Workshop "Emerging Risks and Early Warning Systems"

Deelproject 1.2 Miniconferentie over vroegtijdig signalering en waarschuwsystemen.

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Colophon

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Summary

This report is the result of the workshop "Emerging risks and early warning system" held in Wageningen, The Netherlands on October the 19th 2006.

The workshop is part of the project "Emerging Risks in Dutch Food Chains" which is funded by the Dutch Ministry of Agriculture, Nature and Food Quality and supervised by the Dutch Food and Consumer Product Safety Authority. The purpose of this project is to develop a procedure to identify potential risks in the food chain in an early stage, allowing pro-active intervention on the identified risk. The duration of the project is 4 year (2005-2008).

For the second year of the project, 2006, the subproject 1.2 "Mini conference on early identification and (early) warning systems" was defined. This sub-project 1.2 was carried out, resulting in the preparation and holding of this workshop.

The aim of this workshop was:

- to learn form each others' experience and knowledge on early warning systems;
- to define the contours of a future Early Warning System;
- to discuss the role of the stakeholders and their perceptions on emerging risks;
- to exchange information on emerging risks and early warning systems.

In the first place a scan was performed to identify the already existing and in development (early) warning systems and the experts involved in this field. Based on this scan the speakers/systems were chosen in order to have a balanced set of presentations (different kinds of approach, different stages in development, different countries, etc).

This document describes the workshop in the same sequence as the programme of the workshop: short description of presentations, respective questions and detailed description of the discussion. Appendix 1 contains the slides of the presentations and Appendix 2 background information on the speakers and their (early warning) systems. This document is also the report of subproject 1.2.

In addition to this written document, the workshop is reported in the following interactive web site: http://www.afsg.nl/emergingrisks.
The web site presents the recorded presentations (both image and sound combined with the slides presentation) and the description of the discussion blocks.

Content

1 Introduction

This report is the result of the workshop "Emerging risks and early warning system" held in Wageningen, The Netherlands on October the 19th 2006. The main objective of this workshop was to discuss the possibilities of pro-active identification of emerging risks and exchange experiences and knowledge from (early) warning systems already developed or in development.

The preparation of the workshop is initiated with a scan to identify the already existing and in development (early) warning systems and the experts involved in this field. Based on this scan the speakers/systems were chosen in order to have a balanced set of presentations (different kinds of approach, different stages in development, different countries, etc).

The set up of the workshop allowed for enough time for discussion. In addition, large effort was invested in the preparation of the workshop to gather as much information as possible on the existing and in development systems that would be presented at the workshop. This information was processed in a document and sent to the participants some time before the workshop. In this way the participants could be fully prepared and the workshop could be focussed on the discussion rather than on the detailed content of the different systems.

This document describes the workshop in the same sequence as the programme of the workshop: short description of presentations, respective questions and detailed description of the discussion. Appendix 1 contains the slides of the presentations and Appendix 2 background information on the speakers and their (early warning) systems. In the following chapter the programme of the day is described.

In addition to this written document, the workshop is reported in the following interactive web site: http://www.afsg.nl/emergingrisks.
The web site presents the recorded presentations (both image and sound combined with the slides presentation) and the description of the discussion blocks.

2 Programme

Date: October 19, 2006
Venue: Nol in 't Bosch, Wageningen, The Netherlands

9:00 Reception with coffee/tea
9:30 Welcome and introduction of everyone (Floor Verdenius)
9:45 Introduction workshop (Fátima Kreft)
10:00 Presentation block I
- ECDC: Marco Baldari (Epidemic intelligence for public health)
- RIVM: Wilfrid van Pelt (Vigilance and signaling of human infectious disease events in the Netherlands)

10:20 Discussion block I: The setup of a emerging risks system
11:00 Break
11:20 Presentation block II
- DEFRA: Marion Wooldridge (Horizon scanning)
- VWA: Wim Ooms (EMRisk approach)

11:40 Discussion block II: Using emerging risks systems
12:30 Lunch
13:30 Summary of the morning session (Floor Verdenius)
13:40 Presentation block III
- TNO: Fred van de Brug (Automatic literature search)
- Wageningen UR -- AFSG: Lars Hulzebos (Causal network approach)

14:10 Discussion block III: How to ensure quality of information in emerging risks systems
15:00 Break
15:20 Presentation block IV
- LEI/Rikilt: Thom Achterbosch (Synthesis BO-project)
- FAO: Kisan Gunjal (Giews- system)
- EFSA: Djien Liem (Requirements early warning systems and the role of governments)

15:50 Discussion block IV: The future of Emerging Risk systems for the food chain
16:40 Summary of the afternoon (Floor Verdenius)
17:00 Closing remarks (Hans Marvin)
18:00 Informal gathering at the bar
19:00 Dinner in the restaurant

Mediator: Floor Verdenius

3 Description of the workshop (presentations and discussion)

3.1 Presentation 1: Workshop Emerging Risks and Early Warning Systems A&F - Fátima Kreft

Summary
The first presentation was given by Fátima Kreft. She gave an introduction in food safety and linked this to the purpose of the workshop.

