuses on the following topics:

- Developing and sharing knowledge about the degree of effectiveness of prevention measures and intervention strategies, and any alternatives.
- Sharing knowledge and practical tools to implement Safe & Sustainable by Design strategies.
- Gaining greater insight into the perception and behaviour of workers as a starting point for the proper use of prevention measures or the implementation of intervention strategies.

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Theme B – Secondary prevention: early intervention at the first signs of damage to health

Exposure to hazardous (or potentially hazardous) substances cannot be entirely prevented in all work settings. It is therefore important to recognise the early signs of possible damage to health. When damage to health is recognised in a timely manner, measures can be taken to prevent workers from developing an occupational disease.

In this context, Lexces has set the following objective under the secondary prevention theme:

> **Objective:** Early recognition of signs that could indicate an increased risk of an occupational disease.

Efficient and strong cooperation between the various players in the occupational health chain (occupational hygienists, occupational physicians and clinicians) is extremely important for achieving this objective.

Lexces will also focus on the development of simple tools that could be deployed on a large scale at a low cost, including in small and medium-sized enterprises. This could include the use of short questionnaires that are sufficiently predictive to be used in a triage process. A more advanced approach could involve the use of disease predictors that are measured when a worker does not yet have any clinical symptoms.

In the context of this theme, Lexces investigates the following:
- The connection between substances, the level of exposure and the likely health effects (in the short and long term) at the individual, occupation and population level.
- Broadly applicable methods and technologies for early detection and diagnosis of damage to health from exposure to hazardous substances in the workplace.
- High-quality detection systems that can detect new risks through proper documentation of possible workplace exposure at the time of diagnosis.
- Good data infrastructure to link health data and job-related information, such as information about exposure to hazardous substances, to identify possible causes of diseases.
- Interventions to ensure broader implementation and use of periodic occupational health examinations (PAGOs), preventive medical examinations (PMOs) and other methods and technologies for early detection of damage to health.

Theme C – Tertiary prevention: preventing or limiting the risks of complications or worsening of the disease.

When exposure to hazardous substances in the workplace has led to damage to health, customised occupational healthcare must be delivered. Adjustments to the workplace and the provision of suitable medical treatment can prevent worsening of the disease. This may ensure that affected workers can keep their jobs, or, if that is no longer possible, it may improve the prospects of rehabilitation. Unfortunately, workers with occupational diseases often lack sufficient access to customised occupational healthcare.

In the context of Theme C, Lexces aims to contribute to improving occupational healthcare for occupational diseases with the following specific objective:

Objective: Timely diagnosis and customised occupational healthcare for people with health damage caused by exposure to hazardous substances in the workplace.

To achieve this objective, Lexces focuses on the following topics:

- Developing and disseminating knowledge about the effects of management measures (reducing or stopping the exposure) on the course of various occupational diseases, taking account of the influence of work-related and personal factors.
- Promoting cooperation between the occupational hygienist and occupational physician so that both professionals can reinforce each other in preventing damage to health from exposure to hazardous substances.
- Improving the connection between normal and occupational healthcare by setting up a consultation structure and clearly described care pathways that take account of the individual working conditions and personal preferences of the worker.
- Promoting communication and the exchange of knowledge about early detection and interventions in the workplace between GPs, medical specialists, occupational physicians, occupational hygienists and other occupational health and safety professionals.
- Translating diagnoses and interventions at the individual level into prevention strategies, including preventive medical examinations, at the population level.

Adjustments to the workplace and the provision of suitable medical treatment can prevent worsening of the disease.

Research projects 2023–2025

The research projects in the 2023–2025 work programme are briefly described below.

Overarching projects

Data landscape exploration

Lexces will focus on collecting, combining and sharing as much information as possible about substance-related occupational diseases. This includes information about the harmful health effects of substances, conditions and diseases that may arise from exposure to hazardous substances, and the professions and sectors in the Netherlands in which people work with these substances. In addition, we will identify preventive measures and early interventions in occupational diseases. Since the necessary data is spread over numerous sources, Lexces will start by creating an inventory of these sources and looking at how this data can be linked.

Lexces Academy

The aim of the Lexces Academy is to encourage occupational hygienists, occupational physicians and other occupational health and safety professionals to cooperate with the research institutions involved in Lexces and to share scientific knowledge about substance-related occupational diseases. In the Lexces Academy, professionals in the field can submit research proposals that focus on preventing people from becoming ill following exposure to substances in the workplace.

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Primary prevention projects

Effective prevention and safe innovation
The aim of this project is to investigate strategies to prevent exposure to potentially hazardous substances in the workplace. It will focus on identifying the most effective interventions, understanding risk perception and behaviour when working with hazardous substances, and supporting companies to work with new substances in a safe and sustainable way through Safe & Sustainable by Design.

