ECHA
EUROPEAN CHEMICALS AGENCY

Communication on the safe use of chemicals

Study on the Communication of Information to the General Public

Submitted by the Agency according to Article 34 (1) of the CLP Regulation

Helsinki 20 January 2012

ECHA-12-A-01-EN

The European Chemicals Agency (ECHA) herewith submits to the European Commission the following key findings of the study conducted in accordance with Article 34 (1) of the CLP Regulation.

KEY FINDINGS

Hazard Communication to the general public

1. Awareness-raising activities are needed to enhance the general public's understanding of the new CLP labels [1]

All the feedback from the two surveys[2] undertaken in the context of this study indicates that the new CLP labels (pictograms) are scarcely understood by the general public: only a few pictograms are recognised for what they actually symbolise and misunderstandings are clearly evident. Even if the new labelling legislation is currently only mandatory for chemical substances and not yet for mixtures, it is important to increase public awareness and promote the understanding of hazard labels.

2. Awareness-raising activities need to address national hazard perception patterns and should be targeted at the general public as well as at specific audiences such as families, single households, workers, school children, etc. using a variety of didactic means (web pages, leaflets, audio-visual material, etc.).

Within the European Union, perceptions of the hazards pertaining to certain products as well as the attention paid to sources of information on their hazardousness differ considerably between Member States. Consequently, awareness-raising measures will need to address national audiences in a differentiated manner.

1 The term "CLP hazard label" encompasses the following elements: (a) the hazard pictogram = a graphical composition that includes a symbol plus other graphic elements, such as a border, background pattern or colour that is intended to convey specific information on the hazard concerned; (b) the signal word = a word that indicates the relative level of severity of hazards to alert the reader to a potential hazard; (c) the precautionary statement = a phrase that describes recommended measures to minimise or prevent adverse effects resulting from exposure to a hazardous substance or mixture due to its use or disposal. Further details on "Hazard Communication in the form of Labelling" can be found in Title III, Chapter 1, Articles 19-22 of the CLP Regulation (EC) No 1272/2008.

2 The first survey was: The Eurobarometer Survey of "consumer understanding of labels and the safe use of chemicals"; the second, a qualitative research on "In-depth Study of Hazard Perception of Household Chemical Products: Consequences for the Communication of Information on Safe Use to the General Public".

As citizens comprehend the risks related to the storage and use of certain chemical products in the context of their own living conditions, awareness-raising packages should be adapted to specific audiences (e.g. family households react differently to perceived hazards than workers in the workplace) and reach out to potential multiplier groups (e.g. teachers and employee representatives). Awareness-raising activities will need to be tailored to the institutional capacities and available resources of the public and private bodies involved. They should also be adapted to various settings, with targeted messages available at points of sale (e.g. shops, petrol stations), public spaces (e.g. bus stops or metro stations), schools, or homes (potentially using smart media applications, e.g. so-called "apps" in mobile phones etc).

3. Awareness-raising activities also need to play on the emotional drivers of risk-related behaviour such as the use and storage of household chemicals, giving due consideration to the fact that safety behaviours are influenced by an experience-related rather than an information-based hazard perception;

Most people make their choices on the safe use and storage of household chemical products on the basis of their acquaintance with the product and on other emotional drivers which rely more on experience than on information gathered from the wording or pictograms on a package. Thus, awareness-raising activities need to take into account these emotional and experiential drivers that support the intuitive hazard perception process. They also need to encourage the general public to actually read the pictograms and precautionary statements.

4. A new analysis of the impact of the CLP pictograms on EU citizens' behaviour and understanding will be needed after 2015 – the date by which new labels must have replaced the old hazard pictograms on all mixtures.

Due to the novelty of CLP pictograms (even allowing for the longevity of the preceding pictograms: Directive 67/548/EEC), it is actually not surprising that the knowledge and understanding of them is not yet widespread. Therefore, it seems appropriate to re-visit the level of understanding of European citizens at a later date, when their experience and acquaintance with the pictograms will have developed, preferably after the CLP pictograms also become obligatory for mixtures in 2015.

5. Staff responsible for such communication and awareness-raising activities – both at an industry and Member State Competent Authority level – should exchange best practice and have the opportunity to participate in joint training events;

The general public is not alone in lacking familiarity with the pictograms and CLP text information. The same can be said of risk communicators' experience in reaching out to the public. Sharing experience and exchanging best practice are an imperative element for promoting the understanding of CLP hazard information as well as appropriate risk-related behaviour.

Additional information on product packaging

6. Industry should be encouraged to bring product appearance and packaging more in line with the hazard information on labels, making use of behavioural drivers to amplify the label's message, thereby promoting the appropriate safety behaviour in consumers.