Early Warning Systems and Emerging Risks
This workshop is part of the project "Emerging Risks in Dutch Food Chains" which is coordinated by Dr. H.J.P. Marvin (RIKILT- Institute of Food Safety) and is funded by the Dutch Ministry of Agriculture, Nature and Food Quality and supervised by the Dutch Food and Consumer Product Safety Authority. The purpose within this project is to develop a procedure to identify potential risks in the food chain in an early stage, allowing pro-active intervention on the identified risk. The duration of the project is 4 year.

The reason for working on this project is the realization that **food safety** is an important issue. All kinds of organizations are dealing with food safety. Moreover, public awareness and attention for food safety is high. At the same time, food and feed production gets more and more complex. Therefore, the need for pro-active prevention of risks grows.

In order to develop an emerging risks system, some definitions are needed. In the "Emerging Risks in Dutch Food Chains"-project, the following definitions were used:

- *Food hazard*: a biological, chemical or physical agent in food or feed with the potential to cause an adverse health effect.
- *Emerging Risk*: a potential food hazard that may become a risk for human health in the future
- *Incident*: the instance that the use of the product can or will result in adverse health consequences for animals or human beings; divided in different classes depending on the degree of severity of the problem to animal and human health.
- *Early Warning System*: a system or procedure able to pro-actively identify and prevent a potential hazard to become a risk.

Emerging risks may occur in many places in the food production chain. Each risk can be spotted by one or more indicators that are used to identify the risks. Each indicator has data sources connected to it that can be used to monitor the different indicators. There can be interaction between indicators and between data sources. The early warning system has the task to monitor the various data sources. By defining levels for specific indicators, the risk in the food chain can be quantified. Hereto, we have to take into account which interactions take place between data sources and indicators. When a risk is detected, the early warning system has to indicate how this

risk may propagate through the food production chain. In the system, we also need a definition of appropriate actions to be undertaken when something happens. All these factors need to be determined in the design of an early warning system.

In our approach, the holistic way of thinking is central. Consequences of this approach are e.g.

- The notion that emerging risk indicators may be both inside and outside the food chain.
- The use of a multidisciplinary approach covering products and processing, climate, economy, consumer behaviour, government politics, etc. etc.
- Taking into account the fact that a food production chain may have an international/global dimension

The identified stakeholders in our Early Warning System are: commercial companies directly involved in the production and distribution of the food in the food chain, National and European governmental institutes, scientists & experts dealing with food safety, consumers, NGOs in the area of environment, animal welfare and consumer organisations, and, last but not least, the press and media. These stakeholders may all have different priorities. The question how important a certain risk is in the eyes of a certain stakeholder becomes relevant, since it may affect the possibility to detect an emerging risk in an early stage.

Purpose of the workshop

The purpose of the workshop is to learn form each others' experience and knowledge and to define the contours of a future Early Warning System. One of the discuss topics will be the role of the stakeholders and their perceptions on emerging risks. Moreover, the willingness to exchange information will be considered as well.

As a result of the workshop, Wageningen UR will produce a document containing background information of the presented approaches, the presentation slides, and a written report of discussion. There will be a link to the website with the recordings of the presentations.

Questions from the audience:

- *Is radiation a potential hazard as well.* Answer from the author*: Yes.*
- *I miss nutritional hazards in the list (too much fat, too much sugar,…), is this deliberate?* Answer from the author*: Yes, it is missing because at first the focus within the project is the biological, chemical and physical kind of hazards. The definition of emerging risk is often disputable. The ministry of health includes nutritional hazards, food authorities do not. Part of our project has been to study the stakeholder's perception of emerging risks in the food chain.*

3.2 Presentation 2: Epidemic intelligence for public health
EDCD - Marco Baldari

Summary
A presentation about epidemiological intelligence activities at ECDC, the European authority charged with providing emerging communicable diseases risk assessment from a European point of view.

The European perspective

The European Centre for Disease Prevention and Control (ECDC) has been established as a European response to the exponential increase of goods, people, services and capital moving all around the world, which also entails an increased, much faster circulation of micro-organisms and the need of a coordinated Public Health approach throughout Europe. The ECDC has been tasked with establishing procedures for identifying emerging communicable disease threats and with identifying, assessing and providing information to MS (Member States), the EC and to the public about its findings. All such activities may be indicated as "Epidemiological Intelligence" (E.I.). The adoption of public health measures based on E.I. activities is not in ECDC's mandate.

Epidemiological intelligence: from data source to alert

The ECDC defines epidemic intelligence as the process to detect, verify, analyse, assess and investigate signals that may represent a threat to public health. Epidemic intelligence encompasses not only early warning activities, but also risk assessment and outbreak investigation. The activities of ECDC start with monitoring information. When a potential risk is detected, the corresponding signal is assessed. These activities are part of the epidemic intelligence process. The analysed information is subsequently communicated to the competent authorities, who may or may not act upon it.

