



Second National strategy on endocrine disruptors

2019–2022 action plan



MINISTÈRE
DE LA TRANSITION
ÉCOLOGIQUE
ET SOLIDAIRE

MINISTÈRE
DES SOLIDARITÉS
ET DE LA SANTÉ

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GLOSSARY

ADEME	Agence de l'environnement et de la maîtrise de l'énergie / Environment and Energy Management Agency
AFB	Agence française pour la biodiversité / French agency for biodiversity
ANAP	Agence nationale d'appui à la performance / National agency to support performance
ANSES	Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail / National agency for food, environmental and occupational health and safety
ANR	Agence nationale de la recherche / National research agency
ANSM	Agence nationale de sécurité du médicament et des produits de santé / National agency for medicinal and health product safety
ARS	Agence régionale de santé / Regional health agency
ASQAA	Associations agréées de surveillance de la qualité de l'air / Licensed bodies for air quality surveillance
BRGM	Bureau de Recherches Géologiques et Minières / Office of Geological and Mining Research
CGDD	General Commission for Sustainable Development
CNRS	Centre national de la recherche scientifique / National centre for scientific research
CSTB	Centre scientifique et technique du bâtiment / Scientific and technical centre for buildings
DEB	Direction de l'eau et de la biodiversité / Water and biodiversity board
DGAL	Direction générale de l'alimentation / General directorate for food
DGCCRF	Direction générale de la concurrence, de la consommation et de la répression des fraudes / General directorate for competition, consumption and fraud prevention
DGDDI	Direction générale des douanes et des droits indirects / General directorate for customs and excise
DGE	Direction générale des entreprises / General directorate for business
DGEC	Direction générale de l'énergie et du climat / General directorate for energy and climate
DGEFP	Direction générale à l'emploi et à la formation professionnelle / General directorate for employment and professional training
DGESIP	Direction générale pour l'enseignement supérieur et l'insertion professionnelle / General directorate for higher education and professional integration
DGOS	Direction générale de l'offre de soin / General directorate for healthcare provision
DGPR	Direction générale de la prévention des risques / Directorate-General for Risk Prevention
DGRI	Direction générale de la recherche et de l'innovation / General directorate for research and innovation
DGS	Direction générale de la santé / General directorate for health
DGT	Direction générale du travail / General directorate for work
DHUP	Direction de l'habitat de l'urbanisme et des paysages / Directorate for habitat, urbanism and landscapes
EAT/TDS	Étude alimentation totale / Total diet study
ECHA	European Chemicals Agency
ED	Endocrine disruptor
EHESP	École des hautes études en santé publique / School of Public Health
EFSA	European food safety authority
GHS	Globally harmonized system of classification and labelling of chemicals
INCA	Institut national du cancer / National cancer institute

INERIS	Institut national de l'environnement industriel et des risques / National institute for industrial environment and risks
INRA	Institut national de la recherche agronomique / French National Institute for Agronomy Research
INRS	Institut national de recherche et de sécurité / National institute for research and safety
EQS	Environmental quality standard
OECD	Organization for Economic Co-operation and Development
ONFCS	Office national de la chasse et de la faune sauvage/ National office for hunting and wild fauna
OQAI	Observatoire de la qualité de l'air intérieur / Observatory of indoor air quality
EDC	Endocrine disrupters
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
SCL	Service Commun des laboratoires / Common laboratories service
SDES	Service de la donnée et des études statistiques / Data and Statistical Studies Department
SGPI	Secrétariat général pour l'investissement / General secretariat for investment
UNIHA	Union des hôpitaux pour les achats/ Purchasing union of hospitals
EGV	Valeur guide environnementale / Environmental Guideline Value
ELV	Valeur limite d'exposition / Exposure Limit Value
OELV	Valeur limite d'exposition professionnelle / Occupational exposure limit value



1

Establishing a list of chemicals that may have endocrine-disrupting properties to better manage risks depending on the level of evidence and the degree of uncertainty

1-1 REGULATORY IDENTIFICATION OF HAZARDS AND RISKS

ACTION 1

Evaluating chemicals in order to propose the recognition of endocrine disrupting hazards in European regulation.

Context

Every year since 2014, as part of the first national strategy on endocrine disruptors, Anses is evaluating chemicals that are likely to be endocrine-disruptors, or that are used as substitutes to endocrine disruptors, in order to check the safety or risk of these substitutes, and to propose adapted risk management measures.

As such, Anses is carrying out best risk management option analysis under the REACH regulation. It is within this framework that, following a proposal from France, Bisphenol A has been recognized as an ED under REACH.

Indeed, following the adoption of the ED criteria applicable to biocidal and plant protection products active substances in 2018, EFSA and ECHA published guidelines in June 2018 defining the methodology for the application of these criteria.

This work also fits into actions 1.12 “Better understanding and prevention of emerging risks” and 1.13 “Seeking improvement of the regulatory framework at European level” of the PST3.

-
- Leader: DGPR
 - Contributors: DGS/DGAL/DGT/DGCCRF
 - Operator: Anses
 - Milestones/final outcome(s):
 - From the first half of 2019 onwards:
 - . Anses will list and prioritize the plant protection products and biocidal active substances to prioritize for reassessment (reassessment in advance compared to the set re-approval date);
 - . Based on this prioritization, France will trigger actions at European level.
 - At the end of 2020, Anses will review the applicability of EFSA/ECHA guidelines for identifying ED properties of plant protection products and biocidal active substances, and recommend any improvements it deems necessary.
 - From 2019 onwards, Anses will assess 3 chemicals per year under REACH in order to propose the identification of chemicals as ED based on the list of potential EDs (list to be established by Anses in 2020, see action 4). Anses will also evaluate at least 3 plant protection products and biocidal active substances per year, in particular as rapporteur Member State.
 - ⇒ **6 chemicals assessed per year in 2019 and 2020**
 - From 2021 onwards, Anses will assess 9 chemicals per year, providing ECHA with best risk management option analysis and identification dossiers, or providing both ECHA and EFSA with instruction dossiers for the approbation of plant protection products and biocidal active substances.
 - ⇒ **9 chemicals assessed per year from 2021 onwards**
 - Indicators:
 - Number of chemicals evaluated per year;
 - Opinion on the application of the EFSA/ECHA guidelines.
 - Financing: Anses
-

ACTION 2

Coordinating the work of ANSM and Anses on endocrine disruptors in order to enhance the assessment of hazards and risks of potential EDs in cosmetics and health products (medicines for human use, medical devices etc.) based on the following actions:

- To facilitate expertise data exchange between agencies, in particular by changing the regulatory constraints on data confidentiality protection;
- To jointly establish a list of priority substances in health and cosmetic products to evaluate, and to provide recommendations for managing these substances (hazard identification, risk assessment and management) for both health and the environment under REACH, cosmetics, medical devices and medicines regulations.

Context

EDs may be present in cosmetics and health products and, as such, be covered by specific regulations at European level. Some of these chemicals may also have other uses that are subject to other regulations, particularly at European level (for example, environmental issues under the REACH regulation, the regulation on toys or the regulation on food contact materials). One should thus harmonize and coordinate the approaches. Sharing the modalities of inter-agency expertise could contribute to this aim, especially when examining expertise documents submitted to the European authorities.

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- Leaders: DGPR/DGS
 - Contributors: DGT/DGE/DGCCRF
 - Operators: Anses/ANSM
 - Milestones/final outcome(s):
 - 2020: drafting of a first list of potential EDs of common interest for Anses and ANSM (used in particular in cosmetics and health products), and identifying recommendations, including possible regulatory measures under the sectoral regulations and the REACH regulation;
 - Anses/ANSM joint work programme for 2019-2023: to establish a report of the substances investigated.
 - Indicators: joint opinion in 2020, number of substances submitted to regulatory measures under the REACH, cosmetics, medical devices and medicine regulations and subject to a shared assessment between Anses and ANSM
 - Financing: Anses/ANSM
-

1-2 PRIORITISATION AND CATEGORISATION OF EDS

ACTION 3

Defining a method for prioritizing chemicals that may present ED properties that is scientifically robust and shared with the stakeholders and the other Member States, in order to establish a ranked list of these chemicals that will be made available to stakeholders:

- Based in particular on a literature review and existing lists at European and international level, to establish a prioritized list of potential EDs to be assessed (LIST 1).
- To establish a method to categorise known, presumed and suspected EDs.
- To share this prioritisation and categorisation method with stakeholders; the lists will be public.
- Based on this method, to assess the priority substances from list 1. The result of this assessment will be a list of categorised substances (known, presumed and suspected EDs): LIST 2
- Based on list 2, to formulate recommendations for risk management (e.g. consider regulatory European identification, a reduction through prevention or precaution in their use, or the need for a more in-depth assessment).
- To take this approach and its results to the European authorities.

Context

Many chemicals may have ED properties, which makes prioritization necessary to enable an effective and organized assessment. Lists have already been established by European authorities and by countries sharing a similar approach to the one supported by France in the discussions on ED definition criteria in 2017 (Denmark, Sweden). In order to provide an overall view and enable better management of EDs, a national list of known, presumed and suspected EDs will be drafted based on the assessments already completed and regularly updated. This list will be shared at European level and fed by the work of other Member States.

This work also falls within action 1.12 “Better understanding and prevention of emerging risks” of the PST3 (3rd Occupational Health Plan).

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- Leaders: DGPR/DGS/DGT
 - Contributors: DGAL/DGCCRF/DEB
 - Operators: Anses with the support of ANSM, Ineris, AFB
 - Milestones/final outcome(s):
 - 2019-2020: publication of a prioritised list of potential EDs for assessment after stakeholders consultation;
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- Publication in 2020, if possible jointly with other EU countries, of a regularly updated list of known, presumed or suspected EDs;
 - Annual exchange and sharing of results with consumer associations (*UFC que choisir, 60 millions de consommateurs*) and other stakeholders developing applications for example (e.g.: Yuka) aimed at the general public;
 - Organisation of a communication event on the ED list.
- Indicators: publication and updates of the list
 - Financing: Anses
-



2

Informing citizens about chemicals, including endocrine disruptors

ACTION 4

In line with European and international work, studying the implementation of mandatory information systems (labelling and/or pictogram) for the general and targeted public (pregnant women etc.) on the presence of potential EDs in everyday products and manufactured articles, food products (food, packaging, containers), health products and cosmetics.

Context

The Globally Harmonized System of Classification and Labelling of Chemicals (GHS), implemented at international level under the aegis of the United Nations, describes the classification of chemicals by types of hazard and gives communication medium on these hazards, in particular pictograms, labels and safety data sheets. Regulation (EC) n° 1292/2008 "CLP" sets these requirements at European level. This hazard classification does not currently include specific information on, nor criteria for, endocrine disruptors. Depending on developments, particularly in the framework of Action 2 of the plan relating to the applicability of the GHS for endocrine disruptors, and for consumer products not covered by CLP regulation (food products, manufactured articles, etc.), France will study the interest and the possibility of information systems for the public (and adapted to vulnerable populations), including mandatory labelling of the presence of endocrine disruptors in everyday consumer products.

- Leaders: DGS/DGT/DGPR
- Contributors: competent authorities for the legislations in question
- Milestones/Final outcome(s):
 - 2020: feasibility study on the implementation of an ED label or pictogram;
 - From 2020 onwards: to take the subject to a European level in the context of the GHS subgroup, while also supporting an international definition of EDs (GHS and CLP);
 - 2021: proposition for implementation of a EU-wide label.
- Indicators:
 - French proposals on the possibility of defining and implementing a label;
 - Introduction of the label and its dissemination in terms of number of products/references concerned.
- Financing: involved ministries

ACTION 5

Organizing events such as an “ED day” to raise awareness among the population and opinion relays.

