

tds ► exposure

Newsletter

A word from the coordinator ...



Jean-Luc Volatier (ANSES, FR)

› After two years' work, TDS-Exposure hosted a workshop (Brussels – BE, 5th February 2014) providing stakeholders with an update on the state-of-the-art in total diet studies (TDS) and information about what is happening in Europe with respect to TDS as well as enhance appreciation of the need for better data to facilitate better decision-making amongst users and funding organisations, in particular. Equally important, however, was understanding why participants are or not in favour of TDS and what information participants want, getting feedback about TDS-Exposure activities and determining what steps can be taken to ensure applicability of TDS-Exposure results, and ensuring dissemination channels are optimised to safeguard the sustainability of project outputs.

Chair of the Workshop was Prof. Franz Ulberth, Head of the Standards for Food Bioscience Unit at the Joint Research Centre's Institute for Reference Materials and Measurements (JRC IRMM), and the co-chair was Dr Liisa Valsta, Senior Scientific Officer in the Evidence Management Unit of the European Food Safety Authority (EFSA).

There were 46 participants, 33 of which were from food authorities, food companies, academia and NGOs, from 15 European Member States as well as the USA. A summary of the workshop is provided in this newsletter, but the presentations and the report (including questions and answers) can be downloaded in full from <http://bit.ly/1iGpDwO>.

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› 01: Stakeholders' Meeting Brussels, BE -5th February 2014

Session 1: Total Diet Studies – Introduction and background

Chair: Benjamin Smith, Firmenich (CH)

› Welcome, introduction & workshop objectives - Jean-Luc Volatier, ANSES (FR)

For quite a few chemical substances, diet is one of the main, if not the foremost, route of exposure for the general population. When we talk about heavy metals, such as cadmium, pesticide residues or even phthalates and bisphenol A, the dietary exposure assessment is a critical step in risk assessment and risk management. Unfortunately, it is not always possible today to compare dietary exposure to chemical contaminants amongst different populations across Europe according to their dietary exposure to these chemical contaminants.

Methodological differences in exposure and risk assessment from one country to another can obscure the risk assessment process and results. Risk management decisions at the EU-level need to be transparent, and based on robust exposure data, with a good control of all the uncertainties.

Total diet studies (TDS) can provide a harmonised methodology for dietary exposure assessment with a high coverage level of the whole diet and representative contamination data from food as consumed. It is for these reasons that TDS-Exposure was launched in February 2012 to harmonise exposure assessment and create a network of TDS-centres trained to use common tools, such as databases and modelling software.

With 26 participants in 19 countries and strong links with European and international organisations like the WHO, the FAO and the EFSA, TDS-Exposure covers all the main issues including prioritisation of substances, food sampling, preparation and analysis, database management, statistical modelling, quality procedures, training and communication.

TDS-Exposure is also a unique opportunity to implement TDS in several countries that do not yet use such a methodology.

The aim of this stakeholder workshop was to inform stakeholders about the first results and to evaluate stakeholders' interests in exposure assessment studies. The outcomes will help considerably to ensure the project is as useful as possible, and produces better data for better decisions in the fields of chemical and dietary risk assessment and management.

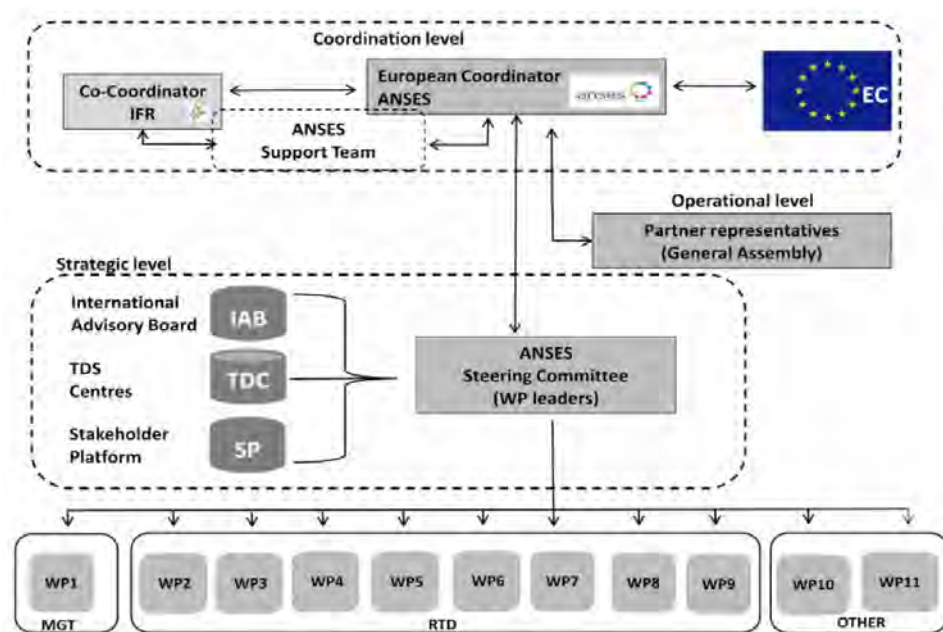


Figure 1. Organisation of TDS-Exposure

› Exposure Assessment and Total Diet Studies - Philippe Verger, WHO (CH)