The information that is monitored belongs to two categories. On one side there are the indicators provided by Public Health and other monitoring systems (environmental, behavioural, etc). These data need analysis and interpretation, after which signals pointing to Public Health problems might be generated. This is the "indicator-based E.I.". On the other side there are *events* of potential Public Health relevance reported as such by a series of sources, with a very different degree of dependability: these events need collecting, filtering, validating and assessing. This is the "event-based E.I.". Both branches of E.I. end up providing signals which need being assessed and – often - further investigated. What ECDC considers to be relevant for EU Public health becomes an alert.

The centrepiece of the E.I. process at ECDC is the daily round table, which supports the filtering process, provides to emerging threats assessment, re-assesses threats upon which measures have been taken, co-ordinates epidemiological investigations, concludes the follow-up of threats which have been controlled and decides on modalities to provide information to the stakeholders (ECDC uses several means to communicate, including a variety of bulletins).
To complete the threats assessment and communication cycle, a weekly video-conference with the health-threats Unit of the Commission (SANCO/C3) is held and it results in a weekly bulletin for the Commissioners.

The Epidemic Intelligence IT system at ECDC
The ECDC-PRU (Preparedness and Response Unit) has developed a threat database to facilitate the process of collecting, verifying, assessing and following up information on emerging communicable disease threats. This database (called the "Threat Tracking Tool") offers to the user the possibility to visualize currently followed-up threats, as well as to search among past ones or to insert new ones. It also has the capability to automatically generate reports and analyses.

Questions from the audience:
- *How does the filtering of information work?* Answer from the author: *Rather raw material is brought to the round table. ECDC assesses whether something is potentially important for public health. All grossly unlikely or un-relevant news are directly filtered out by those in charge of scanning the news. The rest is brought to the Round Table (RT). This way the incoming data stream to the RT is still manageable. The filtering at RT level is relatively intuitive.*
- *Who is participating in round table meetings?* Answer from the author: *The ECDC is made of three Technical Units: PRU (Preparedness and Response), SCU (Surveillance and Communication), and SAU (Scientific Advice). Each unit generally has one person at the round table. Sometimes guests participate as well (everyone officially visiting at ECDC is welcome).*
- *About statistics: you deal with many reports entailing potential threats. What is the percentage of "false alarms", that is of supposed threats that end up being nothing worth worrying about?* Answer from the author: *ECDC produces a yearly report. In this report statistics are provided. Anyway when something reaches up to the Round Table, and it decides it is worth following up, that event generally is confirmed as something really relevant. Note that ECDC only follows up threats to EU citizens within Europe (e.g., malaria, essentially threatening international travellers, is left out).*

3.3 Presentation 3: Vigilance and signalling of human infectious disease events in the Netherlands
RIVM - Wilfrid van Pelt

Summary
In the Netherlands, the institute RIVM is responsible for public health coordination with respect to control of infectious diseases at a national level. In this presentation, Wilfrid van Pelt gives an overview of the tools and techniques that are employed by RIVM for their public health task.

Infectious disease control at RIVM

The Netherlands are subdivided into 36 regions that have responsibility for disease control. The RIVM fulfils a coordinating role at the national level. At RIVM, a group of scientists, forming the Early Warning Committee, gathers each week to discuss possible events of human infectious diseases. Recent large outbreaks ("crisis") that have been discussed and have led to control measures by RIVM are Legionnaires' disease, avian influenza H7N7, Rubella, and MRSA.

Infectious diseases: from data to alert

When a human infectious disease is identified in more than one region, RIVM has the task to provide national control. The process of early warning identification starts with scrutinising data sources. These data sources consist of notifications and lab reports, rumours in professional networks and media, and international bulletins. Algorithms are used to find useful signals in the huge amount of data. The next step is to perform a first verification of serious signals. This is done by RIVM at the Centre for Infectious Diseases Control. In a weekly meeting with the signalling committee, consisting of microbiologists, veterinaries, clinical specialists, epidemiologists and food safety experts, the scrutinized signals are discussed and a decision is made on whether or not to follow up on the alert. A weekly report is composed for the inspectorate, the ministry of health, food safety authorities, municipal health services and other professionals involved in the control of infectious diseases in the Netherlands and entered in a searchable database.

The Infectious Disease IT system at RIVM

Reports of infectious disease alerts are entered into a searchable database open for the public that receive the weekly report. In this database, the type of disease, the data of detection and the location and other items of interest are shown. Statistical algorithms are used by RIVM to detect outbreaks. The algorithms are tuned to spot each outbreak, but not to give too many false alarms. Demographic factors are taken into account in these algorithms. The algorithms have proved to be successful for pathogens that have a good national coverage like salmonella.

Questions from the audience:

- *What does RIVM store and keep in the database? Do you store the complete decision making processes?* Answer from the author: *For Salmonella-detections RIVM has a database that goes back to 1984. This database is used by the algorithms each week. The decision making process is also stored in the database.*
- *In one of the graphs the expectation curve seems to be a poor prediction. Is this true?* Answer from the author: *No, certain pathogens are detected only once a year, the expectation is quite low, of course incidents peak above the expectation curve!*
- *Does the expectation curve differ each year; is it a process of trend watching? How does the expectation curve come into existence?* Answer from the author: *It depends on the time series. It depends on how the trend was in the past. So RIVM does not use external sources for additional information?* Answer from the author: *No, the expectation curve is based on a mathematical model. The cases that are spotted occur sporadically, so incidents (that are filtered anyway) do not play an important role into the prediction of*

occurrence levels in a next month. RIVM has chosen to use an empirical model, made possible due to the high quality of the data.