Context

National days on endocrine disruptors will consist in organizing annual events in different regions, bringing together professionals, public authorities, researchers and associations.

This action will be an important lever for raising public awareness on exposure to risks linked to endocrine disruptors, on the means of protecting oneself from EDs and reducing their exposure in the environment, but also on European and French regulation, progress in research (e.g. presentation of the results of the research projects funded under the PNREST) and the current state of scientific knowledge in this field.

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- Leaders: DGS/DGPR
 - Contributors: DGCCRF/DGAL/DGT/DGE/stakeholders
 - Operators: ARS/DREAL/DIRECCTE
 - Milestones/final outcome(s):
 - Every year: organisation of the day
 - Result indicators:
 - Number of organised events
 - Financing: DGS/DGPR
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ACTION 6

Raising awareness amongst students through educational actions to promote health in schools.

Context

Schools have a part to play in promoting health, which is part of an educational continuum from kindergarten to high school. This involves developing: ways of protecting the health of students, educational projects based on a common foundation of knowledge, skills and culture, and educational activities implemented in teaching with reference to school curricula. These initiatives are divided into three axes: health education, prevention and health protection. Under the prevention axe, one should promote a better understanding of the risks linked to chemical agents in general, and endocrine disruptors in particular, amongst students, teachers and educational staff.

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- Leader: DGESCO
 - Contributors: DGS/DGPR/DGT
 - Operators: National Education schools
 - Milestones/final outcome(s):
 - Presentation of good practices on the “health environment” webpage on Eduscol
 - Indicators:
 - Type of themes addressed in the educational activities on endocrine disruptors and chemical risks
 - Financing: DGESCO
-

ACTION 7

Conducting a communication campaign for the general public and to create a reference website, in order to inform the population about the risks linked to exposure to hazardous chemical in everyday consumption products, and to share good practices in order to limit exposure, by targeting first the most at-risk populations (pregnant women, period of first 1000 days).

Context

The issue of endocrine disruptors is vast and complex because of the concepts in question and the extreme diversity of chemical or natural products concerned, biological mechanisms of action and possible consequences.

Official information is available on the websites of Anses, WHO, EFSA, INERIS, INSERM, Public Health France and the National Cancer Institute, databases at European level via IPChem (non-exhaustive list) that each cover part of the “endocrine disruptor” subject.

Information for the general public is also relayed by non-governmental websites, managed by consumer or environmental protection associations, or industry players. The fragmented data and the diversity of information that differs for each website does not provide the general public with clear, reliable and detailed information.

Launching an official website will provide reliable, scientifically rigorous and regularly updated information, covering the whole subject with a public health approach. This website will better inform the general public by detailing the individual and collective means available to limit exposure for oneself and for the environment.

It will initially target couples of reproductive age, pregnant women and parents of young children in order to inform them of the risks linked to everyday chemicals and of the individual or collective means available to limit their exposure and so make it easier to raise a child in an environment that meets his/her needs.

An communication campaign in the mainstream media will take place in 2020.

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- Leader: Public Health France
 - Contributors: DGPR/DGS/DGCCRF/DGAL/DGT/DEB/Anses/ANSM/AFB
 - Operator: Public Health France
 - Milestones/final outcome(s):
 - The establishment of a monitoring committee by Public Health France;
 - First version of the website to be completed by the end of the first half of 2019 by Public Health France on vulnerable populations (“Agir pour bébé” (Act for baby) website);
 - Communication campaign and final version of website in 2020;
 - Presentation of the website and its updates to the actors developing tools to guide consumers in their decisions (Yuka, etc.).
 - Indicators:
 - Internet traffic on the website;
 - Number of updates to the site over the SNPE 2 (2nd national strategy on endocrine disruptors) period;
 - Assessment of the scope and renown of the communication campaign
 - Financing: Public Health France
-



3

Training and relaying on professional networks, particularly health professionals and actors working in prevention among the general public

3-1 IMPROVING PROFESSIONAL TRAINING ON CHEMICAL RISKS

ACTION 8

Incorporating into some degree courses a module on chemical risks, including endocrine disruptors.

Context

The initial training syllabuses of many professionals do not include educational objectives in their frames of reference specifically on endocrine disruptors and the associated risks. The initial training program should therefore be expanded for several professions, including:

- 1 Health professionals: doctors, midwives, nurses, pharmacists, etc.
- 2 Other professionals who are relevant because of their role in preventing exposure, particularly professionals in agri-food, agronomy, chemistry, farming, veterinary sciences, safety engineers, architects, urban planners and early childhood professionals.

Furthermore, in line with the PST3 (3rd Occupational Health plan) actions, it appears necessary to expand initial training in health and safety at work involving the professional fields in particular.

- Leaders: DGEFP/DGOS
- Contributors: DGS/DGESIP/DGER
- Operators: Training schools/CNAMTS/INRS/Chambers of commerce
- Milestones/final outcome(s):
 - Develop specific content on chemical risks in syllabuses covering public health and the environment/risk management and the environment: for medical training, nurses, paediatric nurses and paediatric auxiliary nurses, produce a program with suggestions and recommendations on using the tools made available by Public Health France, among other things.
- Result indicators:
 - Number and ratio of training programs including a module/educational objective on endocrine disruptors in each of the training categories cited
- Financing: DGEFP/DGOS

ACTION 9

Enabling the development of continuous training for health professionals on chemical risks, particularly endocrine disruptors, and encourage health professionals to develop prevention campaigns aimed at couples and parents.

Context

Improving information for professionals on exposure to chemical products, in particular endocrine disruptors, will contribute to reducing exposure to these chemicals in the long term and also so that health professionals can relay the information to the population on these issues. The majority of health professionals (general doctors, specialist doctors, dentists, physiotherapists, chiropodists, psychologists, nurses etc.) receive no initial training at all on endocrine disruptors, but could have to answer questions on the subject from patients. Reducing exposure during pregnancy has been identified as a priority and health professionals could give advice during pregnancy check-ups. However, that said, this information comes in addition to a long list of recommendations dispensed during pregnancy, especially on the risk of infections, exposure to alcohol and tobacco. This information should be consolidated and made more consistent.

We should therefore incorporate reliable and validated baseline information on endocrine disruption into the syllabuses of recognised and accredited continuous professional training programs. For health professionals, continuous training on endocrine disruptors could be carried out as part of continuing professional development. To facilitate access to training on endocrine disruptors in different professions, specific online training courses could be created for each targeted profession.

-
- Leaders: DGOS/DGS
 - Contributor: DGCS
 - Operators: National continuing professional development agency/Training bodies/Professional bodies/Perinatal networks/EHESP/ARS/INRS/InCA
 - Milestones/final outcome(s):
 - Integration of the subject of endocrine disruptors into the objectives of continuous training;
 - Number of new endorsed continuing professional development training programmes launched.
 - Publication in 2019 by INCa of its updated reference sheets on “cancer risks and endocrine disruptors” and dissemination to professional networks (National Colleges of doctors, obstetricians-gynecologists, paediatricians, occupational doctors, etc.) to ensure it is relayed to citizens.
 - Result indicators:
 - Number of new training programmes on offer;
 - Estimation of number of people trained per category;
 - Diffusion of informative documents amongst professionals
 - Budget: DGS 50,000 euros in 2019
 - Financing: DGS, DGOS
-

 **ACTION 10**

Developing training for regional authority employees (decision-makers, procurers, cleaning staff, managers and service professionals for early childhood, collective catering).

Context

We must intensify efforts to train regional authority employees, and early childhood professionals. The diffusion of good practices can reduce the exposure to endocrine disruptors.

In this context, the CNFPT (National center for territorial public administration) has developed a strategy to train, inform and raise awareness on this theme for the different groups of regional public authority professionals, specifically: professionals in health and early childhood, collective catering, cleaning staff, green space caretakers and public procurement, etc.

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- Leader: CNFPT (National centre for territorial public administration)
 - Contributors: DGPR/DGS/DGT/DGCS/DGCL/stakeholders
 - Operator: CNFPT (National centre for territorial public administration)
 - Milestones/final outcome(s):
 - Training, information and awareness days aimed at regional authorities
 - Indicators:
 - Number of training programmes organised
 - Financing: CNFPT (National centre for territorial public administration)
-

 **ACTION 11**

Enhancing continuous training for professionals, particularly by incorporating issues of health/environment in continuous professional training centers (Technical and Vocational Education centers).

Context

Under the professional certification policy, health environment issues, in particular linked to exposure to endocrine disruptors, will be taken into account in the competency frameworks for certain qualifications issued by the Ministry for Labour for professions that are particularly exposed to these chemicals.

Providing information in professional environments on the hazards, possibilities for exposure and risks will raise awareness in employees, employers and self-employed workers of the issue of endocrine disruption. Various tools and supporting material can be used (short videos, website, etc.). The professional fields will relay this information.

-
- Leader: DGEFP
 - Contributors: DGT/DGPR/DGESIP
 - Operators: Professional organisations/National commission for professional certification
 - Milestones/final outcome(s):
 - Incorporation of an objective on preventing chemical risks, particularly endocrine disruptors, in the competency frameworks
 - Indicators: number of frameworks including a training objective on endocrine disruptors.
 - Financing: DGEFP
-

3-2 BOOSTING THE ROLE PLAYED BY HEALTH PROFESSIONALS IN INFORMING AND RAISING AWARENESS AMONG POPULATIONS

ACTION 12

Based on the health/environment tools available and as part of the health services performed by healthcare students, establishing awareness-raising campaigns in schools, living spaces and businesses.

Context

The national health strategy led to the introduction of a health service to implement prevention actions, across the whole territory, and particularly for vulnerable groups. These actions are led by healthcare students: students of medicine, pharmacy, dentistry, midwifery, physiotherapy and nursing. Under this framework, primary prevention actions are carried out across the country that reach the whole population, particularly the most vulnerable members of the public.

This health service led by students in healthcare is a useful means of conveying prevention messages to raise public awareness to the risks of endocrine disruption. For this action to succeed, healthcare students must possess the necessary skills and must be trained beforehand. Consequently, the objective is to introduce a specific training module on endocrine disruptors and more generally on chemical risks, with tools and supporting material.

-
- Leaders: DGS/SGMCAS
 - Contributor: DGOS
 - Operators: students in healthcare/universities/ associations/ARS/Public Health France
 - Milestones/final outcome(s):
 - Survey of the tools available on endocrine disruptors;
 - Availability of these tools on the Public Health France platform;
 - Prevention actions carried out by healthcare students.
 - Indicators: indicators for the overall assessment of the health service are under construction;
 - Financing: DGS/SGMCAS
-

ACTION 13

Giving more visibility to the actions and good practices implemented by certain health establishments (notably the PREVENIR platforms, maternity and paediatric services), early childhood institutions, regional authorities, and other partners (industry, agriculture, social and associative life) in order to reduce exposure to endocrine disruptors chemicals.

Context

This action aims to bring together and promote the different experiments carried out in health establishments and early childhood institutions.

