

Determination of new lead exposure risk management objectives

Overview and
recommendations

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Determination of new lead exposure risk management objectives

Overview and recommendations

The lead concentration in blood (or blood lead level) of 100 µg/L currently defines, by regulation, childhood lead poisoning and entails reporting of each case to departmental health authorities along with triggering of environmental investigations. However, adverse effects of lead on health have been shown for blood lead levels below 100 µg/L in young children, adolescents, adults and pregnant women.

Therefore, the HCSP advocates a policy of exposure reduction to the lowest possible level in view to take into account these non-threshold effects.

For 2017, it sets the following objectives of reduction of the blood lead level of the general population:

- an expected geometric mean blood lead level of 12 µg/L ;
- 98 % of the population with a blood lead level below 40 µg/L.

Furthermore, it recommends to focus screening, medical care and prevention of intoxications on the most exposed people.

Recalling the individual risk factors which should lead to screening among children (<7 years) and pregnant women, the HCSP proposes two blood lead levels to organize the prevention of childhood lead poisoning:

- a rapid intervention level of 50 µg/L, entailing the mandatory reporting of cases, triggering an environmental investigation and all the collective and individual measures currently initiated when the blood lead level is equal to or above 100 µg/L; it would thus be the new operational definition of childhood lead poisoning;

- a vigilance level of 25 µg/L; its exceedance indicates the probable existence of at least one source of lead exposure in the environment and justifies providing information to families on the lead hazards and on the usual sources of uptake, as well as a close biological surveillance along with hygiene and dietary advice aiming at reducing contact.

These new reference levels will have to be updated every 10 years.

Alert values are also proposed for the main sources of lead in the environment (soils, house dust, tap water). According to the threshold and the environment concerned, the exceedance implies measuring the blood lead level of the persons exposed and/or in-depth analysis of the risk.

Finally, the HCSP recommends that all the data collected on the lead contamination of contact environments (soils, house dust, drinking water) and individuals (blood lead levels), together with information characterizing the subjects and the exposure conditions, be recorded to set up a national database as a tool for knowledge and management purposes.

**DETERMINATION OF NEW LEAD EXPOSURE
RISK MANAGEMENT OBJECTIVES
OVERVIEW AND RECOMMENDATIONS**

June 2014

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WORKING GROUP

Following the referral of 15 October 2012 from the directorate general for health of the Ministry of Social Affairs and Health, a working group was set up by the Environmental health Expert Committee (*Commission spécialisée Risques liés à l'environnement*) of the *Haut Conseil de la santé publique* (HCSP or High Council for public health).

The working group met 12 times to examine the terms of reference, decide on appropriate literature studies, conduct the necessary hearings and answer the questions raised.

The meetings of the working group were held on 18 October 2012, 17 January, 14 February, 11 April, 19 June, 9 October, 20 December 2013, 15 January, 12 February, 20 and 26 March and 7 May 2014.

Working group composition

Working group Chairmen

Jean-Marie Haguenoer, Professor Emeritus of Lille 2 University (Oct. 2012 to Feb. 2014)

Robert Garnier, Poison Control and Toxicovigilance Centre of Paris (Feb. 2014 to May 2014)

Working group members

Nawel Bemrah, French Agency for Food, Environmental and Occupational Health & Safety (*Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail - Anses*)

Olivier Chanel, Aix-Marseille School of Economics, National Center for Scientific Research (*Centre national de recherche scientifique - CNRS*) - *Groupement de Recherche en Économie Quantitative d'Aix-Marseille*

Aline Coftier, the French geological survey (*Bureau de Recherches Géologiques et Minières - BRGM*)

Anne Etchevers, Inserm U1085 – Research Institute for Health, Environment and Labor (*Institut de Recherche en Santé, Environnement et Travail - Irset*)

Philippe Glorennec, French School of Public Health (*Ecole des Hautes Etudes en Santé Publique - EHESP*), Joint Research Unit Inserm 1085 - *Irset*

Jean-Charles Leblanc¹, French Agency for Food, Environmental and Occupational Health & Safety (*Anses*)

Alain Le Tertre, French Institute for Public Health Surveillance (*Institut de Veille sanitaire – InVS*)

Jean-Paul Lucas, *Centre Scientifique et technique du Bâtiment (CSTB)*

Denis Zmirou-Navier, University of Lorraine, Public Health School (*EHESP*) and Inserm U1085 - *Irset*; *HCSP* - Environmental health Expert Committee

Coordination

Kiran Ramgolam, Environmental health Expert Committee coordinator, general secretariat of the HCSP

Public statements of interest

The working group members completed a public statement of interest, and no conflict of interest has been declared to the HCSP.