- *Defra has done something similar, but to set-up a well-predicting model is very difficult, because many things need to be taken into account. This is especially true in a holistic approach.* Answer from the author: *True, but calibration on the basis of empirical data is still very important.*
- *There seems to be confusion on how expectations are formed. How does RIVM do this?* Answer from the author: *RIVM uses an empirical data model.*

3.4 Discussion Block I

Discussion Block I

One important issue in early warning systems is how to take into account the quality of data on which warnings are based. We have seen a lot of human interpretation of data in the previous presentations. When we talk about early warning systems that are computer-based, we need to know how to balance the available data. What are the ideas on this subject?

Automatic Early Warning Systems and the task of experts

An early warning system can be used to automatically detect signals of potential hazards. The general feeling, however, was that a human expert will always be necessary to validate and interpret these signals. The experts have to decide whether action should be undertaken and if so, which actions are called for.

When using experts, the risk exists that the background of the expert introduces a subjective assessment of a signal. To overcome such a bias, the experts should work in teams and the composition of these teams should vary on a regular basis.

The participants of this discussion feel that, at present, finding early warning signals with an AI-system is difficult. When the amount of input data grows and the signals that are to be assessed are not known on beforehand, they believe that the use of computers for (semi-)automatic analysis of the data becomes necessary.

Accuracy of Early Warning Systems

Obtaining representative data as input for early warning systems is extremely difficult. Even when the gathering of data is more or less regulated on a local scale, global data gathering is infeasible at present. In many cases, it is not on beforehand known which outside factors (in terms of data sources and signals) need to be monitored. This only complicates the problem. Different data sources require also different handling procedures.

The accuracy of the early warning system is influenced by a number of factors. Firstly, one needs a good overview of the signals in a "normal situation". Secondly, the accuracy with which

indicators can be determined influences the quality of the assessment. Thirdly, the development of a good filter for relevant signals, decreases the number of false alerts in the system. Finally, the system itself depends on a number of algorithms that are – in general – iteratively refined. The more iterations the system has gone through, the more accurate the system will be.

Objectives of Early Warning Systems

Early Warning Systems can serve many purposes:

- Identification of emerging risks in order to decide on action: this purpose serves short-term decision making and is for policy makers the most interesting.
- Identification of increasing trends in emerging risks to understand what is happening at a micro-organism level: this analysis calls for long-term research. This is scientifically the most interesting.

At present, most participants of the discussion are working on picking up signals of possible emerging risks, analyzing these signals, advising the policy makers on the actions that need to be undertaken. Understanding outbreaks after their occurrence has a lower priority. Prediction and anticipation has (in most cases) no priority, although this becomes easier when the reason for the occurrence of incidents becomes more detailed.

Note that in Early Warning Systems, users work with three types of levels of a signal: the normal level (when no incident is occurring), the expected level (based on a number of factors), and the acceptable level. This last level indicates when a signal should be assessed as a risk. This level is of importance for the decision makers.

3.5 Presentation 4: Emerging Risks and Early Warning Systems and Horizon Scanning DEFRA - Marion Wooldridge

Summary

Marion Wooldridge has presented the early warning approach that is used at VLA. The purpose of this approach is to provide DEFRA with information and early warnings by monitoring trends and changes and by identifying new diseases and pathogens.

Structure of VLA

VLA is a DEFRA science agency that performs surveillance with the objective to identify trends and changes in measured levels of micro-organisms, to identify new diseases, and to use this information to supply Defra with Early Warnings. Hereto, VLA has a number of research and reference labs. They also have regional labs that house Veterinary Investigation Officers (VIOs) who focus on investigating outbreaks on farms. The focus of VLA is on animal health and welfare as well as on veterinary public health.

Farmfile/VIDA – Horizon Scanning

The data that are gathered by the VIOs are stored in an appropriate database. All databases are accessible at the headquarters of VLA in Weybridge. Here, researchers analyse the data in the databases. Typical information in the databases consists of farm and animal details, clinical pictures, samples, tests, diagnoses, and routine reports with trends. Early warning potential is indicated as well.

Statistical methods are used for trend identification. This is called horizon scanning. At present, a baseline threshold has been established for Salmonella and seasonality is taken into account. There are still methodological issues to improve predictions of seasonality. VLA tries to expand the scanning to other pathogens than Salmonella and to VIDA non-diagnosed cases.

Specialist Species Groups

VLA has set up a number of specialist species groups. They consist of VIOs with specialist interest and knowledge, and representatives with e.g. bacteriological, virological, pathological backgrounds. The purpose of these specialist species groups is to investigate outbreaks. A systematic approach has been thought of: the chair of the species group is notified if there is an undiagnosed case of interest, an unexplained trend, or a cluster of undiagnosed syndromes. The species groups can then set up an investigation (with appropriate priority).