The perception of hazard and the responsiveness to a product is influenced by packaging features, i.e. the presence of happiness-related pictures or an eco-label can actually counteract the purpose of hazard pictograms when influencing an end-user's choice regarding the purchase, use and storage of a chemical. Therefore, efforts to harmonise packaging and content-related information taking into account the message conveyed by the hazard label can be a potential avenue for raising awareness and improving behaviour on the safe use of chemicals. Authorities, manufacturers and distributors should – preferably through joint public-private action – seek to promote self-regulatory steps in this regard. An attractive package should not seduce a consumer into ignoring or taking too lightly the warnings that the CLP system has made mandatory.

7. Changes to the CLP pictograms themselves are not recommended as it is more beneficial to allow the public to get used to the new global system, steadily improving their overall understanding of the hazards posed by chemicals and encouraging a safer use of household chemicals in particular.

For the reasons mentioned under point 4, and considering that a proposed change of the CLP pictograms would require the re-negotiation of the relevant GHS provisions established in a multilateral UN context, there is currently no benefit in altering the labels' conventions. Instead, at this juncture, the emphasis of activity needs to be placed on awareness-raising and knowledge-promotion.

STUDY ON THE COMMUNICATION OF INFORMATION TO THE GENERAL PUBLIC

The key findings have emerged from:

A) Introduction

The Globally Harmonized System (GHS) of Classification and Labelling of Chemicals classifies chemicals by types of hazard and proposes harmonised hazard communication instruments, including safety data sheets (for workers) and labels (for both consumers and workers). It aims to ensure that information on physical hazards and the (eco)toxicity of chemicals is available in order to enhance the protection of human health and the environment during the handling, transport, storage and use of chemicals.

Within the European Union, the GHS was implemented on 20 January 2009, when Regulation No (EC) 1272/2008 on the Classification, Labelling and Packaging of substances and mixtures (CLP Regulation) came into force. The Regulation amends and repeals over time Directive 67/548/EEC (the Dangerous Substances Directive) as well as Directive 1999/45/EC (the Dangerous Preparations Directive).

The introduction of the new rules also means that consumers (in Europe and worldwide) will need to understand the new safety labels on the chemical household products that they purchase. In general, hazard labels intend to foster precautionary behaviour and promote safe behaviour in consumers when they handle chemicals. However, recognising labels does not necessarily lead to safer behaviour.

Article 34 (1) of the CLP Regulation establishes that "by 20 January 2012, the Agency shall carry out a study on the communication of information to the general public on the safe use of substances and mixtures and the potential need for additional information on labels. This study shall be carried out in consultation with competent authorities and stakeholders and drawing as appropriate on relevant best practice". The study provides the basis for a report that the European Commission shall submit to the European Parliament and Council.

The main objective of ECHA's study is to provide information for the European Commission on the effect of the CLP Regulation on hazard communication towards the general public. The findings should support the Commission, Member State Competent Authorities and stakeholder organisations in their endeavour to increase awareness and knowledge of hazard labels, reinforcing the safe use of chemicals by Europe's citizens.

B) Background

METHODOLOGY USED

In compiling this study, ECHA relied on contracted surveys and consultants' reports and on extensive consultation of the Agency's Risk Communication Network (RCN).

To fulfil its legal obligation that the "study shall be carried out in consultation with competent authorities and stakeholders", ECHA ensured that the mandate of the RCN specifically included CLP matters, in particular the preparation of the study according to Article 34 (1) of the CLP Regulation. In order to concentrate the consultation process on the RCN, the Agency asked Member State Competent Authorities (MSCAs) to nominate delegates to the RCN.

ECHA also invited its Accredited Stakeholder Organisations to join the RCN to take part in this work. ECHA further involved the European Commission's Joint Research Centre in its work on the study.

Finally, the crucial participants in the study were the European citizens, over 26,000 of whom were interviewed for this piece of work.

A CHRONOLOGICAL OVERVIEW

The Agency set up the RCN soon after starting operations in June 2008. The network is part of the overall ECHA approach to meet its own risk communication challenges in implementing Article 123 of REACH[3] ("providing guidance for the communication of information on the risks and safe use of chemical substances, with a view to coordinating Member States in these activities").

3 Regulation (EC) 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), O.J. L 396, 30 December 2006.

As such, the role of the RCN was to establish a mechanism for the exchange of information, experience, case studies and good practice among those in charge of coordinating risk communication in REACH Competent Authorities (MSCAs) and ECHA. Thus, the network was to help members meet their communication needs vis-à-vis the general public on risks and the safe use of chemicals, avoiding conflicting messages from public authorities and establishing best practice in risk communication.