The ARTEMIS center at the Bordeaux CHU (University Hospital) has been developed in partnership with the Nouvelle-Aquitaine ARS, the National Agency for Food, Environmental and Occupational Health Safety (Anses) and Public Health France (ANSP - SpF) since 2015. Since then, a network of similar platforms has been set up, the PREVENIR (PREvention Environnement Reproduction) platforms, with the hospital centres of Créteil (MATEREXPO-REPROTOXIF platform), Fernand Widal (Paris) (REPROTOXIF platform), Marseille (CRÉER platform) and Rennes (PRE2B platform) within the CRPPEs (occupational and environmental pathology research centers). These platforms are dedicated to the assessment of environmental exposure in patients with reproductive disorders. This makes it possible to recommend targeted prevention messages, based on the assumption that management of patients by platforms with the recommendation of targeted prevention messages allows the reduction of environmental exposure to risk factors for reproduction. Operation of the ARTEMIS center was assessed in 2018 by the Nouvelle-Aquitaine ARS, Anses, SPF and the Bordeaux CHU (University Hospital). It is proposed to conduct an assessment of the operation of all these platforms in order to examine this care practice.

Moreover, the good practices identified in the various structures within healthcare establishments and services for young children could be shared, in particular, as part of the information day concerning endocrine disruptors and also result in the drafting of a good practice guide for public procurers.

This exchange could encourage the health establishments caring for populations pre-defined as vulnerable (pregnant women, children under three years of age):

- to plan, during the construction or refurbishment of premises, to use building and coating materials containing no EDCs (under the condition that the other components or substitutes also present no danger);
- to prioritize furnishings made from materials containing as few EDCs as possible;
- to use the public procurement lever of adding ecological criteria to the public markets to develop the means of consuming and producing products free from EDCs;
- to undertake everyday practices that reduce exposure to EDCs;
- to value those partners helping these same establishments to respond to these objectives.

These actions fall under the framework of the sustainable development convention with healthcare establishments.

-
- Leaders: DGS/DGOS
 - Operators: UNIHA/ANAP/Hospital federations/ARS
 - Milestones/final outcome(s):
 - Assessment of the operation of the PREVENIR platforms (particularly art. 51 LFSS 2018)
 - Exchange of experiences and feedback between establishments;
 - Production of a good practice guide for public procurers.
 - Indicator:
 - Publication of the guide
 - Budget: to be defined in the 2020 budgets
 - Financing: DGS/DGOS
-



PROTECTING THE ENVIRONMENT AND THE POPULATION

4

Improve our knowledge of environmental impregnation by EDs

4-1 COLLECT DATA ON ENVIRONMENTAL IMPREGNATION

ACTION 14

Ensure scientific coordination between agencies and institutes in order to improve our knowledge on impregnation in the environmental media.

Context

The action plan provides for a prioritization of the EDs of interest, based on an *ad hoc* methodology to be determined and precised by Anses (action 4). When completed, this work will be made available to other actions in the plan, particularly to guide those aiming to better document ED impregnation of the different compartments of the environment. Indeed, a large amount of data on the impregnation of various environmental media by chemicals has been collected through measurement campaigns (surface waters: emerging chemicals in 2012 and biocides and detergents in 2018/2019, ambient air: pesticides, indoor air). However, in many cases, the ED effects were not assessed and consequently the listing and prioritization has not been carried out. These campaigns have already taken place based on lists of chemicals that were specifically prioritized (Water Framework Directive, identification of a base list of pesticides to monitor in ambient air etc.) without systematically taking the potential ED characteristics into account.

The occurrence data already obtained in some environmental media (surface water, air, indoor air) will contribute to the ED listing and prioritization work (action 4), and can also be used at the first stage to report on the environmental impregnation of chemicals now thought to be likely to be EDs. The European and international work will also be taken into account.

An inventory should be drawn up for each environmental media and each regulation taking chemicals of interest into account (regulated or not) in the measurement campaigns, by making explicit the set objectives and the metadata linked to technical aspects of the campaign (the sampling and analysis methods) as well as the web link to access the data for each campaign. This inventory will be regularly updated.

- Leader: INERIS
- Contributors: DEB/DGPR/DGEC
- Operators: Ineris/AFB/Anses
- Milestones/Final outcome(s):
 - An initial inventory of substances of interest in the form of a table by the end of 2019;
 - Yearly update.

ACTION 15

Clarify the relationship between exposure and impregnation.

Context

Absorbing contaminants orally or by inhalation, at different stages of life, can lead to body burdens of these contaminants in organs. Measuring these burdens (blood, hair, faeces, meconium, etc.) falls under bio-monitoring and is the object of substantial campaigns.

To understand these changes and provide the means to act effectively on exposure, we must be able to predict the impregnation levels from these exposures, and inversely, retrace the impregnation levels at a given time to exposures that occurred over the course of a life. Yet, the timespans for which these substances remain in the body range from a few hours to several decades. In fact, these tools are defined and deployed as part of the joint European action 2016-2021 HBM4EU ("*Human Biomonitoring for Europe*") in which various French bodies are actively participating (INSERM, Anses, Public Health France, Ineris, CNRS, INRA, INRS, etc.).

The strategy will harness these tools for use in the biomonitoring campaigns.

-
- Leader: INERIS
 - Contributors: DGPR/DEB/DGS
 - Operators: Public Health France/Ineris/Anses
 - Milestones/final outcome(s):
 - Make an inventory by the end of 2019 of the chemicals for which reliable models are available;
 - Identify substances for which we now need to push from modelization towards developing operational tools;
 - By 2020, apply these models to the first monitoring campaigns to identify critical exposure factors;
 - Target new campaigns.
 - Indicators: make new modelization tools available
 - Financing: DGPR
-

ACTION 16

Identify and instigate the monitoring, in outdoor air, of some chemicals identified by the experimental campaigns so as to collect data on the presence of EDs in outdoor air.

Context

One route of exposure to EDs is inhalation, since some EDs are present in the air we breathe. It is thus important to gather data on EDs present in the atmospheric compartment. A pilot programme to launch an experimental monitoring of endocrine disruptors in the air will be implemented, initially based on the exploratory campaign to monitor pesticides in the atmosphere.

Monitoring these compounds will enable:

- a better identification of the relative contribution of the air matrix in the different routes of human exposure to endocrine disruptors;
- planning to add to the list of substances subject to outdoor air measures, in the places where this is required.

This action could, among other things, be used to support arguments in anticipation of requests for the reassessment of certain active substances under European regulation procedures.

-
- Leaders: DGEC/DGPR
 - Contributors: ASQAA/DEB/DGAL/DGS/CGDD/Anses
 - Operators: Ineris/Anses
 - Milestones/final outcome(s):
 - Creation of an ED/air list:
 - . a first list will be drawn up of molecules researched in the national measurement campaign for pesticides in outdoor air (2018-2019). Potentially endocrine-disrupting chemicals will also be featured on the list;
 - . define a ranking method for chemicals likely to be considered as endocrine disruptors, and for those presenting volatile characteristics, in order to complete the first list.
 - Consolidate the sampling and analysis protocols for endocrine disruptors from this list;
 - Ask at European level for an early termination of approvals for substances identified under regulations on plant protection products.
 - Financing: Ineris (DGEC/DGPR)
-

ACTION 17

Identify, among the indoor air pollutants, those pollutants likely to be endocrine disruptors. Instigate measures in residential housing through OQAI and INERIS.

Context

The first residential housing campaign run by the Observatory for Indoor Air Quality (OQAI) over the 2003-2005 period aimed to establish an initial inventory of indoor air quality representing the position of 24 million primary residences in continental metropolitan France. However, this first campaign did not specifically target chemicals with ED effects. In contrast, the ECOS-Habitat project, launched by EHESP (School of Public Health) in collaboration with OQAI and Irset (Research institute on health, environment and work) in 2008, made it possible to draw up a list of semi-volatile organic compounds (SVOC) in indoor environments (air and dust) and selected some of these to be measured in houses. This project, still on-going, aims to assess the aggregate exposure to SVOCs in housing in France and the associated health risks. Concurrently, a first campaign was carried out in schools by OQAI and the results were published in 2018. It demonstrated the, in some cases ubiquitous, presence of SVOCs, among which some have suspected ED effects.

In addition to this already-completed work, and in order to better understand the exposure levels to EDs in indoor air, supplementary measures should be introduced and carried out for housing and more generally in all the living spaces identified as the most relevant (for example, institutions hosting vulnerable populations).

Thus, the EDs likely to be found in the air of different indoor environments will be taken into account in subsequent measurement campaigns for chemicals present in the indoor air of residential housing and institutions hosting children, in order to obtain concentration values that represent the exposure in these living spaces.

Additionally, specific studies to estimate emissions will provide information on which materials emit the most EDs and allow us to target the indoor environments most likely to be impacted.

-
- Leader: DGPR
 - Contributors: DGS/DHUP
 - Operators: Anses/OQAI/CSTB/Ineris/Ademe
 - Milestones/final outcome(s):
 - Completion of the campaign in residential housing and institutions hosting vulnerable members of the public, then publication by the CSTB of a report on the relevant ED concentrations in indoor air (results of the campaign);
 - Evaluation work (CSTB, Ineris) on the main sources of emission in indoor environments and definition of a protocol for measuring the ED emissions from construction, decoration, furnishing and everyday consumer products present in residential housing;
 - Assessment of the health risks associated with EDs identified during the campaigns, to prioritize, where appropriate, the actions;
 - By the end of 2022, complete the measurement campaign for EDs in indoor residential environments.
 - Financing: DGPR/DHUP/DGS/Ademe
-

ACTION 18

Take advantage of the measurements implemented under the framework of the Network for Measuring Soil Quality (RMQS).

Context

The RMQS is a network of 2,240 sites distributed across a 16 km x 16 km grid covering mainland France and the overseas departments. The sites are representative of French soils and their uses, and are all subject to observations and soil sampling every 15 years. The assessment and monitoring of soil quality is based on an analysis of the physical, biological and chemical properties of soils. Thus, since its creation in 2000, the RMQS has been tracing the progression of soil fertility, stores of organic carbon, organic and mineral contaminants and microbial biodiversity. A large number of persistent organic pollutants (HAP, PCB, pesticides, dioxins and furans) were measured across the RMQS. New parameters are regularly added in order to respond to new issues for example, soil vulnerability to climate change, biodiversity and phyto-pharmacovigilance.

The aim of this action is to present, via the “Sharing knowledge on soils” portal of the scientific interest group on soils (GIS Sol), the results of measurements taken across this network of molecules with endocrine-disrupting properties.

-
- Leader: SDES
 - Contributors: Scientific interest group on soils (ADEME, AFB, IGN, INRA, IRD, MAA (DGPE)/MTES (CGDD))
 - Operator: INRA Infosol
 - Milestones/final outcome(s): online publication of results on the GIS sol website
 - Financing: by the GIS Sol partners
-

ACTION 19

Prepare and retrieve the data of the next exploratory campaign planned for under the Water Framework Directive to develop EDC monitoring.

Link with action 26 of the Micropollutants plan 2016-2021, “Carry out a prospective surveillance study on emerging molecules in rivers, groundwater and coastal waters and in drinking water for human consumption”.