Using AI to detect potentially hazardous substances
As part of this project, new artificial intelligence (AI) methods will be used to gather information about possible hazardous substances from the literature and other data sources such as REACH. Lexces will look at how these AI technologies could be used for the early identification of potentially hazardous substances, exposure and new risks.

Health effects of work-related exposure to nanoparticles and ultrafine particles
There is still too much we do not know about the health effects of exposure to nanoparticles and ultrafine particles in the workplace, such as the levels of exposure at which health effects occur, and how to recognise the early signs of health effects from nanoparticles and ultrafine particles. Epidemiological research is required to fill these gaps in our knowledge. As part of this project, Lexces will explore the best way to tackle such research.

Sensors and biomonitoring for measuring exposure
The focus of this project is on new methods of measuring exposure to substances. As part of this project, Lexces will look into the development and use of wearable sensors to measure exposure to chemicals. It will also look into the further development of biomonitoring methods and guidelines. Biomonitoring could be used to detect signs of exposure and possible health effects at an early stage, for example in urine or blood.

Lexces will look into the development and use of wearable sensors to measure exposure to chemicals.

Secondary prevention projects

PMO modules for the lungs and skin

Health monitoring or preventive medical examinations (PMOs) in the workplace can prevent occupational diseases. However, PMOs are not widely used in practice. As part of this project, Lexces will develop PMO modules for allergic occupational asthma, silicosis and contact dermatitis, and support their use in practice with training materials, tools for early detection, advice on reducing exposure and a system for communicating with workers.

Early detection of occupational diseases

Early detection of occupational diseases is one of Lexces' core tasks. The aim of this project is to develop a network structure (such as a

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platform) that connects existing early detection systems and facilitates the ongoing use of signals from other systems. Lexces will also look into the use of new screening methods to detect new, emerging risks based on the potential hazardous properties and exposure data of new substances.

Tertiary prevention projects

Network structure for occupational curative cooperation

Lexces is aiming to strengthen cooperation between occupational hygienists, occupational physicians and ordinary primary and secondary healthcare. As part of this project, Lexces will develop a national and regional infrastructure for multidisciplinary consultation, along with various tools to promote accessible consultation, occupational curative cooperation and knowledge sharing.

Refining methods for making considered decisions about causation

Occupational diseases caused by exposure to substances are often complex, with multiple influencing factors. This project will search for advanced methods to better assess this complex relationship, taking account of factors such as individual susceptibility, the timing of exposure, possible exposure to multiple hazardous substances, and other possible causes outside the workplace.

Diagnostic biomarkers for work-related contact dermatitis

Contact dermatitis is a common occupational disease that may be caused by contact with irritants or allergens. Irritant contact dermatitis and allergic contact dermatitis must be treated differently, but are clinically indistinguishable. The diagnosis becomes even more complex when a worker has atopic dermatitis: a hereditary form of dermatitis that is also clinically indistinguishable from contact dermatitis. This project will research biomarkers that can be used to tell the difference between irritant, allergic and atopic dermatitis. These biomarkers, measured with tape strips on the upper layer of the skin, can help ensure effective measures are taken more quickly to reduce exposure.

Refining methods for estimating historical exposure

It is often difficult to properly estimate historical exposure to substances, since historical workplace-specific measurement data is often not available, and the workplace or company in question may no longer exist. As part of this project, Lexces will work on a mathematical model for estimating historical exposure. Recent measurement data will be used to refine an existing model for historical exposure to solvents. We will then investigate whether this method can also be used to accurately estimate historical exposure for other substance-related occupational diseases.
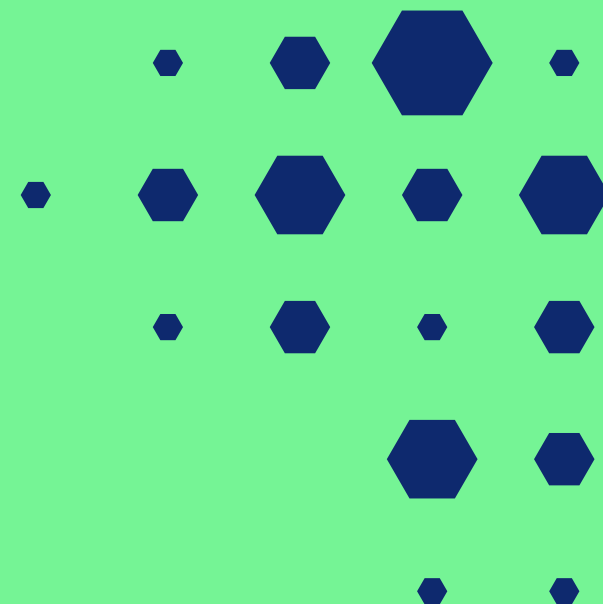
More information and contact details

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Visit our website.

If you have any specific questions, you can email us at info@lexces.nl.

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