¹ Affiliated with Anses until August 2013 (resignation of the working group in August 2013); current affiliation: Food and Agriculture Organization of the United Nations

Scientific support

Note of the executive director of the French Institute for Public Health Surveillance (*InVS*) of 2 December 2013: Identification of risk factors according to blood lead levels found in children (100, 70, 50 and 30 µg/L of blood).

Hearings

- 18 October 2012

- Presentation of the referral by the Directorate general for health (Ministry of Social Affairs and Health)

Frédérique Cousin, head of the office "Indoor environment, workplaces and non-work and non-road related accidents" (EA2) and Anne Pillebout, management officer of the cases « Insalubrity / Lead poisoning », office "Indoor environment, workplaces and non-work and non-road related accidents" (EA2), Division "Environmental and food risk prevention"

- 17 January 2013

- Screening issue: distribution of blood lead level values in the general population and target population; evolution in time since the first campaigns; relative contribution of risk factors

Camille Lecoffre, French Institute for Public Health Surveillance;

Philippe Bretin, Directorate general for health

- Issue of the screening of childhood lead poisoning below the threshold of 100 µg/L of blood

Pascal Jehannin, Nord-Pas de Calais regional Agency for Health

- Methods of determination of the blood lead level: limits of determination and detection of the methods currently used for determining lead levels in blood (notably AAS and ICP-MS)

Laurence Labat, French society of analytical toxicology;

Jean-Pierre Goullé, Le Havre Hospital Center

- Saturnin data

Anne Etchevers, Inserm U1085 – Institute for Health, Environment and Labor (Irset)

- 14 February 2013

- Presentation of the expertise of French Agency for Food, Environmental and Occupational Health & Safety (*Anses*) on lead

Laurent Bodin, *Anses*

- General cartography of lead levels in soils in France, that of significant polluted sites, with data on contaminated agricultural sites and gardens

Aline Coftier, the French geological survey (BRGM)

- INERIS presentation « PLAINÉ: environmental inequality analysis platform » (*Plateforme d'Analyse des INégalités Environnementales*) and feedback from experience on lead-contaminated sites: lead contents in the environment of sites and results of quantitative risk assessments and predictions of blood lead levels or measured blood lead levels

Corinne Hulot, French National competence centre for Industrial Safety and Environmental Protection (*Institut national de l'environnement industriel et des risques – Ineris*)

- Reduction of emissions toxic to human health – National action on lead-polluted soils – Feedback from experience on lead contaminated sites (continuation) - Principles of decontamination methods and their cost-effectiveness

Philippe Bodénez and Dominique Gilbert, Directorate general for risk prevention - Ministry of Ecology, Sustainable Development and Energy (*DGPR*²– *MEDDE*³)

- Lead levels in the different environmental compartments in residential areas

Jean-Paul Lucas, *CSTB*

- Results of a modelling of the impact on blood lead levels of a change in lead contents in soils, dust, water

Philippe Glorennec, *Ecole des Hautes Etudes en Santé Publique*, Joint Research Unit Inserm 1085 - *Irset*

- 11 April 2013

- Results of the national monitoring study of food exposure to chemical substances (Total Diet Study 2 - 2006-2010) concerning lead

Jean-Charles Leblanc, French Agency for Food, Environmental and Occupational Health & Safety (*Anses*)