In March 2009, at the second RCN meeting – following the entry into force of Regulation (EC) 1272/2008 on the Classification, Labelling and Packaging of substances and mixtures (CLP) – the network adopted its mandate, which included the aim to "contribute, alongside other stakeholders, to the ECHA study on the communication of information to the general public on the safe use of substances and mixtures and the potential need for additional information on labels (Article 34 (1) of CLP)". The mandate also entrusted the RCN to "closely follow and contribute to the development of the Risk Communication Guidance, in particular with a view to ensuring its workability".

A meeting on 8 June 2009 between ECHA and the European Commission (DGs Enterprise and Industry, Health and Consumers as well as Environment) concluded that the best means for the Agency to address its obligation under Article 34 (1) of the CLP Regulation was to develop a Europe-wide Eurobarometer survey, with the RCN providing the platform to deliberate on the development of the survey.

With a view to the RCN's work on this study, ECHA consulted the Competent Authorities for REACH and CLP (CARACAL) in October 2009 in written procedure to solicit their involvement, requesting them to send CLP-experienced representatives to partake in the respective activities of the RCN as well as to engage on behalf of the MSCAs in the systematic consultation on the Eurobarometer survey.

The first step towards investigating the actual awareness of the general public on the safe use of substances and mixtures and their current levels of information on labels, was to define the most relevant questions for a representative survey of European citizens.

In June 2009, desk-research was conducted to identify European and international studies, best practice and models in communication campaigns on chemical hazards with different target audiences.

An in-depth consultation took place at the third RCN meeting in January 2010 resulting in the "Eurobarometer Survey Questionnaire on consumer perception of labels and chemicals" including a literature review – a joint effort with the "Bundesinstitut für Risikobewertung (BfR)".

As the second step, ECHA entered into cooperation with the Institute for Health and Consumer Protection (DG Joint Research Centre), drawing on its expertise and research capacity in order to launch and then evaluate the Eurobarometer Survey[4]. The aim of this survey was to gain insights into EU consumers' perceptions of chemical products, and to judge how these perceptions differ when people are regular users of chemicals.

The European Commission's service provider, TNS Opinion[5], conducted the survey in November and December 2010 in all of the EU Member States, involving 26 574 members of the public. These were classified by age, gender, socioeconomic status and other appropriate criteria to collect general demographic data as a basis for an analysis of label comprehension, and to ascertain linguistic and educational work experience as possible factors that might have an impact on comprehension.

The survey also looked at people's attitudes in dealing with safety instructions, and evaluated their understanding of hazard pictograms and the safety language as standardised by the CLP Regulation.

The European Commission published the results of the survey on its website on 18 May 2011; they are representative of the views of 500 million citizens in the EU. The website can be found at: (http://ec.europa.eu/public_opinion/archives/ebs/ebs_360_en.pdf)

As the third step, on 13 May 2011, the Agency contracted a team of academics specialised in the field of risk perception and risk communication to provide a qualitative behavioural interpretation of the results of the Eurobarometer Survey. This qualitative research was designed to examine and explain the information received on the perceptions of the various categories of chemical products within the EU (as a whole and in individual Member States) and to enable the Agency to recommend actions to mitigate misperceptions as well as recurrent behaviours. The research was conducted in July 2011 by a team of academics in the field of risk research and analysis and consisted of interviews with 242 members of the public from three Member States.

4 Since 1973 Eurobarometer surveys are regularly performed on behalf of the European Commission to gauge the public opinion on certain issues relating to the European Union held across the Member States; results are published on DG Communication's web-pages.
5 TNS Opinion is an international coordination centre specialised in opinion research.

The study intended to reveal how people evaluate chemical products based on perceptual and experiential factors in the context of use, and how these judgements link to safety-relevant behaviours, i.e. storage, scrutiny of safety guidelines and adherence to instructions.

At the fourth RCN meeting in June 2011, members and stakeholder observers[6] had the opportunity to contribute to shaping the "qualitative research" through a dialogue and interactive working group session with three members of the academic team.

In September and October 2011, RCN members gave their written feedback on the first draft of the qualitative research.

Finally, the fifth RCN meeting in October 2011 held a concluding discussion with the researchers. The ECHA Secretariat further consulted RCN members on its preliminary proposal for the main findings, which ECHA is now providing to the European Commission.

C) Some basics on Hazard versus Risk Communication

As the study addresses the communication of information to the general public on the safe use of substances and mixtures, it is useful to outline the typical challenges of hazard and risk communication.

In ECHA's Guidance document on Risk Communication, "hazard" is defined as a possible source of danger, or conditions physical or operational that have a capacity to produce a particular type of adverse effect. Consequently, hazard communication is the provision of information on the potential for a substance, activity or process to cause harm and/or and adverse effect. The Guidance document can be found at: (http://echa.europa.eu/documents/10162/17231/risk_communications_en.pdf).