Context

The Water Framework Directive envisages the introduction of surveillance campaigns for some emerging substances featuring on the “Vigilance list” in order to possess information at an EU scale of their presence in aquatic environments and on the risks for the ecosystems. The results of this “prospective” surveillance should feed into the list revision work on chemicals regulated by the WFD. The first vigilance list led to the acquisition of data in 2015 and 2016 on the chemicals with proven endocrine-disrupting properties based on their action mechanism (hormones (EE2, E2, E1)) and on antibiotic molecules and pesticides (neonicotinoids for example). Hormone monitoring will be repeated in 2018 and 2019 but the list of other substances to monitor remains

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limited. In conjunction and complementary to this, a prospective surveillance network (RSP) has been organized at a national level on the initiative of AFB and DEB aiming to gather knowledge and identify chemicals of interest emerging in French river basins. In particular, this involves revising the list of substances on which actions can be taken, and testing and validating the applicability of the innovative measurement tools as a non-targeted analysis, of the integrative samplers or of the biological tools based on the effects of chemicals, in order to incorporate them in the new water status surveillance strategies.

-
- Leaders: DEB / AFB
 - Contributor: DGAL
 - Operators: Water agencies/Ineris/AFB
 - Milestones/final outcome(s):
 - Ranking of a list of potentially endocrine-disrupting chemicals pertinent to aquatic environments: ranking work by the national experts committee instigated by the micropollutants plan → 4th trimester 2021 (in line with action 4 and action 15 aiming to ensure coherence between the prioritization/ranking approaches for the chemical lists and the implementation of research campaigns on potential EDs in the different environments);
 - Specifications of an exploratory campaign on EDs under activity n° 1 of the Prospective surveillance network → 1st quarter of 2022;
 - Carry out field campaigns → 2023.
 - Financing: AFB/ Water agencies
-

ACTION 20

Monitor discharges from some industrial sectors.

Context

The regulation pertaining to liquid discharges aims to establish a list of substances under the Water Framework Directive. These chemicals are being monitored in discharges from ICPEs (Installations Classified for the Protection of the Environment). Several targeted measurement campaigns have, in the last few years, enabled a better characterization of micro-pollutant emissions, of which some have endocrine-disrupting properties (phthalates, PCB, some pesticides, PBDE, etc.). This improvement in the characterization of discharges contributes to identifying and instigating actions to reduce endocrine disruptors likely to impregnate the natural environment. The law of 23rd August 2017 amended (article 23) the monitoring techniques of the RSDE (discharge of hazardous substances in water) campaigns so as to harmonize them for a whole series of chemicals, including endocrine disruptors.

In the cases where the pollution of the natural environment by endocrine disruptors is specifically identified, contributors will be recruited and, where appropriate, complementary actions taken to reduce or monitor the substances as regards the national standards.

This monitoring could be based in particular on biological tests (bioassays) as given in the objectives of the Water sector strategic contract.

-
- Leader: DGPR
 - Operators: Ineris/AFB for sampling in the natural environment
 - Milestones/final outcome(s):
 - Monitoring undertaken;
 - Reduction programmes if necessary;
 - Progression of quantities emitted.
 - Financing: private
-

ACTION 21

Undertake exploratory analyses on consumer products aimed at vulnerable populations (toys for children under 3 years) to search for non-regulated chemicals presenting proven ED properties and which could expose these populations during normal, foreseeable use.

Context

Different studies have shown that many consumer products contain non-regulated EDs, including foodstuffs, toys for children, nappies for babies and cosmetics.

Samples of toys for children under three years old were taken for exploratory analyses. The analyses cover the non-regulated chemicals presenting known ED properties. The substances are targeted in coordination between the DGCCRF, SCL and Anses.

During sampling of other products aimed at children under three years old (nappies etc.), other proven EDCs could be sought.

-
- Leader: DGCCRF
 - Operators: SCL/Anses
 - Final outcome(s):
 - Analysis reports
 - Budget:
 - For the exploratory analyses of toys aimed at children under three years old:
 - . Development of analysis methods: €25,000
 - . Routine analysis: €500 per sample
 - Financing: DGCCRF for the investigators subject to the availability of a budget to develop the analysis methods and cover the analysis costs
-

ACTION 22

Identify consumer products intentionally using EDs for their manufacture which are not covered by restrictions and which may expose the population.

Context

Based on work by Anses (actions 1 and 4) and the results of the exploratory analyses (action 21), instigate work aiming to identify consumer products that contain potential EDs (inventory, report, etc.).

-
- Leaders: DGPR/DGS/DGE
 - Contributor: DGCCRF
 - Operator:
 - Final outcome(s):
 - Inventory, by the end of 2021, of toys sold in the country aimed at children under three years old which use in their manufacture EDs which are not covered by restrictions and which may expose the population and which are sold in this country;
 - By the end of 2022, draw up a list of consumer products to be monitored;
 - By the end of 2022, draw up of list of EDCs frequently found in consumer products.Depending on the results of the actions listed above:
 - Propose lists of substances to be regulated;
 - Involve industry players to encourage voluntary withdrawals of products containing EDs.
 - Indicators:
 - Number of voluntary actions on consumer products undertaken by industry players;
 - Number of chemicals regulated.
 - Financing: DGPR/DGS/DGE
-

4-2 AGGREGATION AND VALORISATION OF ENVIRONMENTAL IMPREGNATION DATA

ACTION 23

Centralizing and utilizing data on environmental impregnation by EDs.

Context

Chemicals presenting an endocrine-disrupting activity, whether proven or not, can be present in the various environments: soil, air, plants, water, consumer goods, foodstuffs... They can have short or long-term impact on the environment (fauna, flora) depending on how the chemicals degrade and how biologically persistent they are. In some cases, they can also interact with other chemicals, although in the majority of cases the effects of these interactions on living organisms are still unknown. Moreover, these chemicals can present effects other than endocrine disruption, and thus could be, or could have been, subject to monitoring measures or one-off studies in the environment (water, foodstuffs, outdoor air, soils, etc.) by different public bodies (data from AASQA, SISE-eaux, EAT2 (TDS2), results from the RMQS (GIS soil information system)). In order for this data to be used and promoted, we should ensure that all of the sources gathering data on EDs (in all types of environment) can quickly transfer their data via API to the data.gouv.fr website. In the medium term, the goal is to harmonize the repositories for data collection and presentation.

-
- Leader: SDES
 - Contributors: DGEC/DEB/AFB/DGPR (identification of substances)
 - Operators: AASQA/Water boards/AFB/OQAI/CSTB/Ineris/Anses/Naturalist Associations/ Consulting firms/INRA/ADEME/DGS/IRD
 - Milestones/final outcome(s):
 - Centralizing data on the different environmental media on the data.gouv.fr website by 2020 and simultaneous background work to harmonize repositories;
 - Organizing a datathon to combine different data sets (environmental contamination, economic activities, socio-professional category, sectoral practices especially in agriculture, ecosystem functioning, etc.) and build a map to reveal the spatial, temporal and socio-economic trends of environmental contamination by EDs and exposure of the population
 - Indicators: Number of EDs measurement points per environmental media, number of EDs monitored per type of environment, number of indicators of environmental impregnation by EDs.
 - Funding: SDES
-

ACTION 24

Better taking into account ED characteristics of chemicals of interest in aquatic environments when deriving Environmental Quality Standards (EQS) and Environmental Guideline Values (EGV).

Link with action 34 of the Micropollutants plan 2016-2021 “Construct reference values and methodologies to better assess surface and ground water quality taking into account endocrine disruptors and relevant metabolites”.

Context

Under the European Water Framework Directive, aquatic environment quality (e.g. surface water, sediments, biota) is assessed by measuring concentrations of chemicals on a network of monitoring sites and comparing those concentrations to environmental quality standards (EQS). EQS are defined as concentrations that should not be exceeded to guarantee adequate protection of the aquatic environment and human health. These EQSs are set for a limited number of chemicals of interest to the EU (called priority substances) and to each member state (river basin specific pollutants) following a harmonized methodology (*Technical Guidance for Deriving Environmental Quality Standards*, EC 2018). This European guidance states that ED characteristics should be taken into account when deriving the EQS by using experimental data showing an ED effect, or by using an additional safety factor. However, a first overview by INERIS in 2016, based on the list of the potential EDCs drafted under the previous European strategy on endocrine disruptors, shows that it is not the case for most EQSs. In response to the need to better account for the dangerousness of chemicals in aquatic environments, we must re-examine the scientific data in the EQS dossiers established at national level by INERIS, to assess the feasibility and relevance of setting revised EQS/EGVs. These revised EQSs could be used to interpret the impregnation data of aquatic environments by potential EDCs.

-
- Leaders: DEB/AFB
 - Operators: INERIS/AFB
 - Milestones/final outcome(s):
 - Develop a methodology to take into account ED characteristics of a chemical when deriving the EQS (2019);
 - Draw up a list of potentially endocrine-disrupting molecules based on criteria defined in the European guidelines for biocidal and plant protection products and the list of chemicals of national interest (2019);
 - EQS revision work based on the prioritized list of potential EDCs (2020-2021);
 - Impact study of the EQS revision on the chemical status of surface water bodies.
 - Indicators: Number of quality standards for aquatic environments revised at the end of the SNPE2
 - Budget: €100,000/ year
 - Funding: AFB
-

ACTION 25

Developing and promoting monitoring of endocrine-disrupting activity in environmental media and discharges using integrating biological methods (rather substance by substance monitoring)

Link with action 25 of the micropollutants plan 2016-2021 “Assess the innovative methods and technologies for monitoring and diagnosis”.

Context

Monitoring the contamination of an environmental compartment by EDs (water, air, soil but also food etc.) can be done by analyzing the presence of potential EDs or by measuring ED activity using biological methods (*in vitro* and *in vivo* bioassays) in complex environmental matrices. Monitoring an endocrine activity (e.g. estrogenic activity), rather than individual chemicals, allows to account for cumulative mixture effects and thus be able to consider all substances that act on a well-defined biological target (for example, the estrogen receptor), whether these substances are known or unknown (e.g. metabolites, degradation products). This cannot be achieved through targeted chemical analysis. Many *in vitro* and some *in vivo* tests, initially developed to assess the activity of single substances, are currently being used for environmental biomonitoring purposes. Estrogenic activity tests are the most commonly used and best documented. However, there is a need to develop and validate similar solutions for many other modes of action (androgenic and anti-androgenic, progestagenic, glucocorticoid and mineralocorticoid activities).

The field application of biological methods identified under this action will be tested on complex matrices under other actions in the plan.

-
- Leaders: DEB/AFB
 - Operators: AFB/INERIS/AQUAREF/private or public laboratories specializing in endocrine disruptors
 - Milestones/final outcome(s):
 - Inventory of biological methods available to measure ED activity in the environmental matrices (2019);
 - Scientific, technical and economic validation of the biological methods made available by the national group on “Bioassays” led by INERIS and AFB (2019);
 - Assess the results of using biological methods to monitor ED activity in surface waters under the Prospective monitoring network and the *Watch-List* European network (2020);
 - Develop an interpretation framework for the results of *in vitro* tests to detect the estrogenic activity in surface waters and discharges (2020);
 - Promote the results from the call for projects on “Micropollutants in urban waters” focusing on the projects that addressed the identification of ED activities in wastewaters by drafting inter-project guides (2020-2021);
 - Promote the importance of monitoring ED activity at the European level, especially considering the ongoing review of the Water Framework Directive and Urban Waste Water Directive
 - Budget: €250,000 (full amount)
-



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5

Enhancing our knowledge of food exposure to endocrine disrupting chemicals (EDCs) and taking measures to prevent and reduce this exposure

ACTION 26

Analyzing the presence of endocrine disrupting chemicals (EDs) in order to assess dietary exposure of the general population, as part of the new Total Diet Study 3 (EAT3).