- 19 June 2013

- Presentation of the Directorate general for health relating to the number of accredited laboratories for blood lead level using atomic absorption spectroscopy or ICP-MS, the risk acceptability with respect to the 97.5 or 90 percentile of the current national distribution, the ARS personnel liable to carry out the environmental investigations, the final objective to be achieved in 2017 and the deadline for submitting recommendations to the DGS

Anne Pillebout and Frédérique Cousin, Directorate general for health - Ministry of Social Affairs and Health

- 9 October 2013

- State of knowledge on the contamination of soils and plant production on the sector of METALEUROP

Francis Douay, Civil engineering and geoenvironment laboratory (LGCgE) - Lille Northern France (EA 4515)

Result of works carried out by Philippe Glorennec, *Ecole des Hautes Etudes en Santé Publique*, Joint Research Unit Inserm 1085 - *Irset*

- Presentation of the scientific support from the French Institute for Public Health Surveillance (*InVS*) by Alain Le Tertre (*InVS*)

- 12 February 2014

- Hearing of the Directorate general for risk prevention (Ministry of Ecology, Sustainable Development and Energy) and the Directorate general for health - Ministry of Social Affairs and Health Presentation of conclusions of the HCSP expertise on lead exposure management

Aurélien Louis, Head of the office of soils and subsoils ; Dominique Gilbert and Tina Léger, Office of soils and subsoils ; Jennifer Cosson, Office of forecasting, evaluation and data; Directorate general for risk prevention, Ministry of ecology, sustainable development and energy;

Frédérique Cousin, Head of the office "Indoor environment, workplaces and non-work and non-road related accidents" (EA2) ; Anne Pillebout, management officer of the cases

« Insalubrity / Lead poisoning » (EA2) ; Philippe Bretin, acting deputy head of the office of outdoor environment and chemical products (EA1) ; Michel Rouge, management officer of polluted sites and soils (EA1) ; Division "Environmental and food risk prevention".

² Directorate general for risk prevention

³ Ministry of Ecology, Sustainable Development and Energy

OVERVIEW AND RECOMMENDATIONS

Referral

The Directorate general for health referred to the High Council for public health (*Haut Conseil de la santé publique* - HCSP) on 15 October 2012 for the determination of new lead exposure levels for risk management.

The questions asked to the HCSP were the following:

- 1 – *Should the individual threshold which triggers both the mandatory reporting and the procedure of immediate removal of children from exposure to lead, set at 100 µg/L of blood today, be revised?*
- 2 - *In case of revision of the threshold,*
 - o *a- should actions of individual identification of children likely to have high blood lead levels be re-initiated?*
 - o *b- which exposures should be targeted in this identification?*
- 3 - *In populations that are overexposed to lead (polluted soils, etc.), should the management measures aiming at reducing this exposure be triggered on the basis of systematic determinations of the blood lead level, random blood screening, or only on environmental exposure data?*
 - o *If the blood lead level determination is retained, which value is applicable to these populations, distinguishing the most sensitive sub-population (pregnant women or women of childbearing age, children)?*
 - o *If environmental exposure data are retained, which value should be retained to trigger the management measures?*
- 4 – *Should a blood lead level reduction target be set for children and the general population? If so, since the prevalence of lead poisoning has significantly decreased between 1996 and 2008, what should be the target to reach for the period 2013-2017 with regard to the current threshold or the revised threshold?*

Working method

To respond to the referral of 15 October 2012 of the Directorate general for health, a working group was set up by the Environmental health Expert Committee of the HCSP. The working group met 12 times, between 18 October 2012 and 7 May 2014, to study the terms of reference, decide on bibliographical studies, conduct the necessary hearings, organize and evaluate the drafting of the report.

The report was presented to the CSRE on 4 April 2014 and amended to take into account the comments made during this session. It was finally validated by the CSRE during its session of 23 May 2014.

Results

There is sufficient evidence of adverse effects of lead on health, when the blood lead level is below 100 µg/L (1):

- *in young children*: on intellectual development, but also on weight and height development and sexual development as well as on behaviour and hearing acuity,
- *in pregnant women*: on foetal development and on the pregnancy,
- *in adolescents and/or adults*: increase of risks of chronic kidney disease and high blood pressure, alteration of sperm quality and decrease of male fertility, decrease of the glomerular filtration rate and increase of blood pressure.