By contrast, "risk" is a combination of the exposure and the hazard severity of a substance, activity or process that causes harm. Risk communication is therefore an interactive process entailing an exchange of information about health or environmental risks between interested parties. More specifically, it is the act of conveying or transmitting information between parties about:

6 Here in particular: the European Chemical Industry Council (cefic) and the International Association for Soaps, Detergents and Maintenance Products (AISE)

(a) the level(s) of health or environmental risks;

(b) the significance or meaning of health or environmental risks;

(c) decisions, actions, or policies aimed at managing or controlling health or environmental risks;

Interested parties include government agencies, corporations and industry groups, trade unions, the media, scientists, professional organisations, public interest groups, and individual citizens[7] .

The field of application for the principles of risk communication is of course not limited to the safe use of chemical substances. Best practice in risk communication is continuously developing through academic research and operational experience. Nevertheless, many of its fundamental elements have remained unchanged for years – e.g. a recognition that the perception of risk is an emotional and not a rational response, which often runs counter to actual risk.

Today, the new frontier of risk communication is based around transparency and trust. In a "post-trust society"[8] , transparency is often a way for the general public and for stakeholders to gain some sense of control over the activities of institutions, which they no longer fully trust. Trust can only be built up over time, through routine and regular communication. This is the main factor in building the reputation and trustworthiness of the institution(s) involved. Effective risk communication by regulatory authorities is therefore particularly challenging and requires a pro-active approach. Furthermore, there is a need to evaluate evidence of the impact of what an organisation communicates on target audiences (so-called "test for trust").

These factors also influenced ECHA's work in establishing Guidance and in evaluating how labels are understood by the general public.

7 Covello, von Winterfeldt, and Slovic (1986) in: "Risk Communication – Chemical Product Risks", An OECD Background Paper", page 172, Berlin, 2000

8 Post-trust societies is a term coined by Ragnar Löfstedt, Professor and Director of the King's Centre of Risk Management at King's College London in his book "Risk Management in Post Trust Societies" (Palgrave Macmillan, 2005). According to Löfstedt, largely western societies, have exhibited a dramatic fall in the trust that citizens accord to both industry and regulators. For example, in the UK it is claimed that between 1974 and 1996 the public's trust in these institutions fell from 39% to 22%. Similar falls have been recorded in Germany, the Netherlands, Spain, Sweden and the USA. The cause of this phenomenon, Löfstedt argues, is the number and size of regulatory scandals that have occurred, particularly in Europe. Faced with the decline in trust, it is becoming ever more difficult for regulators and industry to communicate risk related issues.

ECHA'S RISK COMMUNICATION GUIDANCE

In accordance with its legal obligation under Article 123 of REACH, ECHA published its document containing "Guidance on the communication of information on the risks and safe use of chemicals" in December 2010. The guidance was produced with the input of the RCN, a Partner Expert Group (PEG), as well as ECHA's Member State and Risk Assessment Committees (MSC and RAC), and the MSCAs by means of the CARACAL. This is in accordance with ECHA's standard guidance consultation procedure.

The Guidance document drew on existing information on risk communication in a broader context, which suggested that risk communication can be approached in a four step process.

- **Understand the issue.** For example, is the situation one where there is significant uncertainty regarding the risks of a chemical or chemicals? Is there (or is there likely to be) controversy associated with the issue? Does the situation have the potential to develop into a crisis?

- **Determine the communication needs.** Before actually communicating, there is a need for some focused preparation. What is the objective of the risk communication? What types of communication are going to be most effective for this issue? Is there a need to coordinate the communication with other stakeholders?

- **Implement risk communications.** Actually doing it. The preparation should lead to targeted and well-managed communication.

- **Evaluate and review.** It is essential to learn from experience to ensure that good practice is taken forward and bad practice learnt from.

It is important to recognise the role that the public's perception of risks may play in all of the above stages, as this will not only affect their potential fear of the risks of chemicals but may also affect their behaviour.

D) The two pillars of this study

The Eurobarometer Survey and the "qualitative research" provided two complementary pillars on which this study and its findings are founded:

- The Eurobarometer Survey captured, by means of interviews conducted face-to-face in people's households, the views of a large sample of citizens. It provided collective risk perceptions on national bases, as reflected in the country-level breakdown of survey results throughout the survey. The survey also provided detailed demographic analyses illustrating how respondents perceived chemical products.

- The "qualitative research" on the "risk perception of household chemical products[9] : behavioural patterns and contextual effects" conducted with a pool of interviewees analysed psychological phenomena of individual risk behaviour. When comparing this research with the Eurobarometer Survey, the following emerges: which substance or use regarded as particularly hazardous largely follows different national collective perception patterns; how individuals then react to hazards, however, follows individual behavioural patterns determined by human nature, itself. The qualitative research also complements the Eurobarometer Survey through its findings on different household behaviours (e.g. households with children in comparison to single households) or on attitudes held by the elderly or by people of differing educational or gender backgrounds.