Generally, it is most efficient to use a step-wise approach to assess dietary exposure, beginning with very conservative assumptions and methods, and refining these as the situation demands, e.g. when results are above the Health Based Guidance Value for the chemical under consideration. Further steps should be designed that potential high dietary exposures to a specific chemical contaminant are not under-estimated, and should aim to define more precisely the group of consumers exposed, focus on food categories containing the chemical, analyse food samples as consumed, and estimate occurrence over eating occasions.

Beside its use as a screening tool to estimate the actual occurrence of chemicals in broad food groups, TDS can also constitute a refined step in the exposure assessment if sampling and chemical analysis are performed at food item level rather than the food group level, and raw data from food consumption surveys are available to match occurrence with consumption. Because analysis is performed on pooled samples, TDS are not relevant for a probabilistic approach. However, a combination of TDS results with food consumption constitutes the ultimate refinement for long-term dietary exposure assessment.



For more information visit <http://bit.ly/1pfu2cv>

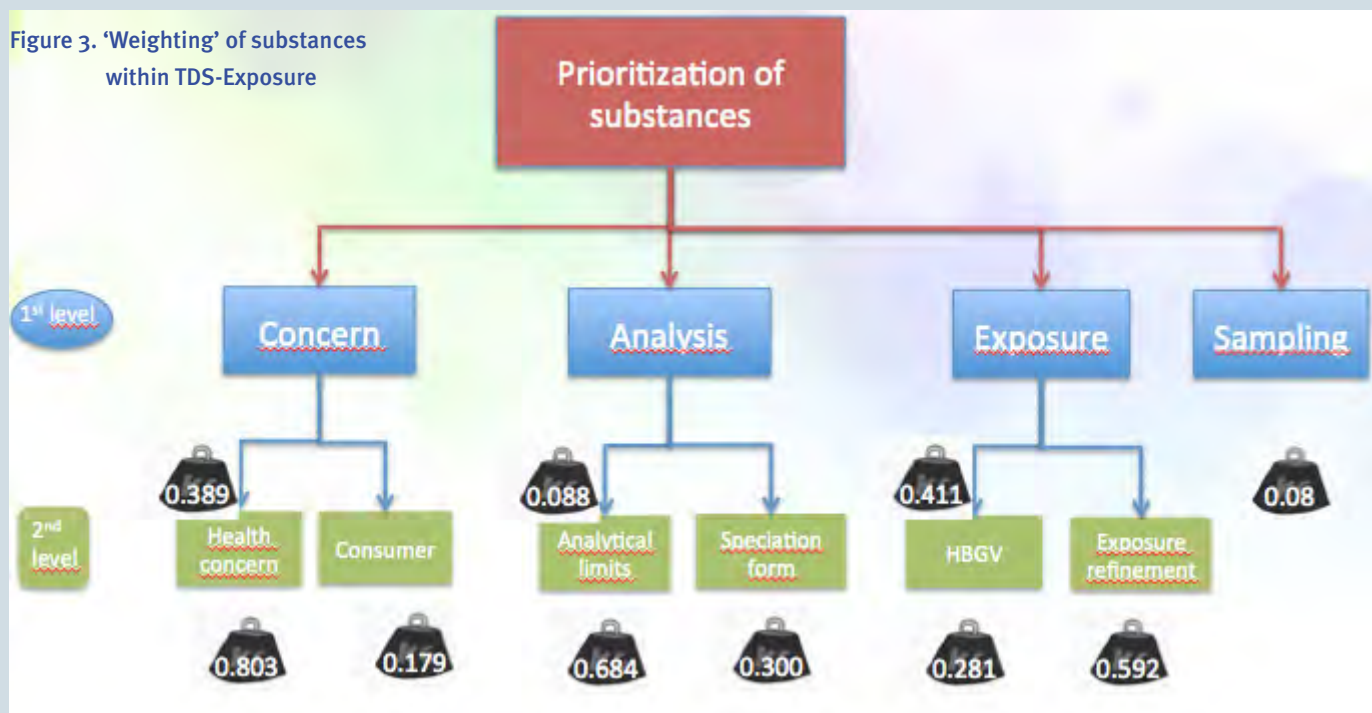
› Substances of interest and populations - Karine Vin, ANSES (FR)

A total diet study (TDS), generally, consists of selecting and collecting commonly consumed food purchased at the retail level, processing foods as consumed, pooling prepared foods to create representative food groups, homogenising pooled samples, and analysing them for harmful and beneficial chemical substances. International organisations such as FAO, WHO and EFSA have

supported the TDS approach for several years, and provided general methodological guidelines. However, none of these documents have proposed a methodology to identify relevant populations, validate the relevance of this approach for the different types of substances or prioritise the substances.