Available epidemiological data show, furthermore, that neurological effects and effects on sexual and height and weight developments, as well as on hearing acuity, in young children, are probably without threshold; as well as kidney effects in adults and adolescents and cardiovascular effects in adults.

The 100 µg/L blood lead level, which defines, by regulation, today childhood lead poisoning and entails the reporting of cases to departmental health authorities and the triggering of the environmental investigation, therefore does not correspond to a safety threshold. In fact, in 2004, this threshold of 100 µg/L was set based on pragmatic considerations:

- it was the threshold of intervention proposed by the USA Centers for disease control and prevention (CDCP) in 1997 (2).
- It was a level of intervention that was shown by the retrospective analysis of screening results during the 1990s to be realistic from the point of view of resources.
- It was also a realistic choice based on both the analytical performances and uptake of the general population at that time:
 - o the variability of the blood lead level measurements, when it was below 400 µg/L, was then estimated to be about 40-60 µg/L (3, 4) and the quantification limit of the blood lead level could reach 50 µg/L in some laboratories;
 - o the assessment of the blood lead level of French children aged from 1 to 6 years made in 1995 showed that the prevalence of blood lead levels above 50 µg/L was 27.2 % (personal communication Anne Etchevers); it was 2.1% for blood lead levels above 100 µg/L (5).

The current situation is very different:

- The blood BMDL₀₁⁴ established by the Efsa⁵ for neurotoxic effects (loss of one IQ point) in young children is 12 µg/L (6).
- The USA CDCP recommend a blood lead level threshold of 50 µg/L to identify intoxicated children and trigger an environmental investigation; this threshold corresponds to the 97.5th percentile of the blood lead level distribution in children under the age of 6 years in the United States (7).
- The quantification limit of the blood lead level by the laboratories operating in France is never above 10 µg/L (8) and the measurement variability is now estimated to be about 10 µg/L, for blood lead levels below 100 µg/L (9).
- The median, the 90th, the 95th and the 98th percentiles of the blood lead level of children under the age of 6 years residing in France were about 15, 25, 35 and 50 µg/L, respectively, in 2008-2009 (10).
- The number of incident cases of childhood lead poisoning (as currently defined by a blood lead level ≥ 100 µg/L) decreased by more than 80 % between 1995 and 2012, whereas in the national monitoring system for blood lead levels in children, the number of children whose blood lead level is at least equal to 50 µg/L is about 4 times higher.

⁴ Benchmark dose of blood lead corresponding to an excess risk of 1 %

⁵ European food safety authority

Recommendations

Two blood lead levels to organize the prevention of childhood lead poisoning

The established existence of adverse health effects of lead below 100 µg/L and the improvement of analytical capabilities justify setting a lower blood lead level threshold to define childhood lead poisoning and trigger the environmental investigations for the identification of sources of exposure and their eradication.

Since there is no safety threshold, the HCSP recommends a policy aiming both to reduce exposure of all children to the lowest possible level, and to direct particular means towards the most exposed. For the latter, it proposes to set two levels:

- **A rapid intervention level**, which entails the mandatory reporting of the case and triggers an environmental investigation, as well as all the collective and individual measures that are currently initiated starting from a blood lead level of 100 µg/L ;
- **A vigilance level**, exceedance of which indicates the probable existence of at least one source of lead exposure in the child environment and justifies providing information to families on the lead hazard and the usual sources of uptake, a close biological surveillance as well as hygiene and dietary advice aiming at reducing exposure.