Both field surveys provided feedback on the understanding (or lack thereof) of individual CLP pictograms. Their findings show that some hazard pictograms are hardly known. This is not surprising given that the provisions of Title III and IV of the CLP Regulation on "hazard communication in the form of labelling" and "packaging" relevant to the topic of this study only took effect with respect to individual substances just over one year ago, on 1 December 2010 (see Article 62 of the CLP Regulation). In fact, most chemicals used by consumers are actually mixtures, and the CLP provisions will only apply to mixtures as of June 2015.
The Agency's study had to be conducted somewhat prematurely, with the Eurobarometer Survey questioning

9 In this report, the terms "household chemicals", "chemicals" and "chemical products" are used as synonyms to make reference to substances and mixtures subject to Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures; the terms thus relate to any substance or mixture of chemicals used in the course of housekeeping or personal routine including housework, gardening, home improvement, car maintenance and hobbies.

the general public at a time (between 25 November and 17 December 2010) when it had hardly encountered the new hazard pictograms in real life. When the "qualitative research" (undertaken between 1 and 30 July 2011) tried to gather the intuitive understanding, the obligation to use the CLP pictograms for labelling and packaging substances had only been in effect for less than a year.

Therefore, the results of this study give an early snapshot of the general public's understanding of the labels.

a) The Eurobarometer Survey of "consumer understanding of labels and the safe use of chemicals"

The challenge of appropriate hazard communication is highlighted by the findings of the Eurobarometer Survey. Its results indicate, for instance, that the levels of understanding of the risks related to chemical products differ considerably from one Member State to another[10] ; that there is generally little understanding of the safety measures that need to be taken when using chemical products; and that most respondents feel only moderately informed or not well informed about the hazards associated with chemical products.

The Eurobarometer Survey has shown that the public is familiar with some CLP hazard pictograms, but that the level of their understanding - or what they perceive as their understanding - varies considerably. For example, the exclamation mark is familiar to many (perhaps because it is seen in a number of different situations), but understood by few. On the other hand, the environmental hazard is familiar to few, and yet many say they can understand its meaning.

(a) the 'exclamation mark' is familiar to 59% but understood by only 11%;

(b) the 'flame' is familiar to 88% and understood by 91% of respondents;

(c) the 'environmental hazard' is familiar to 33% and understood by 76%;

(d) the 'health hazard', pictured by a human silhouette, is familiar to 20% and understood by 44%;

10 For instance, 92% of respondents in Denmark "read and follow the instructions", as opposed to only 51% in Latvia; wearing protective clothing was considered a necessary safety measure by 63% in Ireland, but only 31% in Finland; storing a product correctly is important to 57% of respondents in Belgium, but only 12% in Latvia; 57% in Austria prefer using only the recommended amount of a chemical product, compared to 10% in the UK (see Eurobarometer Survey, page 31).

Even in Member States where understanding of the issues surrounding chemical products is high, the comprehension of the new hazard pictograms is relatively low. This gives additional value for this study's task of identifying potential needs for additional (hazard-based) information on labels.

The diversity of risk-related behaviour across EU Member States underlines the importance of adapting hazard-related communication to national audiences. This emphasises the need for communicators to be aware that a message directed at one national audience can be misunderstood when reaching citizens of another Member State where other reflexes prevail.

b) Qualitative Research or "in-depth study of hazard perception of household chemical products: consequences for the communication of information on safe use to the general public" ("qualitative study")

The research aimed to reveal how people evaluate chemical products in the context of use (i.e. in their home environment) and how these judgements influence safety-relevant behaviours (i.e. type of storage, scrutinizing safety guidelines and adherence to the instructions). It also provided an analysis of the psychological effects and the significance of the new hazard pictograms in the context of the product's overall appearance.

Specifically, it explored: (a) label reading, understanding, and compliance with product use and safety instructions; (b) the role of the product context in which labels are observed and the household context in which they are used; (c) whether consumers know the meaning of the hazard pictograms.

The study was based on a behavioural model[11] according to which respondents would base their judgement on the way of using household chemicals on superficial and quick assumptions. Such cues would either promote or inhibit the emergence of psychological reactions, e.g. perceived danger, alertness and caution. These are to be considered prime motivators for actions that provoke safe use, scrutinising instructions, proper storage and adherence to instructions during use.

11 The model considered a general lack of knowledge in respondents, time pressure and focus on non-safety related prime goals, and finally the high complexity of chemical products.

The study revealed a number of insights:

1. Perception and information processing of hazards

- Hazard and risk perceptions are not rational processes. The risk-related behaviour of individuals is determined by emotion and mental shortcuts, so-called heuristics[12] as well as by experience. Consequently, the communication of hazard-related information needs to acknowledge and make best use of these relevant perception drivers[13].