Context

In addition to monitoring and control plans as well as biomonitoring studies, total diet studies (TDS) are recognized as one of the most cost-effective methods of assessing a population's dietary exposure to a large number of substances and enable Health Risk Assessments (HRAs) to be completed. Since the end of 2017, ANSES has initiated discussions to define the strategic framework for a new total diet study, EAT3. EAT3 will be based on data from the latest food consumption survey (INCA3) published in 2017, which covers the general population in mainland France, from 0 to 79 years old. Children under three years old who were the subject of a specific total diet study published in 2016 will not be included in the EAT3 study population. For the first time in France, the study will include specific conclusions on organic products and consumers of these products. As part of this study, ANSES will focus in particular on the presence of certain EDs in foods.

- Leaders: DGAL/DGCCRF/ANSES
- Contributors: DGAL/DGPR/DGS/DGCCRF
- Operator: Anses
- Milestones/Final outcome(s):
 - 2019: sampling;
 - 2020: analysis;
 - Study report including an estimate of the level of contamination of foodstuffs by the substances selected in the study and a risk analysis related to the exposure of the population to these substances. Specific conclusions will focus on organic products and consumers of these products;
 - The first results on some groups of substances will be available in 2023.
- Indicator: publication of a specific section on EDs in the EAT3 study
- Budget: €3.4M
- Funding: divided between ministries in charge of this action



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6

Understanding the impact of EDs on biodiversity

ACTION 27

Studying the impact of ED presence in water on fish intersexuality. Extending the list of water quality indicators developed under the French National Observatory on Biodiversity to include indicators of environmental contamination by endocrine-disrupting substances.

Link to Action 29 of the 2016-2021 Micropollutants Plan "Assess the impact of micropollutants on aquatic fauna and flora, in particular the synergistic potential of micropollutant mixtures, including those associated with endocrine disruption".

Context

In the natural environment, EDs are suspected of interfering with the reproduction of many wildlife species, including fish. Among fish, numerous studies carried out in industrialized countries show that endocrine disruption is widespread and impacts populations of various native species living in rivers, lakes and estuaries. Many anomalies have been observed in the environment: delays in sexual maturity, presence of intersex individuals in the population, feminization or masculinization of secondary sexual characteristics, etc.

While some studies of river fish populations suggest a link between the exposure of organisms to environmental contaminants and alterations in development and reproduction, no cause-and-effect relationship *in situ*, between one or more contaminants and a specific physiological effect, has yet been found. Among the biomarkers of environmental quality classically associated with endocrine disruption, intersexuality is defined in sex-separated fish species as the simultaneous presence of male and female gonadal tissues. This biomarker is particularly relevant because the presence and severity of intersexuality observed at the individual level has been linked to the extinction of some local fish populations (Kidd et al. 2007).

- Leaders: DEB/AFB
- Contributors: DEB/DGPR
- Operators: Water boards/ AFB and ONB/ Ineris/ Naturalist Associations
- Milestones/final outcome(s):
 - National mapping of river fish intersexuality based on the study of more than 250 sites (2019);
 - Additional environmental investigations on the study sites presenting a high rate of intersexuality to explain the causes of this phenomenon (2019-2021).
- Indicators:
 - For the intersex study: identification of ED action modes in environments using bioassays, correlation with human activity;

-
- Integration of an “ED” indicator within the French National Observatory of Biodiversity (ONB).
 - Budget: €120,000/year for the intersex study
 - Funding: AFB
-

ACTION 28

Developing knowledge on the effects of EDs on wildlife.

Context

So far, research efforts in the field of endocrine disruption have mainly been focused on human populations, often leaving out the natural environment and wildlife species. In addition, most of the research carried out to date has focused on the easily quantifiable reproduction function, at the expense of other functions such as thyroid function, metabolism and neurodevelopment.

The direct link between the quality of human health and the quality of ecosystem health makes it clear that more research is needed on the effects of pollution on the environment and all its inhabitants.

-
- Leaders: DEB/AFB
 - Contributor: DGPR
 - Operators: Anses/AFB/ONFCS
 - Milestones/final outcome(s):
 - 2020: draft an updated summary of the knowledge of the impact of EDs on all environments (aquatic, marine, terrestrial), on wildlife, focusing on the effects observed at population level. Potential risks to wildlife populations can then be identified based on this knowledge on hazard combined with the results of another action in the plan on the impregnation of environments will allow risk assess potential risks to wild populations.
 - 2021: A second step will aim at highlighting knowledge gaps that hinder risk assessment and management of EDs through a survey of stakeholders (mainly from research). These gaps could fuel calls for projects/calls for expressions of interest.

This action is to be connected to the work undertaken by AFB and Anses on the impact of chemical substances, in particular EDs, on coral reefs.
 - Indicators: Number of research and development contracts
 - Budget: Around €100,000
 - Funding: AFB
-



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7

Preserving and restoring the environment

7-1 PRESERVING THE ENVIRONMENT

ACTION 29

Strengthening the monitoring of EDs released into the water upstream and downstream of WWTPs based on existing environmental monitoring structures.

Link with Action 17 of the 2016-2021 Micropollutants Plan "To continue research on hazardous substances in raw and treated wastewater from wastewater treatment plants and research on reduction actions".

Context

The National Action for the Research and Reduction of Discharges of Hazardous Substances in Water (RSDE) began in 2002. This action falls within the framework of the Water Framework Directive (WFD) and aims at strengthening the protection of the aquatic environment through specific measures designed to progressively reduce or phase out the discharges, losses and emissions of hazardous and priority substances.

The results of the first phase of this action have highlighted that:

- there are significant emissions of hazardous and priority hazardous substances, as defined by the WFD, into aquatic environments through urban wastewaters;
- there is a lack of knowledge regarding emissions of certain micropollutants through urban wastewaters.

The RSDE action, extended after 2010, has generalized the measurement of the flow of certain micropollutants in treated water from wastewater treatment plants (WWTP) with a nominal treatment capacity greater than or equal to 600 kg of BOD5/day. This phase made it possible to identify the list of micropollutants present in wastewaters in a significant quantity.

The new phase of the RSDE action, initiated in 2016 for the WWTPs, aims at:

- participating in better control and reduction in the emissions of a number of hazardous substances to wastewater collection networks;
- quantifying the evolution of pressures on aquatic environments.

This new data generated will enable the assessment of EDs emissions into aquatic environments by urban centers through wastewaters and propose actions and recommendations to reduce these emissions.

Some river districts also plan to monitor substances including EDs in sewage sludge. The RSDE working group will discuss the results of this additional monitoring.

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At the same time, the “Innovation and Practice Change: Micropollutants in Urban Wastewater” call for projects produced monitoring data on collection networks as well as raw and treated urban wastewater.

-
- Leader: DEB
 - Contributor: DEB
 - Operators: AFB/Ineris
 - Milestones/final outcome(s): Based on the data collected from:
 - 1. The 2017-2018 monitoring campaign “Research on and Reduction of Releases of Hazardous Substances into Water (RSDE)”;
 - 2. The call for projects “Innovation and Practice Change: Micropollutants in Urban Wastewater”;
 - 3. Results of Action 4 of the SNPE relating to the availability of a list of ED substances.
 - INERIS:
 - . will report on the presence of EDs monitored upstream and downstream of WWTPs;
 - . will propose actions to reduce pollution by substances with ED properties at the source;
 - . will produce recommendations for launching a new RSDE campaign that would specifically develop the tracking of substances with ED properties.
 - Indicators: Deliverables corresponding to the abovementioned results
 - Budget: €55,000 for data exploitation
 - Funding: AFB
-

ACTION 30

Adjusting the emission limit values (ELV) in surface water based on the revised EQS.

Context

Action 25 of the strategy provides for the revision of the threshold values of concentrations not to be exceeded in the aquatic environment (Environmental Quality Standards (EQSs)) or Environmental Guidance Values (EGVs)) to interpret the results of the aquatic environment impregnation data with potentially ED substances.

Discharges must respect emission limit values (ELVs) in order to guarantee the protection of receiving aquatic environments. The ELV are set at national or local level, based on the EQS when available and adapted to local environmental characteristics if needed.

The approach introduced by the WFD is to ensure that the release of a substance in the environment will not cause a threshold value (EQS) to be exceeded in the receiving water body. It will then be necessary to define a strategy to revise, when appropriate, the emission limit values set in national and local regulation taking into account the new threshold values (EQS, EGV).

-
- Leaders: DGPR/DEB
 - Operator: INERIS
 - Milestones/final outcome(s):
 - Publication of new EQS;
 - In case control bodies establish EQS exceedance in the field, ELV revisions should be discussed to take into account updated EQS values;
 - Update of the WFD guidance regarding industrial emissions.
 - Indicators: number of known exceedances of EQS
 - Funding: Water and Biodiversity Department (DEB) for research on EQS exceedances and defining new EQS
-

7-2 RESTORING THE ENVIRONMENT

ACTION 31

Identifying appropriate soil management measures.

Context

The first step is to establish a state of knowledge on EDs substances regarding their behaviour in the environment and associated issues. This is a prerequisite for identifying suitable management measures. This state of knowledge deals with the sources of these compounds, the behaviour of these compounds in the environment, their occurrence in environments and technical tools to manage the issues related to these substances. This review will permit to provide operational recommendations in the context of managing historically polluted sites or active sites, in particular for environmental inspectors, but also for providers and contributors in the field of polluted sites and soils. In 2018, a review of the information available was gathered and will continue in 2019 on perfluorinated compounds (PFCs) in the context of polluted sites and soils.

-
- Leader: DGPR
 - Operator: BRGM
 - Milestones/final outcome(s): Operational recommendations for stakeholders in the field of polluted sites and soils
 - Indicators: reports corresponding to the above mentioned results
 - Budget: €100,000
 - Financing: MTES (through BRGM) funding
-



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8

Harmonise the European regulation regarding everyday objects

ACTION 32

Defining EDs quickly and consistently in all relevant European legislation to ensure an appropriate level of protection for all modes and routes of exposure. Support France's position at the European level to work towards a horizontal definition of EDs.

Context

The regulation of chemical substances is essentially a Community competence. On the one hand there are sectoral European frameworks (phytopharmaceuticals, biocides, toys, cosmetics, medical devices, water for human consumption, materials in contact with foodstuffs, etc.) and, on the other hand, cross-compliance regulations such as REACH and CLP. It is therefore necessary to make the frameworks for evaluating substances coherent between the regulations and closer to one another, in order to put in place the measures that best protect citizens. It is particularly necessary to include in the appendices of the regulations the required tests concerning endocrine disruptors, notably taking into account those already existing and to ensure their coherence throughout the regulations. Anses will be mobilised to assist the government in modifying the European regulations to guarantee a satisfactory level of protection with regard to endocrine disruptors.

The current EU-level definition of an ED substance may implicitly lead to the classification of a substance into two categories: An EDC can be "known" or "presumed"; the "suspected" category is currently not included in the EU regulation regarding EDs. For the sake of consistency in the regulations on chemical substances, the ED classification should be implemented in compliance with the CMR's in three categories. In practice, it allows to make provisions inspired by the precautionary principle, one of the foundations of the EU's general environmental policy, which recommends "*the implementation of risk assessment procedures and the adoption of provisional and proportionate measures to prevent the occurrence of the damage*".