For the *rapid intervention level*, the HCSP advocates the 98th percentile (which corresponds to the concentration of 50 µg/L) of the blood lead level distribution in children under the age of 7 in the Saturn-inf survey of 2008-2009 (11). In other words, one can expect during the recent period, on national average, about 2% of children aged from 6 months to 6 years to have blood lead level values above 50 µg/L; in some regions and urban areas, this prevalence will be higher. Since the number of incident cases with a blood lead level at least equal to 100 µg/L has been divided by 5 between 1995 and 2012, and since the number of incident cases with a blood lead level at least equal to 50 µg/L is only 4 times higher, the use of this new level of intervention should not present insurmountable logistic problems, provided that the necessary human means within the relevant departments of the ARS and local authorities are maintained (or reestablished in some places). The means to be put in place are those required for the screening, its monitoring and for carrying out environmental investigations, but also those required for reducing exposure to identified sources of lead. In the latter context, according to cases, the measures to be implemented are environmental and collective (for example to prevent exposure to a contaminated soil or in case of residence in a building presenting damaged lead-based paint, etc.) or/and individual (use of kitchen utensils or other products containing lead, advice on regular cleaning of house floor dust, etc.), with the series of accompanying measures to ensure the effectiveness of these preventive actions. Other children and pregnant women exposed to the same conditions that have led to these high blood lead level values should also be identified.

For the *vigilance level*, the HCSP recommends the 25 µg/L concentration, which corresponds, in the Saturn-inf survey, to the 90th percentile of the blood lead level distribution in children under the age of 7 and to half of the rapid action threshold. When this level is reached, biological monitoring should be reinforced and the HCSP recommends a measurement of the blood lead level at least on a quarterly basis, as long as it is above 24 µg/L in a child under the age of 7.

According to the rationale adopted, the blood lead levels guiding public action will therefore evolve over time, due to actions undertaken to control lead poisoning. **The HCSP advocates that the numerical values corresponding to prevalences of 2% (98th percentile) and 10% (90th percentile) be updated every 10 years** through national surveys allowing a representative distribution of children's blood lead levels to be produced. This implies therefore that the definition of « childhood lead poisoning », from the point of view of the blood lead level value considered to necessitate actions of removal from risk, may change each decade. National surveys such as Elfe, Esteban or others to come can be used to this end or will have to be conducted for this purpose.

Screening based on individual risk factors

The search for individual risk factors of lead exposure remains justified in children under the age of 7 and the discovery of at least one of these factors entails the prescription of a measurement of the blood lead level. The risk factors listed by the guide published in 2006 by the Directorate general for health (12), remain relevant, pending the results of works in progress, with some adjustments:

- The child resides in or visits regularly a building built before 1st January 1975 (particularly if it was built before 1^{er} January 1949⁶) and
 - o the paint is chipped,
 - o or renovation works have been recently carried out,
 - o or the child eats paint chips (pica behaviour).
- In the child's surrounding, another person (brother, sister, classmate, mother, and so on) is or has been lead poisoned.
- The child resides in or visits regularly areas near an industrial site that is at risk, in activity or not.
- The parents exercise a professional or leisure activity exposing to lead (12).
- The child resides in a housing built before 1955, located in a municipality supplied with aggressive drinking water and he or she regularly consumes tap water⁷.
- The child has recently arrived in France (possible exposure in the country of origin).

The 2006 guide of the Directorate general for health (12) recommends to systematically carry out the identification of lead exposure risk factors, in all children, during check-ups of the 9th and 24th month of life (giving rise to the drawing up of the 2nd and 3rd health certificates) and to register the results in the child's health record. This recommendation should be retained. For this purpose, in addition to the factors specified above, particular attention will be paid to:

- a lead concentration in drinking water exceeding the quality limit (> 10 µg/L),
- the presence of metal railings or leaden surface coating materials, on the windows, balconies or terraces of the housing, when it was built before the end of the XXth century,
- a passive exposure of the child to tobacco smoke in the place of residence,
- the use of traditional cosmetics (khol, surma, etc.) by one or several persons within the child's surrounding,
- the use of handcrafted tableware in the place of residence of the child.

For pregnant women, the identification of lead exposure risk factors should be systematically carried out during the prenatal interview of the 4th month, in accordance with the recommendations of the DGS. This recommendation can obviously be extended to all women of childbearing age without having a binding character. Thus, for pregnant women or women planning a pregnancy, the risk factors to be searched are the following:

- professional or leisure activity exposing to lead, of the women concerned or those around her,
- renovation works producing dust in an old apartment, in the course of the 6 last months,
- use of traditional remedies or food supplements,
- geophagy or pica (consumption of clay, earth, plaster, paint chips, and so on),
- use of traditional cosmetics (khol, surma, and alike),

⁶ Recent works indicate that the date up to which paints containing high lead concentrations were used inside French housings should be reset from 1948 to 1974.