Another way to utilise the databases are the rapid farm level qualitative risk assessments. The goal of these risk assessments is to rapidly estimate risks of the spread of pathogens or diseases on a farm, the risk of such a spread to farm workers and other humans, and the risk of a foodborne or animal product spread. This risk analysis helps in deciding who needs to be notified, what safeguards are necessary, and whether or not long-term research needs to be started up.

Conclusion

VLA has a large network of laboratory capacity, VIOs and research at its disposal. On a routine basis, scanning surveillances are being executed and the gathered data are stored in a database and analysed. Moreover, species groups and risk assessment mechanisms are in place, enabling interaction of all above. In the project "delivering intelligent surveillance" data mining from publications, geographical information systems for visualisations, and data analysis from existing databases are included to maximise interaction of all available information.

Questions from the audience:

- *VLA has an internal look at the problems, is there any calibration for what is important to humans?* Answer from the author: *Yes, there is a link with Human Health. If an outbreak occurs, VLA is asked to trace it back to the farms. Many projects are jointly funded and analysed between department of health, food safety authority and the work of VLA.*
- *Is this a purely national system? FAO has opened a crisis management centre, does VLA deal with international importing of risks?* Answer from the author: *VLA regularly assesses imported risk.*

Moreover, VLA has a network of reference laboratories that do a lot of tests. Among these are also international products laboratories that gather information in a database. In addition: VLA looks at animals around the country. This also links to the import risk analysis.

3.6 Presentation 5: Systematic Identification of Emerging Risks: a Holistic Approach VWA - Wim Ooms

Summary

Wim Ooms presented the holistic approach to the identification of Emerging Risks in Food and Feed (for human health) as developed within two consecutive European projects, funded by the European Commission and EFSA respectively and coordinated by the Dutch Food and Consumer Product Safety Authority (VWA).

Rationale for the need for Emerging Risks Identification

In recent years, the food production chains have become more and more complex. The General Food Law and the Law on Independent Risk Assessment introduced the requirements for EFSA and VWA to act proactively concerning food supply chain risks. The approach to emerging risk identification that has been developed by the consortia led by VWA (next referred to as VWA-consortium) has the objective to develop a procedure to *prevent a potential hazard from becoming a risk for human health*. In the search of the VWA-consortium for potential hazards, diet-related issues are also taken into account.

Type of hazards

The VWA-consortium recognises three types of hazards:

- Unidentified new forms of a group of known hazards, *e.g.* a 'new' mycotoxin
- Not well-known hazards, *e.g.* acrylamide
- Re-emerging hazards, *e.g.* avian flu

The assumption in the approach is that knowledge of food, feed or diet related matters will provide all relevant information on hazards. When a risk is as yet unknown, studying the food, feed and dietary related matters is essential, but may provide insufficient information. In that case, it is important to study the environment related to the feed and food supply chain as well.

The chosen approach

The VWA-consortium has developed a *holistic approach:* for identifying emerging hazards, not only information is used from within the food supply chain but also information from outside the food supply chain. The VWA-consortium has identified the following sectors as having an impact on the food chain:

- Environment & Energy
- Government & Politics
- Industry & Trade
- Populations & Social conditions
- Health & Welfare

- Agriculture
- Economy & Finance
- Information & Communication
- Science & Technology

Together with the feed and food sector chain these sectors form the host environment of the food supply chain. In the above mentioned projects, the VWA-consortium has worked on the problem of how to obtain possibly relevant information systematically. In the Periapt-project, the focus was on identifying the most critical factors in the above-mentioned sectors. The Emrisk-project, focuses more on important indicators and information sources.

The approach

To identify emerging risks, first the influential sectors were identified and especially their proximity to the food supply chain and its potential hazards. The closer the sector is to the food supply chain, the more influence it has on potential hazard development, the more important it is, and the closer it should be monitored. After identification of the relevant sectors, the critical factors within each sector need to be determined. With these factors known, corresponding indicators can be pinpointed and relevant information sources can be identified to obtain values of these indicators. The changes in the values of the indicators must be scientifically evaluated and the results communicated to the relevant authorities.

As an example, it is relevant to develop indicators in the sector "nature and environment" for monitoring a new mycotoxin. A critical factor is the climate and an indicator for the climate condition is for instance the (monthly) amount of rainfall. To predict any, preferably measurable, changes sufficient information is needed from climate scenarios and climate modelling, which will be available at meteorological institutes.

Conclusion

The conclusion is that it is worthwhile to pursue the holistic approach taken by the VWA-consortium. Necessary information from the host environment can be gathered by identifying indicators and linking these to the relevant data sources.