The objective of TDS-Exposure is to identify the populations of interest and to develop a list of specific foods to be included in the study as well as propose a general method to validate the relevance of the TDS approach for different groups of substances and prioritise substances for which a TDS has been considered relevant.

Figure 3. 'Weighting' of substances within TDS-Exposure



Session 2: TDS design and quality

Chair: Jacob van Klaveren, RIVM (NL)

› Food sampling - Aida Turrini, CRA-NUT (IT)

Food sampling represents the first practical step in obtaining a representative sample for a reference diet. This activity is performed, after a desk analysis, and leads to a food shopping list for purchasing foods. The baskets of foods gathered by food categories represent the composite samples for subsequent analysis. Documentation, procedures and tools are the pillars of each step in the overall protocol, namely characterising the food list, designing the food sampling plan, formulating the food shopping lists. Background information describing the context is used to formulate the food list; strata are defined according to relevant parameters in a specific country and methods for retailer selection linked to the kinds of information available. Selecting

population groups and relevant substances, prioritised according to the overall aims of a total diet study, drives the elaboration of the food list based on food intake statistics. A sampling plan for collecting products is prepared to ensure all possible variants of dietary habits, often related to geographical areas, are represented in the sample identifying relevant strata. The importance of factors such as geographical area (regional vs. national) and season is linked to the type of food (fresh vs. processed) and evaluated for each food category. The types of shopping locations are linked to habits in food procurement and need to be taken into account for the shopping plan. The former steps create information to be implemented in food collection in practice. Knowledge of

the market allows the number of varieties and/or branded products include to be estimated and sampling to ensure the diet is represented appropriately. An example of food products included in one important food category, bread, in Italy, is shown in Figure 4. The degree of processing related to food shopping habits should be included when defining the food shopping list (e.g. fresh raw foods, composite raw, composite half-prepared or ready-to-eat foods). Several options are available for selecting shops for purchasing food (sampling plan) or to guide probabilistic selection of products on the shelves (food shopping). However, the method of choice falls in the set of alternatives to be matched with logistical considerations (e.g. scheduling of the whole TDS).

FRISELLA PANE	Bread, «frisella» type
PANE AL LATTE	Bread, milk dough
PANE ALL OLIO DIVERSE MISURE	Bread, oil dough
PANE AZIMO	Bread, unleavened
PANE BISCOTTATO APROTEICO	Toasted bread, protein free
PANE CARASAU SARDO	Bread, «carasau» type
PANE CON PATATE	Bread with potatoes in the dough
PANE DI FARRO	Spelt flour bread
PANE DI GRANO DURO	Durum wheat bread
PANE DI KAMUT	Kamut bread
PANE DI MAIS	Corn bread
PANE DI SEGALE	Rye bread
PANE DI SOIA	Soy flour bread
PANE INTEGRALE	Wholemeal bread
PANE PAN BRIOSCE NON FARCITO	Sandwich bread (packed)
PANE ROSETTA FARINA TIPO 00	Bread, 00 flour, type «rosetta»
PANE SCIAPO	Bread without salt
PANE SENZA GLUTINE	Bread, gluten free
PANE TIPO 0	Bread, 0 flour type
PANE TIPO 00	Bread, 00 flour type

Figure 4. Example of one food category in Italy (bread)

› Analytical methods - Laurence Castle, FERA (UK)

A key part of TDS work is that exposure estimates are based on chemical concentrations measured in the food as eaten. Depending on the characteristics of the food and the chemicals targeted, food preparation methods can cause concentrations to rise, fall or remain unchanged. Unless care is taken during preparation, methods may also introduce additional extraneous contaminants. So, it is important to ensure food preparation methods used in TDS work reflect properly consumer practice. Individual food items are then pooled to reduce the cost of analysis. TDS work should be designed so that pooling does not give rise to a dilution of the target chemicals, such that analytical methods result in a large number of non-detects. Similarly, pooling can make the sample matrix more complex and this has implications for the validation of analytical methods. The availability and performance requirements of analytical methods and reference materials are being explored by TDS-Exposure.



Figure 5. Cooking time typical of consumer?