- Hazard pictograms are perceived to indicate a hazard, but the knowledge about the meaning of the various pictograms is limited. Thus, the general features of the new CLP hazard symbols and not their specific meaning play the decisive role in perceiving hazards.

- The correlation between risk perception and safety behaviour is rather low. This suggests that risk perception is not a major driver of safety behaviour.

2. Storage and safety behaviour

- The risk perception related to the use of chemical household products varies from one Member State to another[14]; however, no substantial association between general safety beliefs and the frequency of use could be found[15] .

12 "Heuristic" means to follow (unconscious) rules derived from experience when assessing a complex situation. The study showed that people's judgements on chemical household products are not firm, i.e. they do not clearly differentiate between the risks of specific chemical household products, and that intuitive misunderstandings can distort risk perceptions.
13 Most respondents are aware that using chemicals might involve some risk; the risk perception of chemicals varies across countries and, as the overall risk perception across chemical household products shows, is rather moderate; the distribution however appears slightly skewed towards higher risk concerns.
14 The researchers found no indication in their study that respondents overestimated risks when they handled chemical household products; cleaning products are judged to have a mediocre risk but on the other hand some products such as ammonia or bleach were understood as posing a health hazard; the study also showed that familiarity with a product may reduce people's risk perception.
15 For some products there are substantial differences in the frequency of use across countries, gender, type of residence and level of education; the study showed, for instance, that men use grill lighters more than women and people over 50 use more flower fertilizer.

- Nevertheless, safe-storage behaviour is directly related to the perceived danger associated with the chemical household product[16]. For some products there are substantial differences in the frequency of safety measures taken across countries, genders, and the types of residence and levels of education[17] ;

- Reading instructions of use (including warnings) is common practice[18] . Label reading varies tremendously across chemical products. Yet against a background of little knowledge of chemical products and time pressure in decision-making, most consumers will rely on superficial and quick assessments, making use of visual cues available on the product[19] ("minimal effort").

- Product appearance and packaging should be brought in line with the hazard information of labels, making use of behavioural findings (e.g. ideo-motor principle[20]) to amplify the label's message, thereby encouraging the appropriate safety behaviour in users.

3. Potential need for additional information on product packaging

The study shows that messages expressed explicitly or inherently through the appearance of a product or through its packaging override the messages contained in a CLP label. For instance, the shape and colour of packaging; the presence of "innocence" related visual elements on a product (for example, pictures of a child or a flower); brand recognition and appreciation; the user's perception of the usefulness of the product; understanding a product to be more "natural" than industrial; these are all factors that influence the perception of hazards[21].

16 Looking at respondents' safety behaviour, the analysis reveals that the majority do not take any safety measures – notable exceptions are paint remover and lacquers. The more innocuous products such as dishwasher soap are openly stored, while the more dangerous such as paint thinner are stored more safely. Nevertheless, 20% of respondents seem to openly store more dangerous products such as drain cleaners. Women seem to handle chemical household products more carefully while retired people are more careful than other age groups.

17 On average across all products, 30% of respondents in France report "nearly always" taking safety measures compared to 26% in the Netherlands and 24% in Germany. The study found that, on average, people living in independent houses take more safety measures than those living in apartments or bigger houses and that people with a more basic education generally store chemicals more safely than higher educated people. The latter finding may reflect a "desirability bias", i.e. systematic error in self-report measures resulting from the desire of the respondent to give the "right" answer.

18 For more than half of the products, a majority of respondents (80%) stated that they "nearly always" read the labels when using the chemical. For less frequently used chemicals, people in the Netherlands and in France read labels more often than in Germany. In terms of frequently used chemical household products "readership" levels are more homogeneous in the three countries. Women generally read labels more often than males. The age group "40 to 49" reads labels more frequently than younger age groups. Although for paint thinner and paint remover,younger age groups tend to read labels more frequently. No clear patterns were found the respondents' education level. People living in apartments are more concerned about lamp oil, grill lighter and methylated spirits and people living in houses paid more attention to reading adhesives, descaler, grill lighter, insecticides, paint thinner and oven cleaner.

19 People's behaviour is more linked to their daily lifestyle and household culture. They tend to have automatic and to some extent subconscious behaviours i.e. packaging and smell play a role.

20 The ideo-motor principle (IMP) hypothesises a bidirectional action-effect linkage in which the desired (perceptual) effect triggers the execution of the action that previously caused that effect. In the ideo-motor view, causality, as present in the real world, is reversed in the inner world. A mental representation of the intended effect of an action is the cause of the action: here it is not the action that produces the effect, but the effect that produces the action; in: "An analysis of the Ideo-motor Principle and TOTE" by Giovanni Pezzulo, Gianluca Baldassarre, Martin V. Butz, Cristiano Castelfranchi and Joachim Hoffmann, ISTC-CNR, Rome, Italy and University of Würzburg, Würzburg, Germany, October 2006.