Questions from the audience:

- *Did the used experts prioritise the indicators?* Answer from the author: *Yes, this was the most difficult part, especially since indicators may influence each other. These relationships also needed to be weighted. The results are available on the EFSA-website, more details are available on request.*
- *Did VWA use an expert decision tool?* Answer from the author: *Yes but only for determining the relevant influential sectors and critical factors. Not for prioritizing the indicators, since there was not enough time to do this.*
- *Is there already a view on the real areas where VWA expects the most problems?* Answer from the author: *Yes, VWA decided to firstly address the sectors of agriculture, environment, and health. In a later stage, more areas will be taken into account. The host environment that takes all these sectors into account is*

not yet finalised and sustainable. To make this host environment more sustainable it is necessary to convene more workshops on this topic of identifying sectors, factors and indicators

- *How did VWA conclude that these sectors are the most important?* Answer from the author: *The most important sectors are identified based on the proximity to the food supply chain in which the potential hazard will occur. This selection was based on the assessment by experts.*
- *Does this mean that data collection process differs over time?* Answer from the author: *Yes, it does. It is a dynamic world we live in and that will be reflected in the host environment of the food supply chain. That raises reliability issues, since the decisions on what things to include influence the safety of the system.*

3.7 Discussion Block II

Discussion Block II

Reliability of data for risk assessment

An emerging risks system can only function well when the data on which the analyses are based are complete, reliable and objective. To illustrate the importance of this point and the occurring difficulties, the following example was used. In the case of DEFRA, Veterinary Investigation Officers (VIO) play an important role in adding data into the database. Ideally, the VIOs are brought in on a case by local veterinarians when something odd is observed. They analyse the case and enter the data into the system. If the farmer does not warn the veterinarian, however, or if the veterinarian does not warn the VIO, then relevant information may get lost.

It is important to note that farmers may not always want to report relevant information. This is because (i) it costs money to call in a veterinarian, or (ii) if the disease turns out to be contagious, the livelihood of the farmer could be in danger. The moral responsibility of the stakeholders plays also an important role in the reliability of the system. The World Bank and several governments have come up with a financial compensation, to make sure that farmers report occurring cases. By ensuring that as many data as possible are gathered in the emerging risk system, the risk analysis becomes more reliable, since it is based on a large data set.

Even when most cases are entered into the database, the process of risk analysis may miss certain symptoms. If for example two veterinarians describe a problem in natural language, but use different terminology to do so, the detection of multiple occurrences of the described problem may become difficult when the likeliness of the symptoms is not recognised.

An additional issue for successfully performing the risk assessment task is the uncertainty of which information may be relevant. When a syndrome is unknown on beforehand, it is difficult to indicate which data sources may contain relevant information and need to be monitored.

The role of the expert

In most emerging risks systems, the risk assessment is performed by human experts. They analyse and interpret the data and communicate their findings to the risk managers. The use of human

experts has a certain risk, though, since they may not be objective with respect to the risk to be spotted. The personality or background of the expert may have influence on the interpretation of the signals. Data may get coloured, due to the perception of the expert. In the most extreme cases this may lead to the detection of 'self-fulfilling prophecies': an expert notices a signal, identifies it as important, and looks for any occurrence of the signal that amplifies it. This process of 'hyping' a signal may occur unintentional, but the current funding system also strengthens the deliberate hyping of certain interesting signals to obtain additional research grants.

To overcome these issues, one could choose to rely not on one expert, but on a multidisciplinary team of experts and stakeholders. As additional parameter in the risk assessment, one could take statistical information of the occurrence of signals and the reliability of the information into account.

The role of an autonomous data analysis system

In general, an early warning system can be used to facilitate the process of risk detection. However, it can only be used to support the experts, not to replace them. This is because an early warning system is indeed capable of detecting signals, but not of automatically filter signals on their importance, since it cannot assess whether a signal is amplified or reduced. Filtering is the link between data picking and the required action afterwards.

An early warning system that operates autonomously is a big asset in case one does not know which indicators may be important. In case you want to be vigilant on a broad scale, looking for unknown risks, you need a large data set and a (semantics-based) software module to analyse the data. Note, though, that the availability of many data may lead to the detection of many false alarms. The filtering of these alarms is difficult, but relevant. The risk manager needs to get a clear advice on which risks he/she needs to act upon.

3.8 Summary of the Morning Sessions

In the first session, the focus was on the setup of a risk management system. It turned out that in general, an emerging risk system consists of five parts. These parts are displayed in Figure 1.

If any tools are to be used in the process of risk assessment, it will be most likely happen in the first two steps. From the moment of hazard identification, human experts take over. They interpret signals and present their conclusions to risk managers. The risk managers decide whether or not preventive or curative action needs to take place. Whether a tool for signal detection and data interpretation is desirable, is still a point of discussion. One relevant factor in this decision is whether the system looks for known or unknown risks.