› Quality standards - Paul Finglas, IFR (UK) & EuroFIR (BE) and Luísa Oliveira, INSA (PT)

One of the key objectives in TDS-Exposure is to encourage the development of TDS globally in order to improve the quality of chemical risk assessments, and encourage and support the implementation of new TDS in EU Member States. TDS-Exposure has created a network of centres, and is developing and implementing an overall quality standard framework for TDS centres in Europe leading to a Total Quality Management System, based on the European Foundation for Quality Management (EFQM) Excellence Model including commonly agreed concepts and associated terms, and quality tools such as SOPs, requirements for data generation, collation and exchange as well as quality review. The overall aim is to improve the quality of data and comparability of results among countries.

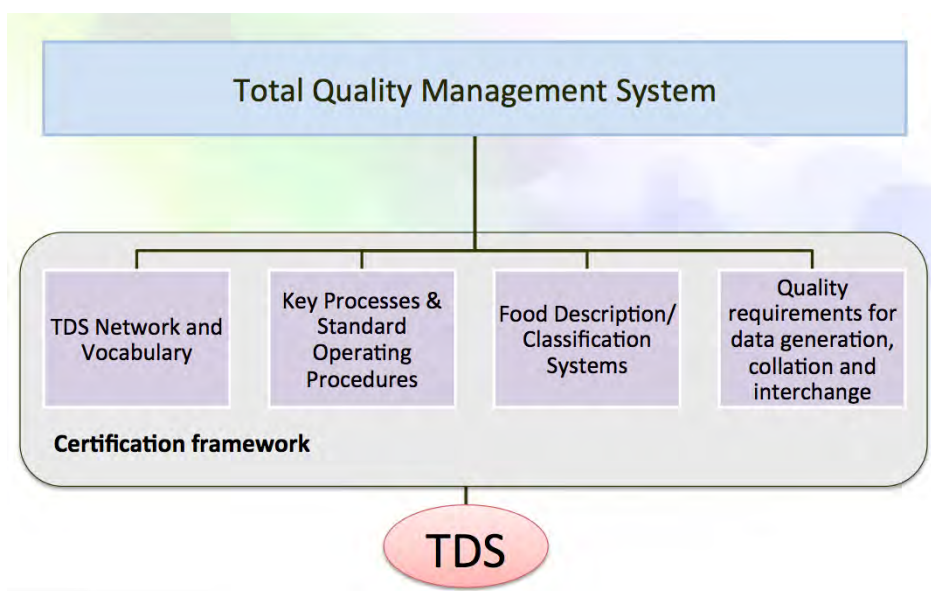


Figure 6. Developing a total quality management system for TDS

Session 3: Methodology, tools and implementation

Chair: Matthias Greiner, BfR (DE)

► Database management - Karl Presser, ETH Zurich (CH)

The proper management of scientific information is important as it can have an impact on the quality of data, which in turn can impact risk assessment, scientific conclusions, and policy decisions. Using Excel or other Microsoft Office software to manage TDS data is not ideal because organisation of multiple files is a challenging and error-prone. More importantly, these tools are limited in maintaining data quality. For instance, it is possible to save text where numbers are expected and delete data accidentally, and more advanced data quality checks, such as range checks for contaminant values, are only possible with some expert knowledge. In addition, users often struggle with these tools once the file reaches a certain size.

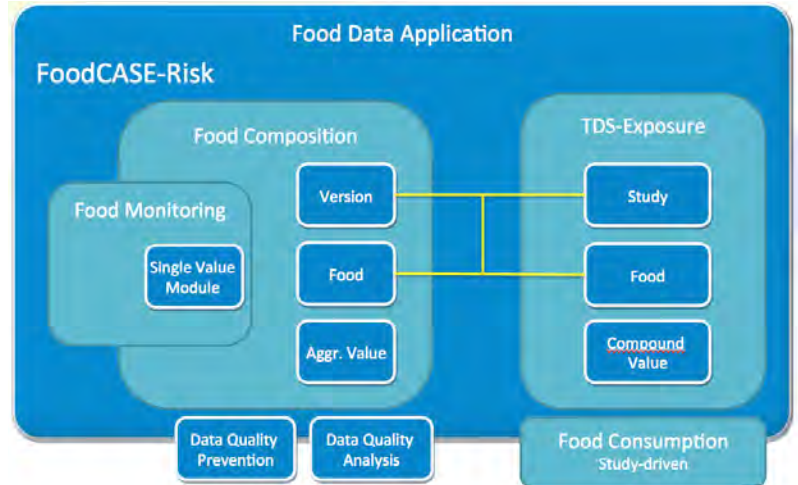


Figure 7. TDS data in the context of food composition

FoodCASE is a software system to manage food composition data and was designed to European standards, defined by EuroFIR. With this experience and knowledge, the goal of TDS-Exposure is to extend FoodCASE (FoodCASE-Risk) to manage TDS data. Advantages in this approach are that all TDS data are stored centrally, in the same format,

extended search functionalities are provided, and export in different formats is possible. The combination of TDS data with food composition and food consumption data offers new possibilities to combine these data and explore them. Data quality is a particular focus in FoodCASE-Risk as risk data needs to be the best possible quality.