- Leader: DGPR
- Contributors: French authorities and competent authorities for the legislations in question
- Operator: Anses

-
- Milestones/final outcome(s):
 - As part of the *fitness-check* soon to be conducted by the Commission, Anses will propose improvements of the regulations regarding the test requirements required from industrial operators, and of risk assessments in the various regulations.
 - French authorities position paper and policy statements each year;
 - Development of a criteria proposal for the classification of chemicals in the category “suspected”;
 - French authorities position paper to ask the European Commission that the cross-compliance definition of EDs introduce a sub-category according to the level of evidence (known, presumed, suspected) like CMRs, and a risk management similar to the CMRs, PBTs and vPvBs;
 - French authorities position paper to establish an identical definition of endocrine disruptors in all sectorial regulations on chemical products: cosmetics, toys, food packaging, etc., introducing a level of evidence in three categories (known, presumed and suspected). The required tests concerning endocrine disruptors must also be added in the appendices of the above-mentioned regulations, notably taking into account those already existing and ensuring their consistence throughout the regulations.
 - Indicators:
 - Number of Community debates in the European Parliament, in the Council, and in Community agencies (ECHA, EFSA, etc.) at the instigation of the national authorities and linked to the inclusion in European regulations of the criteria for determining EDs effects;
 - Number of community debate minutes and reports, particularly in the framework of the Council Presidencies.
 - Financing: relevant ministries
-

ACTION 33

Verifying compliance with regulatory requirements (restrictions, prohibitions, withdrawal of authorization) for substances listed for their ED property.

Context

In terms of market surveillance, the DGCCRF continues its actions to control emerging risks, such as endocrine disruptors on food and non-food products.

-
- Leader: DGCCRF
 - Contributor: DGCCRF
 - Operator: SCL
 - Milestones/Final outcome(s): according to the DGCCRF’s national survey program; Review of the checks carried out
 - Indicators:
 - Number of checks;
 - Follow-up action taken.
 - Financing: DGCCRF
-

ACTION 34

Controlling imported products.

Context

Products that may contain EDs that cross the border must be checked to ensure compliance with European and national legislation. The aim is therefore to strengthen customs controls when importing products likely to contain EDs, such as cosmetics, toys, and childcare items. This action could be taken at European level in the framework of the ECHA forum.

-
- Leader: DGDDI
 - Operator: Customs Agent
 - Milestones/Final outcome(s):
 - Controls all year and for certain types of products;
 - Possibilities of reinforced control campaigns;
 - Review of the controls carried out.
 - Results indicator:
 - Number of controls on products that may contain EDs
 - Financing: DGDDI
-



PROTECTING THE ENVIRONMENT AND THE POPULATION

9

Guiding industry actions in substitution and protection

9-1 PROMOTING SUBSTITUTION

ACTION 35

Mobilizing companies in a technological, organizational and departmental innovation around EDs substitution.

Context

It is essential to reduce human and environmental exposure to EDs. Economic actors play a key role in this respect. Substitution can lead to a competitive advantage which allows the restrictive regulations to be anticipated and the products to be better promoted. Not only specific calls for projects or expressions of interest should be launched but also the issues at stake should be identified in the existing calls for projects to create a dynamic around substitution (ADEME, regions, competitive cluster, investment program for the future, etc.).

- Leaders: DGE/CGDD/SGPI
- Contributors: DGEC/DGPR/DEB/DGE/DGT/DGRI
- Operators: ADEME/Ineris/Anses/ANR
- Milestones/final outcome(s):
 - Initiate theses on EDs substitution;
 - Clearly show the theme of substitution in relevant existing calls for projects;
 - Launch a call for expressions of interest to centralize and select projects on ED substitution and guide them to the most relevant portals;
 - Launch new calls for projects around substitution.
- Indicators:
 - For the theses:
 - . Number of substitution solutions that are the subject of a thesis, the degree of increase in their TRL between the beginning and the end of the thesis, and that will eventually lead to an alternative on the 2019 market at the end of the National Strategy on Endocrine Disruptors 2 (this management of the efficiency of the financed research will be provided by the financing body);
 - . Verification that the theses take into account the principles of sustainable substitution and not regrettable substitution (national guides on the substitution of EDs).
 - Number, sustainability, economic viability and activity of actors offering substitution services, created or seeing their activity increased;
 - Number of selected projects.

-
- Budget:
 - €3-4 million (innovation competition);
 - €10-15 million (AAP demonstrator)
 - Financing:
 - Innovation Competition Actions and Demonstrators of the High Ambition Innovation Transition (PIA);
 - ADEME's theses.
-

ACTION 36

Promoting substitution within R&D animation structures and with operators. In particular, involve the relevant competitiveness clusters or technical centres by encouraging them to take this problematic into account in their actions.

Context

Chemical risks in general, and those associated with the substitution of dangerous substances in particular, are too rarely an innovation factor or a factor integrated into innovations. They must be taken into account from the design stage by industrial sectors. For the moment, they are more the result of teams focused on regulation, which are not necessarily associated with the development of new products by companies. Substitution or removal must be promoted by involving all stakeholders.

-
- Leaders: DGE/CGDD
 - Contributor: DGT
 - Operators: Competitiveness clusters/technical centres/industry players and federations
 - Milestones/final outcome(s):
 - Promoting and widely disseminating the substitution guide from SNPE 1:
 - . Online publication of the guide to the sites of all relevant ministries and promotion to research teams;
 - . Promotion to industrialists concerned by substitution (professional federations, MEDEF, CGPME) and workers' unions;
 - . Presentation in community and international bodies.
 - Organization of discussions and awareness-raising with the relevant hubs, to identify actions in favour of substitution;
 - Annual organization of workshops mainly bringing companies together to promote the dissemination of knowledge and experiences on the substitution of harmful substances;
 - Evolution of the number of CTIs with a substitution component.
 - Indicators:
 - Number of workshops, industrial participants, concrete substitution cases presented and discussed for their recovery/ adaptation by other actors;
 - Analysis of feedback from industrial participants: did the workshops significantly help in setting up a substitution?
 - Analysis report on feedback from experiences after three years.
 - Financing: DGE/CGDD
-

ACTION 37

Contributing to ECHA's work on the substitution of EDs substances.

Context

The substitution of chemical substances used in industrial manufacturing processes with adverse effects on health is desirable. The European Chemicals Agency has produced a guide called "*Strategy to promote substitution to safer chemicals through innovation*", which emphasizes the importance of voluntary substitution of EDs substances in industry (in addition to regulatory approaches, which are ECHA's main mission). Substitution must not be limited to replacing one substance by another. It must be used as an opportunity to re-examine the manufacturing process, the functionality of a product and the existence or development of alternatives. In this framework, ECHA plays a supporting and facilitating role for the Member States of the European Union (EU) in the following areas:

- training (seminars);
- information and action to strengthen the financing of substitution;
- provision of data to avoid regrettable substitutions;
- help in creating networks on substitution.

This action can be associated with action 1.10 of the PST3 on substitution.

-
- Leaders: DGPR/INERIS
 - Operators: Ineris/Anses
 - Milestones/final outcome(s):
 - Review of substitution methodologies published in scientific and technical literature for ED substances; case-by-case analysis per substance;
 - Data on on-going substitution work provided by manufacturers;
 - Support for the creation of substitution networks in line with the catalytic role of ECHA;
 - Organization of seminars to discuss methodologies, which has enabled the inclusion of information on substitution disseminated by ECHA on national information media in 2020.
 - Indicators:
 - Designation of one or more public network facilitator;
 - Establishment of regular links and exchanges with ECHA and facilitators from other members states;
 - Summary of this network's activities.
 - Financing: MTES financing of Ineris
-

9-2 PROTECTING WORKERS

ACTION 38

In connection with Actions 1.10 and 1.11 of the PST3, integrating the endocrine disruptor issue into prevention initiatives in the cleaning sector and extend this approach to other sectors (e.g. hairdressing, nail care, etc.).

Context

The action proposed here focuses specifically on the cleaning sector, where workers may be exposed to products with endocrine-disrupting effects.

-
- Leader: DGT
 - Contributor: INRS
 - Operators: Anses/INRS
 - Milestones/final outcome(s):
 - Report on the state of play of the different types of employers in cleaning professions (private enterprise, public administration, individuals) specifying the number of employees in each relevant category, as well as prevention measures currently in progress in this sector and for these different types of employers;
 - Actions to extend the prevention of exposure to endocrine disruptors:
 - . List of products according to their content of known, presumed or suspected endocrine disruptors, to support and accompany the substitution of products that may have ED effects, in particular based on list 2;
 - . Information campaign for cleaning professionals and their different types of employers to encourage them to limit EDs exposure and replace products.
 - Extend the actions to the other trades and sectors where employees are likely to be exposed to endocrine disruptors (such as hairdressers, nail care, etc.).
 - Indicators:
 - Number of actions to encourage the substitution of cleaning products potentially containing EDs;
 - Number of prevention actions that incorporate information intended for users and targeted information on different types of employers for the household sector;
 - Number of similar actions for other trades impacted by exposure to endocrine disruptors.
 - Financing: ANSES (Ministry of Labour funding)
-

ACTION 39

For identified EDs: establish Occupational Exposure Limit Values (OELVs) and/or biological exposure indicators (BEIs) derived from the effects of EDs if relevant (for the most perceptible effects).

Context

Occupational activity is an important route of exposure to products with potentially endocrine-disrupting properties, for various activities in various professions. Occupational exposure can have a particularly negative impact on the health of unborn children in women of childbearing age as well as on the health of adults throughout all periods of their lives and their future children.

OELVs are part of the regulatory tools that enable the implementation of exposure reduction strategies through collective actions (such as suction or ventilation) or individual protection actions (respiratory masks, gloves, overalls).

-
- Leader: DGT
 - Contributors: SG of the MAA for exposure to farmers and farm workers
 - Operators: Anses/INRS/Public Health France
 - Milestones/final outcome(s):
 - List of professions (NAF professional sectors at least) with the finest level of French job classifications (PCS 4 digits, 497 jobs), with an indication of the probability of a respiratory exposure to EDs (type: certain, probable, possible, negligible and undocumented);
 - Implementation of recommendations for occupational surveillance strategies by OELV and/or BEIs (INRS);
 - List of validated sampling and assaying techniques for at least known or suspected ECs;
 - Conducting measurement campaigns in particularly relevant sectors.
 - Financing: Anses
-

9-3 MOBILISING COMPANIES TO REDUCE CONSUMER EXPOSURE TO ENDOCRINE DISRUPTORS AND DEVELOP INFORMATION FOR THE GENERAL PUBLIC

ACTION 40

Encouraging voluntary commitments by manufacturers and distributors to remove or substitute substances that may have endocrine-disrupting properties in everyday consumer goods, and inform consumers through the dissemination of prevention messages.

Context

French people today have a strong expectation of information on daily exposure to chemicals in their immediate environment via consumer products. The most vulnerable populations for which exposure reduction measures are the most important are children and pregnant women. The mobilization of manufacturers to reduce the general public's exposure, and more specifically that of vulnerable people, could be done in several ways:

- developing consumer product ranges for the most vulnerable target audiences without EDs: toys, cosmetics, food containers;
- financing by voluntary manufacturers for newborn gift boxes without ED substances;
- propose the provision of newborn gift boxes without potential ED substances to pilot maternity hospitals.