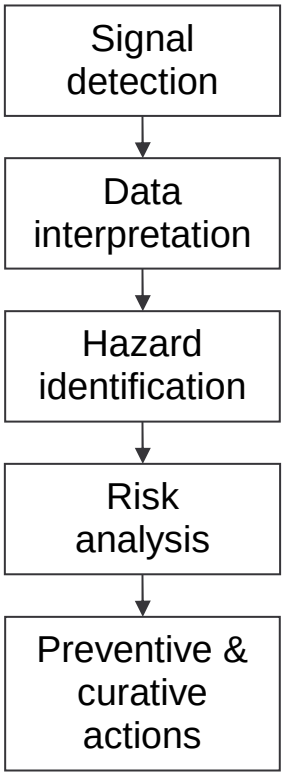


Figure 1: The five stages of an emerging risk system

With an emerging risks system, two approaches are possible. The system can be used to learn how risks come about from a scientific point of view, or to give a risk assessment that can be used to decide how to act on the identified risk.

From the step of hazard identification, human experts interpret data and make a risk assessment. The use of experts is ambiguous, since they are influenced by their own history and viewpoint. Therefore, their judgment may not be objective. To overcome these subjectivity issues, one can *e.g.* bring experts with a multidisciplinary background together in a round table session. The most important question to answer is whether the experts assessment is objective enough or not.

3.9 Presentation 6: Early Identification of Emerging Risks TNO - Fred van de Brug

Summary

Fred van de Brug presented the Emerging Risks Identification System which TNO is developing in the Food Informatics sub programme being part of the VL/e-project. This information system will help us with preventing food safety incidents like we have had in the past.

Focus

The scope of the TNO project fits very well with the subsequent EU projects Periapt and Emrisk in such a way that the information system will use as input the information sources that have been classified as relevant by the Emrisk project. TNO focuses on the processing of the analysed information sources. The purpose of the approach of TNO is to identify emerging risks in an early stage.

Consortium

In the Dutch national project VL/e (Virtual Lab e-Science), research is done on development of ontologies and other knowledge management tools. The five partners in the Food Informatics consortium, Unilever, Friesland Foods, TNO, WUR and WCFS have defined common requirements to resolve their individual case studies. The case study of TNO is about detecting emerging risks in an early stage. So far, on the basis of a historical case study, an ontology (knowledge model) has been created, and the developed tools will be evaluated using the historical cases 'acrylamide in fried food (2002)' and 'dioxin in kaolinitic clay (2004)'.

The historical cases 'acrylamide in fried food' and 'dioxin in kaolinitic clay'

In 1997, results from occupational studies on acrylamide (acrylamide in the blood of non-exposed non-smoking persons) were published outside the food domain. In 2000 acrylamide in rat blood was linked to fried rat feed. Only from 2002, we became seriously aware of the danger of acrylamide in fried food. A solution to lessen the occurrence of acrylamide in fried food was presented in 2005.

With regard to dioxin, already in 1997 the FDA warned about the possible presence of dioxin in kaolinitic clay and that kaolinitic clay should not be used for production of feed. However, in 2004 a Dutch company used kaolinitic clay for the sorting of potatoes.

Approach

TNO wants to combine pieces of published data to meaningful information. As data sources, TNO documents, selected websites, public & commercial databases and information supplied by TNO consumers are used. These documents are processed and analysed using the Food Informatics system, and the output is evaluated by a risk analyst.

Conclusion

The Food Informatics tools create links between pieces of information. Risk managers can come into action based on the output of the system. The early detection of emerging risks will reduce the possibility of threats to human health and economical damage as a result of food safety incidents.

Questions from the audience:

- *Does the system depend on the used language in the various data sources?* Answer from the author: *TNO primarily focuses on English documents. Additional language modules cost money and will only be added when they are necessary.*
- *Are systems that are not based on natural language, not better suited for this problem?* With those systems, you only have statistical data and you miss a lot of information.
- *Do the Food Informatics-partners all develop the same system?* Answer from the author: *No. There are some generic modules that can be used by any user group, but each Food Informatics partner adds his own tools. The combination of the specific modules is unique, and defines the application.*

- *Is the system text based or context based?* Answer from the author: *It is context based.*
- *Is the system self-learning?* Answer from the author: *In the future hopefully yes, but this is still part of a dream.*
- *How does TNO relate to e.g. VWA?* Answer from the author : *TNO is an independent R&D organization. We do a lot of work for Dutch and EU government. We get a large amount of funding of government.*

3.10 Presentation 7: Emerging Risk Detection Support A&F - Lars Hulzebos

Summary

Lars Hulzebos presented a prototype for the holistic approach to emerging risk detection. This approach is being developed by several institutes of Wageningen UR, together with VWA and the Ministry of Agriculture, Nature and Food Quality.

Approach

For the early warning system, a knowledge model has been developed in which food safety activities are divided into four major areas.

1. *Early warning detection:* in this area, the monitoring of food chains takes place. Measurements are made, samples are taken and detected values are compared to the detection threshold of the phenomena of interest. The result of activities in this area is a report with possible food safety hazards.
2. *Risk communication:* in the area of risk communication, risk analysts decide how to act on the reported potential hazards.
3. *Food safety research:* on a longer time-scale, academic and industrial research is done in the field of food safety. Knowledge gaps are detected and new research is carried out to fill these gaps.
4. *Emerging risk detection:* in the field of emerging risk detection, knowledge from early warning systems and from food safety research are combined and used to detect emerging risks. When emerging risks are detected, they are not only reported to the proper agencies, but they are used to improve the response to future threats from the existing early warning systems as well.