► Variation and trends - Oliver Lindtner, BfR (DE)

One of the main characteristics of TDS is the majority of the diet (e.g. 90%) is covered and a wide range of substances included. This is only feasible, however, by pooling foods for analysis. However, according to the EFSA, WHO and FAO Working Group, this introduces some limitations in the TDS approach: calculation of exposure for populations with different dietary habits and high dietary exposure given that pooled samples provide only mean concentration values (EFSA 2011). Therefore, TDS-Exposure has studied variation in consumption in Belgium, France, Czech Republic and UK, and how food lists derived based on the whole adult population represent the dietary habits of several sub-populations. Comparing consumption behaviour of pregnant women and the general population in Norway has allowed the scope of TDS to be extended. Preliminary results show that dietary behaviour of sub-populations, based on sex, age groups, high exposure and pregnant women, is adequately addressed by TDS food lists

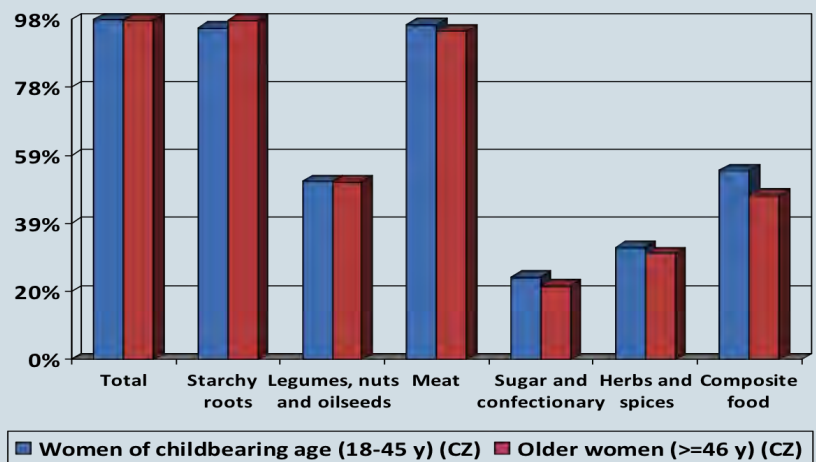


Figure 8. Coverage of average consumption amounts (%) of several food groups by TDS food list comparing population sub-groups

derived for the whole adult population. Studying variation in concentration data had already started and how linear models can be applied to explain variation, in the case of confounding factors, can now be demonstrated. Data have been made available to perform simulations in food monitoring data for metals included in the TDS-Exposure Pilot Studies. Based on these simulations, procedures necessary to extrapolate from

mean concentrations in pooled samples to high concentrations will be determined. Other aspects to be investigated are: practical application of TDS as tool for trend analyses; comparison of TDS with food monitoring to create a decision tree for determining which approach should be used; and description of uncertainties associated with TDS data.

► Methodology and software - Jacob van Klaveren, RIVM (NL)

Exposure assessment is an important aspect for risk evaluation of data generated in a total diet study (TDS). An important aim of TDS-Exposure is to improve the exposure assessment methodology and to harmonise TDS exposure assessment across Europe. The current level of harmonisation for food coding is FoodEx1. All European countries, having performed a TDS study in the past, have been trained to organise TDS data consistently. The TDS data are linked to consumption data using the web-based Monte Carlo Risk Assessment (MCRA) software to guarantee a standardised approach in performing exposure assessments at the international level. In the MCRA software, most uncertainties are taken into account. TDS data differ significantly among countries because of study design and the level of detail provided for individual foods and samples pooled and analysed. Countries like Belgium, Spain and the Netherlands performed a less detailed TDS study, with fewer pooled samples, compared to France or the Czech Republic. In the UK, a well-designed TDS study has been performed for years, but the sampled foods were pooled in broad food categories before being analysed for residues and contaminants. TDS-Exposure data from the Pilot Studies will be stored in FoodCase Risk and linked to the exposure assessment software MCRA. MCRA has a module enabling a stakeholder to link residue findings to the TDS data collection, and the TDS exposure assessment methodology, providing those generating the data have agreed access. The platform will include new countries (maybe up to 29). The next step is to study the source of the uncertainties.