21 In certain cases, industry has undertaken voluntary information campaigns to increase users' awareness and encourage the safe use of their products. Yet such campaigns have largely not been based on the new CLP hazard pictograms and have focused on images and symbols that addressed certain types of behaviours or hazards; an example is the A.I.S.E. campaign on "safe use icons".

1. Hazard pictograms are more intuitively indicative of a hazard and hence have the largest effect on risk perception, regardless of country, gender, age or educational level.[22]

2. Product labels and product packaging should send consistent messages, e.g. avoid the combination of hazard symbols with (hidden) messages that activate positive feelings or feelings of innocence (e.g. nature, pictures of babies and mothers).

3. Messages should focus on safe storage as well as specific safety and disposal measures, make use of intuitive behaviours and be consistent with the message of the hazard pictogram. For example, when a product package is red and/or black, users automatically tend to judge the product as more dangerous.

4. Households differ in terms of their vulnerability (accessibility of products to children, etc.). Therefore, hazard communication is most effective if it systematically targets specific household categories (e.g. families with young children, people with disabilities, the elderly).

5. Information on chemicals should be offered in the relevant context of use. This implies that information "builds up" in households over a longer period of time and needs to be available for consumers before or at the time of use of the product.

6. Although the research did not address the context of "purchasing decisions", this could be an additional context for selected communications to encourage safety behaviour (e.g. buying products that can be safely stored in households with specific features like storage space, presence of children).

4. The need for training:

The research also proposed a training activities scheme aimed to enhance best practice in communication campaigns for the general public in EU Member States. The activities increase the ability of MSCAs and stakeholder organisations to communicate more effectively about hazardous chemicals by using the following tools:

22 The findings of the study also showed that if no labels are present, the perception of risk decreases. Similarly, the presence of an "eco-label" as well as of a "positive picture", e.g. happy mother with a baby also reduces risk perception.

1. Website to promote a better understanding of the new CLP hazard pictograms. The content of such a website could include:

   (a) studies on the understanding of chemicals;

   (b) country specific details;

   (c) country specific campaigns conducted by MSCAs and industry;

   (d) basic knowledge about the psychological models and theories of risk perception and safety behaviour.

2. Annual workshops to "train the trainers" to support MSCAs in planning and conducting their country specific activities. Together with stakeholders, the MSCAs could benefit from resources, funds and experience to:

   (a) develop case studies to assess campaign needs in different EU Member States;

   (b) develop objectives for joint campaigns (e.g. raise the awareness of the new hazard pictograms);

   (c) assess country specific needs for campaigns;

   (d) identify multipliers and facilitators;

   (e) select targets (e.g. the elderly, young couples with children);

   (f) develop general and specific messages;

   (g) develop pan-European educational material;

   (h) develop a database with best practice and lessons learnt.

c) Common findings of both studies on the general public's knowledge and understanding of CLP pictograms

Both the Eurobarometer Survey and the "qualitative research" provided indicators on the extent to which the CLP hazard pictograms are (partly) known and to which they are (mis)understood.

The Eurobarometer Survey gave feedback on certain selected CLP symbols[23] , also broken down by socio-demographic criteria and gender.

The "qualitative research" has summarised the respondents' knowledge of the meaning of all CLP hazard pictograms in a comparative table, revealing also some striking national differences.

23 see Heading "3.3 Comprehension of the new symbols", Pages 81-90.

The surveys covered four out of the nine CLP pictograms in common. The feedback on the extent to which a symbol is known and understood also differs from one survey to the other. This is a clear indicator that the public's exposure to the pictograms has been too short to reveal stable patterns of understanding.

The table below summarises the feedback across the EU:

Pictogram	**Meaning**	**Familiarity (Eurobarometer(EB)/Qualitative Research(QR))**
 corrosion	Corrosive	- / medium EB: 44% of EU citizens say they are familiar while 53% say they have never seen the label QR: 48% familiarity (64% male, and 42% female)
 environment	Environmental Hazard	High / medium EB: 32% of EU citizens say they are familiar while 65% say they have never seen the label QR: 68% familiarity (78% male and 63% female)
 gas cylinder	Gas cylinder under pressure	- / very low EB: - QR: 4% familiarity (6% male and 3% female)
 exclamation mark	Health Hazard	Low / high[24] EB: 59% of EU citizens say they are familiar while 38% say they have never seen the label QR: 80% familiarity (78% male and 81% female)
 exploding bomb	Explosive	- / high QR: 81% familiarity (87% male and 79% female)

24 A CLP Study done by the Italian Competent Authority (presented at a conference in Rome in December 2010) showed similar results for the exclamation mark in the label. It is believed that the familiarity with the symbol derives from the fact that people see the exclamation mark e.g. in road signs. While their visual memory does not retain the background or frame of the sign, they do remember the sign itself.