⁷ After a wide use of lead in the connections to the public network and internal water pipes, lead ceased to be used on the pipes of internal distribution networks in the 1950s, thanks to the evolution of regulations and professional practices.

- use of handcrafted ceramic tableware,
- storage of food or drinks in pewter or crystal containers,
- presence of lead water pipes in the housing,
- personal history of lead intoxication,
- housing or regular stays near an industrial site releasing or having released lead into the air and soils.

It is important to widely disseminate information on these individual risk factors which can justify an individual screening, in a summary form to provide a decision aid with healthcare professionals. More broadly, health professionals should be made aware of the issue of childhood lead poisoning and its screening.

Caring for people whose blood lead level exceeds the vigilance level or the rapid intervention level

As indicated above, the exceedance of the vigilance level (25 µg/L blood) entails the implementation of a close biological surveillance, as well as information for the person concerned and/or those around him or lead hazards and the main sources of exposure to this metal, and hygiene and dietary advice aiming at reducing exposure. The exceedance of the rapid intervention level entails the mandatory reporting of the case and triggers an environmental investigation; additional measures can be necessary (search for complications, implementation of a treatment and/or medical surveillance); they depend on the blood lead level.

The hygiene and dietary advice, the content of the environmental investigation, that of the reinforced medical surveillance, the indications of the treatment and its methods have been the subject of recommendations in 2003 (13) and in 2006 (12). These documents need to be updated with the assistance of the professionals concerned, to be adapted to the new levels of action and to take into account advances in knowledge.

Screening based on environmental risk factors.

In line with the definition of the « rapid intervention level » set out above, a screening of individuals who are overexposed to lead is advocated in the population of children under the age of 7 and in pregnant women or women planning a pregnancy in the short term (within 6 months), when environmental investigations of the living areas of these target populations have demonstrated a contamination of at least one environment, such as to give rise to a likely increase of the blood lead level above 50 µg/L. These environmental investigations will have been carried out when the context has shown a potential for contamination of environments (industrial site, active or not, associated with the emission of lead, old non-rehabilitated habitat with the likely presence of lead in private or common spaces, presence of old lead water pipes).

The Table below shows the concentrations corresponding to the « screening trigger level », in the different environments.

Contamination values of contact environments requiring a screening of childhood lead poisoning.

Environment	Soils	Deposited dust in the housings	Drinking water
Mean concentration leading to a screening of lead poisoning (expected blood lead level > 50 µg/L in about 5% of children)	300 mg(Pb)/kg(soil)	70 µg/m ²	20 µg/L

In such environments, the fact that no case presenting high blood lead values is found during the screening does not mean that the situation is satisfactory; this can reflect the limited size of the population concerned or the fact that intensity of contact with the contaminated environment is below the conventional values retained for the modelling of exposure. This can be true at the moment of the screening campaign, however the potential exposure and thus the threat remain present and may develop in the future. An in-depth analysis of the risk should be conducted in any event, with particular attention to the soils of collective spaces usually frequented by children, including notably an assessment of the current and possible future conditions of contact with lead, in order to draw from this analysis the management measures deemed most relevant in the particular context.

Furthermore, the HCSP proposes the definition of the « vigilance level » corresponding to a blood lead level above 24 µg/L (but below 50 µg/L blood). This level does not entail a screening but monitoring and advice. However, in the particular case of the soils of collective spaces usually frequented by children (playground, public park, shared municipal gardens, etc.), when the concentrations reach levels likely to induce an exposure of the children locally present such that the expected blood lead level is above or equal to 25 µg/L in at least 5% of children (i.e., for mean contents above 100 ppm in the soil), a risk assessment should be carried out. The latter is based on the reference dose proposed by the Efsa and takes into account local contact conditions. This risk assessment is needed for the purpose of assessing the necessity of measures to be implemented and to help in their scaling. It should be followed by a technical and economic analysis to determine the management measures specific to this site. In the context of an old housing district with damaged paints, one might have to measure the lead in the house dust. The finding of values above 25 µg(Pb)/m² (but below 70 µg(Pb)/m²) should lead to the provision of advice regarding hygiene and diet to families, and appropriate assistance.