Figure 9. MCRA log-in page - <https://mcra8.rivm.nl>

► Implementation – Pilot studies - Jirí Ruprich, SZU (CZ)

Specific effort has been dedicated to implementation and feasibility testing of “harmonised TDS methodology”. It will be tested in a limited number of countries (CZ, DE, FI, IS, PT), which do not have a TDS programme or have not harmonised already. The work is broken into nine steps (tasks). Six tasks are required for the harmonisation and implementation of TDS methodology, while three others are related to feasibility testing. TDS-Exposure has developed a specific (national) TDS sample/food list defining food items to be sampled for standard kitchen preparation and chemical analyses. A list of sampled foods, a country-specific sampling protocol defining quantity, frequency, places, seasons, and standardised cooking recipes, reflecting typical/dominant kitchen preparation, and other possible factors were created, harmonised and documented. As there are no recommendations for numbers of samples, TDS-Exposure Pilot Studies will use about 100 and exclude those irrelevant to the chemical substances under investigation. This is possible because these studies are not addressing dietary exposure for particular countries, but studying feasibility under specific conditions. Protocols for TDS sample composition and/or aggregation are needed before laboratory analyses as well as pre-laboratory treatment (e.g., effective homogenisation of pooled TDS samples) before analytical processes in accredited laboratories are tested. These processes are described in harmonised (model) Standard Operating Procedures (SOPs), which have been tailored to country-specific conditions. This deskwork will be followed by one-year Pilot Studies to test the feasibility of suggested procedures in the various countries. The Pilot Studies cover the same sampling seasons for population sub-groups (adults and elderly) in all participating countries. TDS samples will be analysed for a limited number of chemicals (total Hg, Cu, Se, Mn) and MCRA software will be used for calculation of individual exposure doses distribution. Finally, results for specific food groups will be reviewed and published.

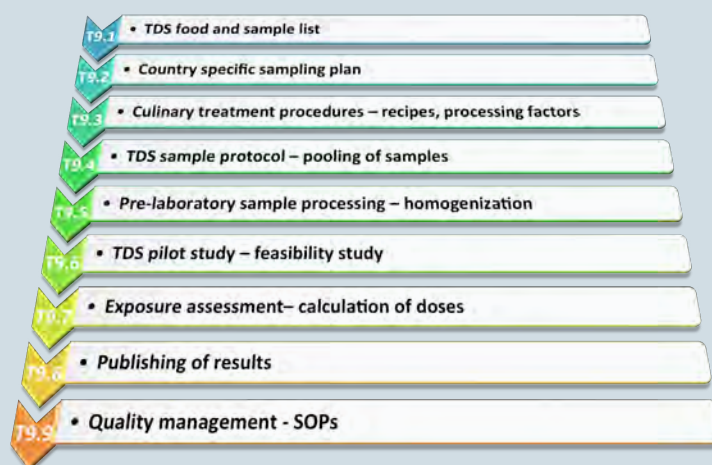


Figure 10. TDS-Exposure Pilot Study planning

Session 4: Dissemination and next steps

Chair: Jean-Luc Volatier, ANSES (FR)

› Training and spreading of excellence - Siân Astley, EuroFIR AISBL (BE)

TDS-Exposure aims to promote knowledge and development of skills amongst organisations and individuals running and evaluating TDS for food safety and risk assessment in Europe. This is being achieved through a coherent set of closely related training events, which bring a high level of integration to existing and new training activities as well as exchange of methods and sharing of facilities. Training and spreading of excellence will continue throughout the project lifetime and, whilst there are organisations with specific tasks in these activities, it is expected that all beneficiaries will contribute, and the entire consortium benefit from the outputs, as well as external parties (e.g., countries planning TDS).



Figure 11. TDS-Exposure Summer School 2014 (TUBITAK, TR)

The Organising Committee would like to thank all the chairs, speakers and the rapporteurs for their outstanding work to ensure a successful workshop and also to all participants for the valuable contribution, the useful comments and the inspiring debate experienced throughout the workshop. The organising committee also wants to express its sincere gratitude to the experts involved in the development of this report.

› 02: Project News

› Publications

Two publications about WP2 populations and substances are currently in press:

1. TDS-Exposure project: Relevance of the Total Diet Study approach for different groups of substances
2. TDS-Exposure project: Application of the Analytic Hierarchy Process for the prioritization of substances to be analyzed in a Total Diet Study

Also, an article is in press describing variations and trends (WP7): Establishing a food list for a total diet study: how does food consumption of specific subpopulations need to be considered?

› Future project meetings

The next Steering Committee meeting will be in September 2014 at RIVM in Bilthoven (NL), and the next General Assembly in February 2015 at ETHZ in Zurich (CH).

› Beneficiaries update

Following a structural reorganisation at the risk assessment public institutions in Latvia, the beneficiary **PVD** (Assessment and Registration Agency of Food and Veterinary Service) transferred its rights and obligations in TDS-Exposure to the Institute of Food Safety, Animal Health and Environment Pārtikas drošības, dzīvnieku veselības un vides zinātniskais institūts (BIOR, LV). BIOR joined the project on the 1st February 2013.