-
- Leaders: DGCCRF/DGPR
 - Contributors: DGE/DGS
 - Milestones/final outcome(s):
 - 2019: organization of a round table with industry stakeholders;
 - Following the round table, there will be voluntary withdrawals of products potentially containing ED substances, substitution of ED substances, and the general public will receive prevention messages from manufacturers;
 - Identify, by involving the various stakeholders, a range of priority products to be targeted due to the exposure of vulnerable populations;
 - Based on the "phenol-free" model on receipts, consider launching new labels targeting substances identified as EDs.
 - Indicators: decrease, before the expiry of the SNPE2, in the number of consumer products containing known or suspected ED substances according to the ANSES list, that are sold nationally in the priority families range of products.
 - Financing: DGPR/DGCCRF/DGE/DGS
-



IMPROVE CURRENT KNOWLEDGE

10

Accelerating research to understand and adapt our risk management and regulation

ACTION 41

Introducing a platform to support the validation of methods and tests permitting the identification of endocrine-disrupting effects.

Context

There is a need for a large number of “tests” undertaken in the context of “test strategies” because of the many different action mechanisms for endocrine disruption and the fact that in order to classify a chemical, it must be proven that it not only has a damaging effect and that it acts on the endocrine system, but also that the effect is indeed caused by endocrine disruption.

Yet, many of these tests have not been carried out or are not “valid” as understood in the “substance” regulations, meaning they are not enforceable without ratification from an international body such as the OECD. This validation process is costly and complex since the tests must be repeated many times on a high number of molecules and in several different laboratories to ensure they are robust and reliable.

The public/private platform project, for which the SNPE1 approved the idea of carrying out a feasibility study, will enable complete, high-quality method documents to be presented to the international validation bodies more quickly. These documents will be intended for integration into the regulations (REACH, biocide, phytosanitary, etc.).

This platform will enable:

- the recognition of trial methods enabling the identification of ED effects;
- the quality of the results of the method to be demonstrated, particularly by performing independent tests in different laboratories;
- the method to be sent for validation by the official bodies.

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- Leaders: DGPR/INERIS
 - Contributors: DGT/DGE/DGAL/DGRI/professional federations/CRO
 - Operators: INERIS, Anses, ANSM
 - Milestones/final outcome(s):
 - First half of 2019: decision to fund the project through the “PIA (Programme d’investissements d’avenir or future investments programme) followed by the operational phase and implementation of the platform;
 - Revisions of the OECD’s general guidelines, including a particular acknowledgement of effects other than reproductive toxicity, including for low doses;
 - Validation of tests enabling the ED characteristics to be determined based on tools developed in the research laboratories;
-

-
- Association of European and international partners;
 - Number and complexity of pre-validated trials.
 - Indicators:
 - Publication before the end of 2020 of a document updating and completing the list of tests for identifying the danger of chemicals that take the specific properties of chemicals with endocrine-disrupting properties into account. This document could be proposed to the relevant European authorities
 - Pre-validation of three trial methods as a yearly minimum (simple *in vivo*, complex *in vitro*, simple *in vitro*);
 - Success of a formal validation by the official bodies (OECD in particular), and in the meantime, eligibility in the assessments;
 - Update the EFSA/ECHA guidelines according to the publication and validation of new tests.
 - Budget: approx €3 million/year over 10 years
 - Financing: public/private
-

10-1 BUILDING ON THE INSTITUTIONAL FRAMEWORK DEVELOPED FOR CHEMICAL RISK RESEARCH TO SUPPORT LONG-TERM RESEARCH ON ENDOCRINE DISRUPTORS

ACTION 42

Coordinating to support research and innovation on environmental contaminants, including endocrine disruptors, in support of the implementation of public policies in the broader context of the theme of environmental health.

Ensure clarity for all stakeholders in research efforts and progress on EDCs.

Context

The French scientific community is very mobilized on the subject of the chemical exposome, which include EDs. Research helps to make progress on identifying them and understanding the action mechanisms of cellular or tissue processes of these disruptors. Within the framework of SNPE2, this mobilization will be continued and encouraged. It will build on the efforts of the research and higher education bodies coordinated at Alliances level and in collaboration with the agencies, to develop skills and tools to better understand the chemical exposome. This mobilization will also build on their commitment to European-wide research projects for health and the environment.

Strategic thinking, stakeholder involvement and harmonisation at European level.

Strategic thinking on ED research is conducted at national and European level using several levers and instruments: as part of the HERA strategic action with the European Joint Programming Initiative (EJP) HBM4EU; broader European programming calls for projects from the French National Agency for Research (ANR), the PNR EST (National Research Programme on health, the environment and work) led by Anses, cohorts and clinical studies with health and environment sections.

The chemical exposome and its impact on health are attracting increasing interest. The HBM4EU project "*European Human Biomonitoring Initiative*" (Cofund H2020, 2017-2021) aims to provide Europe with a mechanism and consortium to address current issues surrounding biomonitoring and the environment - health link. This project brings together 38 signatory structures including Inserm under the French "*hub*", to which nearly 70 "*linked third parties or LTPs*" are added, including for France with the Hub composed of ANSES, Public Health France, CEA, CNRS, INERIS, INRA, and INRS. This initiative is based on human biomonitoring (detection of xenobiotics in biological samples) to assess human exposure to substances, in connection with the state of health. Part of this work is dedicated firstly to emerging contaminants, and secondly to research on cocktail effects.

At European and national level, HBM4EU partners deepen dialogue with stakeholders and public actors so that the results can be used to support public policy development to protect human health and the environment.

In addition, the European Commission supports the Health and Environment research on the exposome under the banner "*Decoding the role of the environment, including climate change, for health and well-being*", which includes research on endocrine disruptors and their impacts as part of the "Health, demographic change and well-being" challenge, and also under the "Bioeconomy, food, natural resources and the environment" challenge. France will support the continuation of this theme within the framework of the future Horizon Europe programme.

At the national level, research organizations and agencies will ensure continuity of support for research and they will promote the emergence of new ideas and approaches concerning the impregnation of environments, exposure to human and living organisms, impacts and ways to reduce them. They will ensure the continuity of large cohorts, including CONSTANCES, ESTEBAN, E4N, ELFE, Epiage, Nutritnet, PELAGIE. Other more focused cohorts related to particular contamination situations, such as TIMOUN for exposure to chlordecone, or specific risks such as cancer and exposome, or autism and exposome, are in progress or in preparation.

These actions are complemented by research actions aimed at reducing exposure by developing alternatives to the use of potentially risky products. The priority programme of agroecology announced by the Ministry of Research in 2018 aims to develop agricultural practices without phytopharmaceutical products that are toxic to humans and ecosystems.

Alliances and ministries coordinate with the ANR and Anses on guidelines for generic or specific calls for projects. The theme of endocrine disruptors has been in the picture for more than ten years and continues to be explicitly included in the framework of health and the environment. To strengthen the previous actions, including the ED national research programme, it also received two additional budgets in 2018 and 2019 as part of the PNR EST (National Research Programme on health, the environment and work) led by Anses. Among the different forms of research, the concept of translational research has emerged in the last twenty years as the expression of an essential need for the promise of basic research to rapidly translate into improvements in health of individuals and populations as well as better patient care. Special action will be taken on health and environment research, including EDs, at the level of translational research call for projects.

It is also essential to encourage EDC research through different population and social and human sciences (SHS) approaches, and to develop new methods and tools for monitoring human health and the environment. This includes analyzing and evaluating the economic cost of EDCs and their effects, the impacts of public policies, the strategies of the different actors (public decision/makers, industrialists, non-governmental organizations) and their results in terms of encouraging substitution, producing information, being able to influence regulatory decisions, the effects of different sources of information on citizens' behaviour. These approaches will be included in the ANR's calls for projects and other operators such as Anses which contribute to driving forward and bringing together the scientific community through calls for research proposals.

National research organisations and alliances will ensure interaction with stakeholders, public authorities and civil society actors, especially with doctors who face the pathologies that can result from exposure to EDCs.

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- Leaders: DGRI, CGDD
 - Contributors: Ministries of Health and Agriculture
 - Operators: members of National Research Alliances (Aviesan, Allenvi, Athena), notably INSERM and INRA, ANR, ANSES, ANSM, CNRS, CEA, INRS, InCA, BRGM, MNHN
 - Milestones/final outcome(s):
 - Evaluation of research on endocrine disruptors in France and in relation to European and international activities;
 - Organization of a conference every two years, interacting with stakeholders on endocrine disruptors, presenting the results of studies on the overall activity of institutions carrying out research, new projects launched and a review of the resources deployed;
 - Maintaining generic ANR calls for the display of the ED theme in the health, environment and exposome context; Availability of the ANR to launch more specific calls for ARP projects, for example, on ministerial referral;
 - European health and environment research agenda, giving the subject of EDs a proper place;
 - Organization of stakeholder interaction within mirror groups to clarify research activities.
 - Indicators:
 - Annual reviews of ANR, Anses and PHRC-funded projects including PRTS and PRT-K with research on the exposome, by singling out the projects dealing with endocrine disruptors. Projects in translational research and SHS will also be distinguished. The assessment will concern the amounts committed, the themes, the teams involved in consolidating multi-year overviews. Consolidation of these reports with research actions from other AAPs, including European AAPs.
 - Financing: European and international financing, ANR, Future Investments Programme, ANSES
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IMPROVE CURRENT KNOWLEDGE

11

Developing applied health research to better prevent, care for and treat the effects of endocrine disruptors

ACTION 43

Mapping of applied ongoing health research and developing projects on the health effects of endocrine disruptors, especially for vulnerable people and exposed workers, and clinical tools to characterize the link between health anomalies and endocrine disruption.

Context

Applied health research is defined here as all scientific studies carried out on human beings in order to develop our biological or medical knowledge. This research is vital to better understand and/or treat the diseases, and to identify potential risk factors.

Translational health research ensures a continuum and thus provides a direct, two-way bridge between basic and clinical research by stimulating clinical research through therapeutic and methodological innovations or investigative tools emanating from basic research, and reciprocally by the dissemination of new observations on the nature and progression of diseases to basic research.

The Translational Health Research Programme (PRTS) proposed by the Directorate-General for the Provision of Care (DGOS) and the French National Agency for Research (ANR) intends to meet the specific funding needs of the studies, which are downstream of ANR-supported exploratory projects and upstream of projects supported by the Clinical Research Hospital Programme (PHRC) of the DGOS. The PRTS programme is for research conducted by investigators bringing together a team from a research organization and a team belonging to a French healthcare facility (the presence of at least these two types of teams is required).

Holders of research projects on ED substances and the characterization of their effects are particularly welcome to submit their projects in this programme.

Further coordination of the surveillance studies developed by "Santé publique France" (Public Health France) and the clinical trials on the subject of endocrine disruptors will be carried out to improve our understanding of the links between exposure and health effects.

- Leader: DGOS
- Contributors: DGS/DGRI/DGT
- Operators: ANR, InCA
- Milestones/final outcome(s):
 - 2019-2022: List of applied health research projects in progress along with their characteristics (main objective, teams, provisional planning, pathologies, clinical trial number), number of applied health research projects on endocrine disruptors selected under the PRTS framework;

IMPROVE CURRENT KNOWLEDGE

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- Indicators:
 - Number of new funded projects
 - Budget: €3 million within the PRTS framework
 - Financing: DGOS
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IMPROVE CURRENT KNOWLEDGE

12

Expanding monitoring, in relation to exposure to endocrine disruptors, to other human pathologies beyond those related to reproduction and continue monitoring human exposures

ACTION 44

Developing critical impregnation values (health reference values).