The contamination values of contact environments which should lead to a screening for childhood lead poisoning indicated above are not effect thresholds or environmental quality objectives but thresholds for which the risk of high uptake justifies the identification of the individuals concerned within the populations.

For contaminated soils, the HCSP considers that it is not relevant to set a quality objective which would apply to any type of soil because of the wide variety of both bioavailability of lead (according to the nature of the soil and lead species) and exposure conditions and circumstances. The definition of quality objectives should necessarily include an analysis of the particular circumstances of the contact between children and the environments considered, an expertise which can only be conducted at the local scale, site by site, allowing one to derive the management measures deemed to be the most appropriate.

Benefits and costs of screenings

A marginal and partial economic analysis of the different screening strategies tends to show that the adoption of the levels of intervention and of vigilance proposed could lead, in all the cases that were assessed, to higher marginal benefits than marginal costs.

Blood lead level reduction target

Since several toxic effects of lead are probably without threshold, the blood lead level, in particular that of young children and pregnant women, should be as low as possible. Based on the current state of knowledge, the respect of the reference dose (BMDL_{0.1}) of the Efsa (12 µg/L) corresponding to the loss of one IQ point should be the target to guarantee a minimum risk.. An additional objective is to reduce the level of lead uptake of the 2% of children most exposed.

The HCSP recommends therefore the following objectives to achieve by year 2017:

- geometric mean blood lead level expected in the general population: 12 µg/L
- expected 98th percentile of the distribution of blood lead levels in the general population: 40 µg/L

Regarding adolescents, adults and elderly people, the HCSP notes that the complete data required to conduct a risk assessment and define on this basis informed criteria for the management of this risk are not currently available. As a result, it does not pronounce itself on these groups, except to recommend that studies be carried out to address these gaps.

Setting up of a database

In addition to the recommendations made in response to the questions of the referral, the HCSP adds a recommendation on feedback from experience: all the data collected when contact environments (soils, house dust, drinking water) present lead concentrations exceeding the screening trigger levels advocated in this report should be compiled into a national database by regional services from both health and environmental departments (regional departments for environment, planning and housing and regional health agencies). The results of measurements in the contact media (with specification of the sampling strategy and measurement methods) and of blood lead level analyses that should result from them, will be registered into this database, along with information characterizing the subjects and exposure conditions. This database will be a valuable knowledge tool for the study of factors influencing the relationship between environmental concentrations and blood lead levels.

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GLOSSARY

<i>AAS</i>	Atomic absorption spectroscopy
<i>ARS</i>	Regional health agency
<i>Anses</i>	French agency for food, environmental and occupational health safety
<i>BMDL₀₁</i>	Benchmark dose of blood lead corresponding to an excess risk of 1 %
<i>BRGM</i>	French geological survey
<i>CDCP</i>	Centers for disease control and prevention
<i>CSTB</i>	Scientific and technical centre for building
<i>DGPR</i>	Directorate general for risk prevention
<i>DGS</i>	Directorate general for health
<i>Efsa</i>	European food safety authority
<i>HCSP</i>	High Council for public health
<i>ICP-MS</i>	Inductively coupled plasma mass spectrometry
<i>Ineris</i>	French national institute for industrial environment and hazards
<i>Inserm</i>	French national institute for health and medical research
<i>InVS</i>	French institute for public health surveillance
<i>IQ</i>	Intelligence quotient
<i>Irset</i>	Research institute for health, environment and labor
<i>MEDDE</i>	Ministry of ecology, sustainable development and energy
<i>Plaine</i>	Environmental inequality analysis platform (Plateforme d'Analyse des INégalités Environnementales)
<i>SFTA</i>	French society of analytical toxicology