INRAN (Istituto Nazionale di Ricerca per gli Alimenti e la Nutrizione, Italy) changed its legal entity end to become CRA (Consiglio per la ricerca e la sperimentazione in agricoltura) by an inter-ministerial decree on the 18th March 2013.

AESAN (Spanish Food Safety and Nutrition Agency) merged with the Spanish National Institute for Consumer Affairs (INC) on 3rd February 2013 to become the Spanish Agency for Consumer Affairs, Food Safety and Nutrition (AECOSAN).

› Observers

TDS-Exposure has welcomed three organisations as “observers”, namely:

- Centre for Ecological-Noosphere Studies of National Academy of Sciences of Republic of Armenia – CENS (AL)
- State General Laboratory of Cyprus – SGL (CY)
- Scientific Institute of Public Health of Belgium – WIV-ISP (BE)

› TDS-Exposure: Introduction to EFSA Network for Chemical Occurrence Data - 8th April 2014, Parma (IT)



The objective of this presentation was to introduce the project to the Network for Chemical Occurrence Data members, and describe progress and initial outcomes. TDS principles, strengths and weaknesses, objectives, beneficiaries and national food authorities involved in the project, and project organisation were outlined. The presentation was appreciated and EFSA declared an interest in the outcomes of TDS-Exposure in general.

Karin Vin (ANSES, FR)

A discussion was initiated about the possible uses of TDS data in future evaluations of chemical substances realised by EFSA. EFSA is not opposed to the use of such data and would be interested in data generated by the project. Further collaboration will be sought between EFSA and the TDS-Exposure consortium to define the needs of the Agency. Issues concerning the limitations of these data, but also ownership, will be discussed.

› TDS-Exposure Summer School 2014 (Sunday 22nd June-Friday 27th June 2014) (TUBITAK, TR)

There were 17 delegates - selected by competitive application - from 12 organisations; nine TDS-Exposure beneficiaries and three external organisations, including an SME [IT], Turkish government [TR] and Uzhhorod National University in the Ukraine. There were 13 lecturers; nine TDS-Exposure and four external from WHO (retired), EFSA (IT), FAO (IT) and the Danish FoodInformatics (DK).

TDS-Exposure Summer School 2014, hosted by Türkiye Bilimsel ve Teknolojik Arastırma Kurumu (TUBITAK), was at the Aden Hotel in Kadıköy, Istanbul (TR), and the hotel embraced its temporary residents with support from TUBITAK.

Working in a second language is challenging, but with everyone in the same place there was time for more detailed discussion during lunch and dinner as well as a little

dancing on Monday evening, after sitting all day.

Delivering a summer school is difficult and TUBITAK, especially Hayrettin Ozer and his colleagues, is to be congratulated for an excellent location and relaxed atmosphere, balancing work and play, and ensuring the delegates got the most from the experience. EVIRA (FI) will host the TDS-Exposure Summer School 2015.



Sea of Marmara and the Bosphorus Strait looking towards Europe from the Aden Hotel, Kadıköy, Istanbul (TR)



Lawrence Castle (FERA, UK), Gerald Moy (ex-WHO) and Fanny Heraud (EFSA) deep in discussions ...



Véronique Sirot (ANSES) discussing criteria for selection of chemical substances and population targets



Gerald Moy kindly donated a copy of Total Diet Studies (Gerald G. Moy & Richard W. Vannoort – eds., ISBN 978-1-14419-7689-5, published by Springer) that was awarded to Michaela Suchánková (SZU) following a draw.

Figure 12. TDS-Exposure Summer School 2014 (TUBITAK, TR)

► Food safety challenges for Mediterranean products, 10-11th June 2014, Zaragoza (ES) - Aida Turrini, CRA-Nut (IT)

The workshop was organised by the Mediterranean Agronomic Institute of Zaragoza (IAMZ) part of the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM, www.ciheam.org) in collaboration with the European Food Safety Authority (EFSA). It represents the first activity of “SAMEFOOD” (SAfe MEditerranean Food), the network promoted by CIHEAM. A talk in the second session, about ‘Exposure assessment: Total Diet Studies’ examined new tools for risk assessment and was related to the definition of food lists, sampling plans, and collection of representative market

baskets, aimed at reflecting the average diet in a population group.

Representativeness is a keyword for every statistical sample. However, in the case of foods it is impossible to ‘know the universe’, which limits the feasibility of probabilistic approaches ensuring purchased food reproduce the total diet. This means errors do not derive from randomness and cannot be evaluated. The only alternative is to follow a study design trying to capture all the variants involved; reproducing all food groups – varieties and brands, regions, and

seasons, and purchasing them in the most relevant shops.