Context

Biomonitoring data are essential elements of information on internal levels of exposure to the chemical substances of populations or subgroups of the population. To be useful to experts, managers and decision makers, these data need to be interpreted in terms of reference values which establish a population, temporal or geographical basis of comparison, or even all three at the same time. The typology of the reference values classifies these values into two categories:

- 1 exposure reference values, which allow comparison on the sole basis of impregnation levels;
- 2 health reference values that allow health interpretations to be made regarding the levels of impregnation observed.

Developing these values is a complex process which requires the availability of adequate scientific data and knowledge (epidemiology, toxicology) and involves the intervention of experts in the fields of biomonitoring, toxicology and health risk assessment.

- Leader: Anses
- Contributors: DGS/DGRI/DGT
- Operators: Public Health France/Anses
- Milestones/Final outcome(s):
 - Adoption of the production values organizational scheme;
 - Lists of priority ED substances for the establishment of medium-term critical impregnation values;
 - Publication of critical impregnation values.
- Indicator: proportion and number of ED substances covered by a critical reference value
- Financing: Public Health France/Anses

ACTION 45

Continuing and strengthening the monitoring of health indicators already developed in relation to endocrine disruptors.

Context

"Santé publique France" (Public Health France) has set up, within the framework of the first SNPE, a national epidemiological surveillance of reproductive health indicators. In 2016¹, as part of an international collaboration, Public Health France identified seven key indicators of male and female reproductive health to watch as a result of their supposed links with EDCs. These indicators are: prostate cancer, breast cancer, the proportion of boys/girls at birth (sex ratio), endometriosis, uterine fibroids, indicators of testicular dysgenesis syndrome, early puberty. The data sources used, among others, include the French National Health Insurance Cross-Schemes Information System (Sniiram), the Medicalisation of Information Systems Programme (PMSI), the national registry of IVF attempts (Fivnat) and INSEE data.

This monitoring needs to be strengthened and may be re-evaluated in light of recent data from the scientific literature.

This monitoring should continue to include field clinicians. Sharing between teams of clinician scientists and health agencies is a useful support to identify and build the indicators to be taken into account in the monitoring and evaluation of EDs, on the one hand, in clinical practice and, on the other hand, to produce knowledge.

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- Leader: Public Health France
 - Contributors: DGPR/DGS
 - Operator: Public Health France/Inca
 - Milestones/Final outcome(s):
 - Creation of a Thematic Support Committee on indicators related to EDs;
 - 2019: accessibility to the new portal for the provision of monitoring indicators;
 - Provision of indicators that are monitored in the registers and outside of the registry framework: quantified indicators and methodology;
 - Establishment of partnerships with field clinicians.
 - Indicators:
 - Study of temporal and spatial trends for indicators whose quality is considered satisfactory;
 - Ecological or etiological studies where health indicators can be integrated into larger studies.
 - Financing: Public Health France
-

¹ Le Moal J, Sharpe RM, Jvarphirgensen N, Levine H, Jurewicz J, Mendiola J, Swan SH, Virtanen H, Christin-Maitre S, Cordier S, Toppari J, Hanke W, in name of the HN. Toward a multi-country monitoring system of reproductive health in the context of endocrine disrupting chemical exposure. Eur J Public Health 2016; 26:76-83

ACTION 46

Expanding surveillance to other pathologies related to endocrine disruptors.

Context

The majority of disorders possibly related to endocrine disruptor exposure have been described as regards the reproductive system (malformations of the genital system, fertility disorders, early puberty, hormone-dependent cancers). They have been the subject of numerous publications, a systematic evaluation, especially through IARC's CMR classification (carcinogenic, mutagenic, reprotoxic) where the reprotoxic character must be systematically evaluated. Most of these disorders are now monitored, notably by Public Health France.

However, new work from the scientific literature reports effects of ED exposure on functions other than reproductive function, including metabolic abnormalities, abnormalities of the thyroid axis, effects on the immune system and developmental disorders (by direct and/or indirect toxicity).

The health indicators linked to exposure to endocrine disruptors shall be ranked according to:

- the level of evidence in the link between exposure to endocrine disruptors and the pathology;
- societal concern and stakeholder interest;
- the feasibility of monitoring the health indicator.

Indicators relating to professional activity will also be integrated. Stakeholders present during the development of SNPE2 will also be involved in the prioritization process.

Public Health France will then modify the list of monitored pathologies in accordance with data from scientific literature to take into account a wide range of effects in relation to ED exposure, regardless of the exposure period.

-
- Leader: Public Health France
 - Contributor: DGS
 - Operators: Public Health France/InCA
 - Milestones/Final outcome(s):
 - Definition of the prioritization process; publication end 2019-early 2020;
 - List of health indicators to be monitored as a priority;
 - Implementation of new monitoring devices.
 - Indicators:
 - Modification of monitoring programmes for existing pathologies according to the hierarchy;
 - Number of pathologies monitored other than those of the reproductive function and possibly related to ED exposure (for which it is possible to produce local or national incidence data);
 - Proportion of health indicators proposed by non-governmental organisations and taken into account.
 - Financing: Public Health France
-



IMPROVE CURRENT KNOWLEDGE

13

Defining new perspectives for the national biomonitoring programme in the European context

ACTION 47

Developing a national network of laboratories which will analyse the biomonitoring data.

Context

National “Esteban” biomonitoring studies collect a significant number of human biological samples, the objective of which is to measure the population’s impregnation levels by certain chemical substances. The acquisition of impregnation data requires laboratory analyses to be performed by qualified staff. In France there are several analytical research groups working in the field of health in connection with the chemical environment. However, not all of these groups are able to meet the needs of large cohort epidemiological studies or human biomonitoring programmes conducted in France and Europe. As it stands, it is not easy to meet all the technological and scientific challenges posed by the study of mixed and/or emerging substances. Nor the characterization of the chemical exposome, which is both fine and focused, as well as extensive and not *a priori* (non-targeted profiling), requires a broad set of scientific, technological and methodological skills which does not yet exist in France in a structured way. The recently-launched dynamic initiated at European level under the framework of the H2020 HBM4EU project (*Human Biomonitoring for Europe*) is a real opportunity to create a national dynamic. The action therefore aims to pool skills, strategies, technical means of analysis and data processing at the national level, by equipping it with state-of-the-art technological equipment and critical mass. The network will develop reliable methods and broad spectrum screening of thousands of chemicals and the identification of new pollutants and will concomitantly develop *ad hoc* conditions to capture metabolic footprints by focusing on metabolomic approaches. The network should be a reference and a scientific facilitator for health agencies and/or research teams working in this field, and make it possible to establish reference methodologies and contribute to national plans or actions carried by the government.

- Leader: DGRI
- Contributors: DGS/DGPR/DGAL/ANSP
- Operators: ANSP/ANSES/ANR/INRA; future platform operators

-
- Milestones/final outcome(s):
 - Launch of a call for projects to build this network including precise specifications;
 - Selection of the laboratories that will constitute the network.
 - Indicators:
 - Establishment of a national network of national reference laboratories for biomonitoring;
 - Number of analyzable ED chemicals in this national laboratory network.
 - Financing: DGRI
-

ACTION 48

Creating a national platform for the collection, harmonization and sharing of biomonitoring data.

Context

Firstly, this platform would make it possible to store and make existing or future biomonitoring data available. Secondly, existing biological impregnation data within partner structures could be inventoried and gradually shared through this platform. Accessible via an internet portal, the data would be available to the public.

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- Leader: Public Health France
 - Contributors: DGS/DGPR/DGT
 - Operator: Public Health France
 - Milestones/final outcome(s): Platform on the Public Health France website
 - Results indicator:
 - Existence in 2020 of a single internet portal taking stock of existing biomonitoring data;
 - Number of substances with ED effects whose data is shared on this portal.
 - Financing: Public Health France
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ACTION 49

Defining new perspectives for the national biomonitoring programme in the European context.

Context

The national biomonitoring programme includes two studies: a study on pregnant women, the results of which were published in 2017, and a study on the general population, the results of which are currently under analysis. Reflection work must now be carried out to define the new orientations for this programme in terms of time steps, biomarkers to be analysed, the population to be studied (especially the 0-3 years and puberty age ranges) and to identify the means to achieve it. This reflection will take into account the European work carried out as part of the HBM4EU project funded through the H2020 programme.

The first two biomonitoring studies integrated into the national biomonitoring programme (PNBS) have come to an end and have been able to provide, or will provide in the next few months, a great deal of data to characterize the levels of impregnation of the French population (pregnant women and the general population). The continuation of the PNBS will achieve the following objectives:

- trace trends in these levels of impregnation for the populations already integrated into the PNBS and evaluate the effectiveness of public policies implemented to reduce exposures;
- include new substances that have not been retained previously (for example, some substances suspected of having ED effects) and broaden the range of substances whose levels of impregnation are monitored;
- include vulnerable populations or populations at risk of exposure to endocrine-disrupting substances, which have not yet been monitored for levels of chemical impregnation (for example children 0-3 years old);
- ensure that future studies of exposure to endocrine disruptors via food (EAT3) and human biomonitoring (e.g. Esteban) share a basic list of substances to be analyzed in order to be able to link the internal and external exposures.

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- Leader: Public Health France
 - Contributors: DGS/DGPR/DGRI/DGT
 - Operator: Public Health France
 - Milestones/final outcome(s):
 - 2019: drafting of the consultation method;
 - 2019-2020: implementation of the consultation process;
 - New orientations of the national biomonitoring programme with possible study protocols.
 - Indicators:
 - Publication by the end of 2019 of a hierarchical and quantified list of possible national biomonitoring studies and proposal of an implementation schedule;
 - Setting up of a reflection committee on the continuation of the work of the national biomonitoring programme led by Public Health France.
 - Financing: DGS/DGPR/DGRI/DGAL/DGT
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ACTION 50

Identifying the biomarkers of effects and integrate them into biomonitoring studies.

Context

Exposure of populations to chemicals with endocrine-disrupting effects can be documented by measuring exposure biomarkers (the substance itself and/or its metabolite(s)). The biological disturbances possibly caused by these exposures can be documented by measuring biomarkers of effect, where they exist and where they have been identified. Some biomarkers of effect may be early and sensitive markers of biological changes related to chemical exposure which may lead, in the longer term, to the development of functional disorders and one or more pathologies.

Measuring biomarkers of effect in the human body can also allow an overall effect related to an exposure, past or present, to be taken into account for several chemicals that can disrupt the endocrine system and provide a better understanding of the relationship between exposure and biological effects and health effects.

It is thus necessary to identify possible biomarkers of effect that can measure, as precisely as possible, the effect of exposure to these substances and which can be taken into account in national biomonitoring studies.

It is also about including biomarkers of effect in biomonitoring studies, to investigate human exposure to the early biological effect of a substance in order to study the links between exposure and health effects.

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- Leader: Public Health France
 - Contributors: DGS/DGRI
 - Operators: Public Health France/Anses
 - Milestones/final outcome(s):
 - 2019: biomarkers of effect tests on Esteban samples;
 - 2020: first inclusion of biomarkers of effect into the future multi-site study on pesticide exposure of agricultural areas;
 - Measurement results.
 - Indicators:
 - Number of biomarkers of effect identified/validated;
 - Number of pathologies or endocrine disruptions for which one or more biomarkers of effect are identified/validated.
 - Budget: €200,000
 - Financing: Public Health France
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