Pictogram	Meaning	Familiarity (Eurobarometer(EB)/Qualitative Research(QR))
 flame	Flammable	High / high EB: 88% of EU citizens say they are familiar while 10% say they have never seen the label QR: 82% familiarity (87% male and 80% female)
 flame over circle	Oxidising	- / very low QR: 82% familiarity (by 87% male and 80% female)
 health hazard	Serious health hazard	Low / very low EB: 20% of EU citizens say they are familiar while 77% say they have never seen the label QR: 12% familiarity (12% male and 12% female)
 skull and crossbones	Acute toxicity	- / low[25] EB: - QR: 33% - 51% male and 26% female

People may be more familiar with certain labels because some of the pictograms were very similar to the 'old' labels. The only difference being the background colour: orange with the old labels and a red diamond with the new hazard labels.

In some cases the hazard label - e.g. the skull and crossbones - might have been intuitively recognised but not correctly understood. However, the overall level of familiarity with the symbol is surprisingly low as one would have expected that the image is widely known from other contexts e.g. pirate films or comics. However, in view of the limitations in place for many of the products that carry this label, members of the general

25 A Spanish study on 'product safety – Pictograms safety and danger' tested the visibility, identification and understanding of pictograms that included five pre-GHS pictograms (the skull and crossbones label was amongst the five. The hazard label was translated 'toxico' which is very similar to the old pictogram), communicating chemical hazard information on consumer products (Spain, 2010). The skull is recognised by 95% of participants and 90% claim that they know what it means. However it is not clear whether Spanish respondents understood the difference in meaning between the old and the new pictogram.

public may not have seen or handled substances or products labelled with the symbol with the exception perhaps of seeing it in e.g. petrol stations. It is difficult to conclude from the research whether respondents were aware of the substantial change in 'meaning' emerging from the new CLP legislation[26]

The surveys showed that a number of people understood the new symbol for serious health hazards intuitively, however, as is the case with the skull and crossbones label, it is difficult from the two studies to draw conclusions as to respondents' understanding of the actual meaning.

E) Further efforts by the Agency

The European Chemicals Agency is submitting this study to the European Commission as mandated by Article 34 (1) of the CLP Regulation as the basis for a report to the European Parliament and Council. ECHA plans to pursue a number of activities within its own scope, to communicate on the safe use of chemicals.

The Agency will continue to include CLP-related information activities in its regular public communications.

F) Conclusions

The study was conducted at a time when citizens have been exposed to the new CLP pictograms for less than one year as "hazard communication in the form of labelling" and "packaging" has only applied for chemical substances since 1 December 2010, and the CLP Regulation for mixtures will only enter into force on 1 June 2015. Consequently, the study provides an early snapshot of the levels of awareness and understanding and it may therefore be somewhat premature to draw robust conclusions. It therefore seems appropriate to repeat this exercise some time after the application of the CLP Regulation in 2015.

As regards the communication of information to the general public, ECHA's findings in this study are based on its experience in the course of elaborating its respective "Guidance on the communication of information on the risks and the safe use of chemicals", the "Eurobarometer Survey" and the qualitative research ("In-depth study of hazard perception of household chemical products") and their discussion within the RCN.
The surveys conducted in the course of drawing up this study nevertheless reveal that the public lacks the motivation and encouragement to read information provided on the hazard labels. To a large extent, people also seem to be influenced in their perception of hazards by the overall packaging of a product and

26 By splitting the hazard classes, the CLP Regulation now distinguishes between the skull and crossbones pictogram that covers the more severe classes of acute toxicity and the serious and health hazard pictogram that covers CMRs, specific target organ toxicity after single and repeated exposure, aspiration hazards and respiratory sensitisation.

by experience rather than by the hazard label itself. Furthermore, behavioural patterns can run counter to the warnings that CLP labels intend to convey. In addition, messages inherent in the packaging itself may contradict the messages expressed by the CLP pictograms.

The second conclusion of the study is the need to reinforce the understanding of CLP pictograms with the public by targeted awareness-raising and by building the capacity and experience at national authority and industry levels. The targeted awareness-raising needs to reflect the different preoccupations and awareness levels in Member States and industry, but also the specific behavioural patterns of sub-groups of the general public (e.g. families, single households, workers, school children).

EUROPEAN CHEMICALS AGENCY
ANNANKATU 18, P.O. BOX 400,
FI-00121 HELSINKI, FINLAND
ECHA.EUROPA.EU