Documentation, procedures and tools are the pillars supporting the development of the three main steps; characterisation of food lists, defining sampling plans, and collecting foods, and these were presented by Aida Turrini (CRA-Nut) as an activity performed within TDS-Exposure (WP3 Food sampling: food products collection).

This paper will be published at <http://bit.ly/1mJ8G5S>

► Development and implementation of quality standard framework for TDS Centres in Europe: Publication of the European TDS Vocabulary

One of the main aims of TDS-Exposure is to harmonise methods for dietary exposure risks worldwide. Standardised methods and practices can be developed, but the end data may be worthless to other TDS Centres if the terms used are not clearly defined. Up until now, there has been no need to make data available for use, and therefore methods and terminology have evolved and developed in different ways over time. Based on this and the increasing need to share data trans-nationally, it is vital to make available a common language for all TDS Centres.

Construction of the TDS Vocabulary began by identifying TDS terms in the EFSA/FAO/WHO document ‘State-of-the-art on Total Diet Studies based on the replies to the EFSA/FAO/WHO questionnaire on national total diet study approaches’. This publication mapped the methodological aspects of TDS around the world, capturing common language. Terms were further identified and developed by guidance and standard documents such as CEN Standard ‘Food data – data structure’, publications, and by participants in TDS-Exposure who are experienced in TDS. During construction of

the vocabulary, it was clear this outcome is an important part for exchange of harmonised data amongst countries. Without a definition, terms such as ‘TDS list’ and ‘sampling food list’ are used to describe the same thing whilst being understood to be different.

The TDS Vocabulary can be found at (<http://bit.ly/Xv5Ywm>) and contains 209 terms considered relevant to TDS, including those related to set up and design; sampling and analysis; and data evaluation and dissemination. It also contains 29 terms related to the European Foundation for Quality Management (EFQM) model, which will help TDS Centres to assess quality procedures.

There is a constant need to update and expand the vocabulary. Currently, this is happening through work performed across TDS-Exposure, especially those involved in the TDS pilot studies (WP9). Please send any comments or suggestions for new or amended terms to hannah.pinchen@ifr.ac.uk.

Examples:

Sample acceptance criteria: Before registering the food at the receiving kitchen, any incoming dispatch should be checked for compliance with specific acceptance criteria following a “Food Receipt Check List” as detailed in a SOP (EFSA/FAO/WHO, 2011).

Food Basket: An assortment of foods representative for relevant aspects of a population’s diet.

Risk: A function of the probability of an adverse health effect and the severity of that effect, consequential to a hazard(s) in food (Codex Alimentarius Commission, 2005).

Specificity: The ability to assess unequivocally the analyte in the presence of components that might be expected to be present. Typically, these include impurities, degradants, matrix, etc. (Eurachem Guide, 1998)

› 03: Project partners

Coordinated by ANSES, the TDS-Exposure consortium includes 26 beneficiaries, including 10 research centres, six food safety agencies, five universities, four national institutes of public health, and one SME. The range of expertise covers: analytical chemistry, exposure assessment, food safety, epidemiology, statistics and modelling, and social sciences.



French Agency for Food, Environmental and Occupational Health & Safety



Ghent University



National Food and Nutrition Institute



Croatian Food Agency



National Health Institute



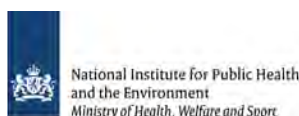
European Food Information Resource



Institute of Food Safety, Animal Health and Environment



TÜBİTAK Marmara Research Centre Food Institute



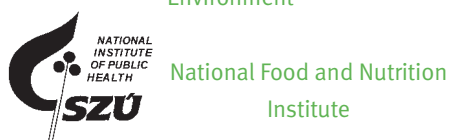
National Institute for Public Health and the Environment



Finnish Food Safety Authority Evira



University Rovira i Virgili



National Food and Nutrition Institute



Agencia Española de Consumo, Seguridad Alimentaria y Nutrición



Flemish Institute for Technological Research NV



Consiglio per la Ricerca e la Sperimentazione in Agricoltura Institute



The Secretary Of State For Environment, Food And Rural Affairs



National Food Agency



Federal Institute for Risk Assessment



National Health Institute Dr Ricardo Jorge



Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich



University of Granada



Norwegian Institute of Public Health



International Life Sciences Institute European Branch AISBL

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MATIS OHF





› 04: Contact us

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TDS-Exposure at a glance

- › Duration: 4 years
- › Budget: over 7,5 million Euros
- › Partners: 26
- › Countries: 19
- › Work Packages: 11

TDS-Exposure has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration (Grant Agreement no. 289108), and is coordinated by ANSES. This newsletter does not necessarily reflect the views of the EC nor is the consortium liable for any use of the information contained herein.