One of the key elements in the presented approach is the realisation that a food safety network is holistic. This means that many areas are related to the food production chain, and all these areas may have an effect on food safety. This is closely related to the presented holistic approach by VWA.

False alarm elimination

By gathering knowledge from many related areas of the food chain, one obtains an enormous amount of data. In order to eliminate irrelevant risks on beforehand, the project consortium has developed an associative-thinking tool to support the food safety expert in creating a 'knowledge filter' for relevant and irrelevant risks. An important requirement for this activity is to keep the resulting information from the emerging risk detection support system manageable.

ER detection process:

The process that is carried out by the Emerging Risk Detection System consists of two major steps:

- *Focus of the Food safety expert:* the food safety expert has to answer the question whether there is a link between two detected phenomena. If so, a possible causal path is found.
- *Zooming in on a causal path:* on all possible causal paths, "what-if"-scenarios and diagnostic analyses can be carried out. In a "what if"-scenario, a question is raised and all consequences are determined and calculated. In the diagnostic analysis, the cause of an occurring emerging risk is traced.

Prototype

Using a rapid prototyping method, a first version of the future emerging risks system has been developed. The purpose of this prototype is to make emerging risk detection process tangible for users and researchers. The demo-website already has the following functionality:

- It is possible to select sectors of interest and two terms in these sectors for which causal paths need to be found.
- The system can indicate all paths between the two selected terms (nodes) in a network on a high level.
- The food safety experts has the possibility to perform "what if" scenario's by changing the values along one or more found paths. The consequences of these changed values are being propagated along the selected path.
- The system presents to the food safety expert a summary of the steps that the system has taken and the corresponding conclusions.

The development of this tool is still work in progress.

Conclusion

The combination of food chain related knowledge from a holistic point of view, together with the possibility to perform "what if"-scenarios and diagnostic analyses offer additional value for the food safety expert. In the near future, the system will be extended. Optimal support of emerging risks detection by fine-tuning functionality and content will be implemented.

Questions from the audience:

- *The presented model showed the identified pathways. Does the model take into account how likely a pathway is?* Answer from the author: *No, the probability is very qualitative, the system triggers the knowledge of the food expert. For now, such weights on possible pathways are too complex to handle, we may work on this in the future. How useful is the system if you do not know the relevance of some pathways? Do you put in expert knowledge in the nodes?* Answer from the author: *Yes, from experts from different fields. From experience, we know that probability and possibility are easily confused by experts. In our opinion, probability of the pathways is relevant.*
- *So, do you need some risk assessment per node?* Answer from the author: *Yes, we do.*
- *To what extend is this approach generic? Do you need case by case specific modules to design?* Answer from the author: *The network will grow and grow with every case. So,* w*ith every case you improve your system and in the end it is generic?* Answer from the author: *Yes, that is true.*

3.11 Discussion Block III

Discussion Block III

We have seen two approaches to risk assessment. Both systems have assumptions on quality of information you can get from the systems. What should the quality be and how do you guard the quality of the input data?

A short overview of the two presented systems
In the previous session, the Wageningen UR system and the TNO system have been presented. The prototype that was presented by Wageningen UR was based on a case study on salmons. The amount of relevant nodes and paths in this case study was still manageable. When the system is expanded, many nodes and paths will be added to the system. In the future, the user interface of the presented system will be improved, and the content will be expanded.

The purpose of the Wageningen UR system is (i) to detect pathways and (ii) to perform simulations on these pathways. By adding more and more information to the system, the information will get more complete. In practice, only part of all relevant information can be contained in the system. If the system can come up with pathways that were unknown to the expert, but that turn out to be valid, the expert has benefited from the system. This system will support the detection of re-emerging risks without additional expert interviews; for new domains, a knowledge acquisition activity needs to take place. Note that experts are considered to be an important source of new knowledge.

The system that was presented by TNO shows the user a ranked list of potential risks. On the basis of this list protocols are invoked. The user can tweak the used filter at will to obtain relevant output. How the output is dealt with is outside the scope of the system.

The input knowledge is important in the TNO system. When more information is available, the system becomes more and more reliable and objective. Users and stakeholders can provide information to the system.

The Wageningen system and the TNO system are complementary. The TNO system could be used to present relevant input data to the WUR system. As an example: in the dioxin clay case, the fact that McCain started using clay to sort potatoes could be presented as a new path in the Wageningen system. The TNO system should be able to monitor press coverage and present the link to the Wageningen system. For the TNO system, the input sources are mainly databases and the internet, while in the Wageningen system, the input is chiefly provided by human experts and databases.

Determine the quality of an emerging risks system

In general, it is difficult to assert the quality of an emerging risk system. As an initial check, one can look at some example cases and see whether the output of the system equals the expected output. In a later stage, you have to assess the quality of the system in unknown, real-life circumstances. This is extremely difficult. When a quality assessment can be made, though, it can be used to implement a self-learning capacity into the system. That way, the system will get better and better in time. The underlying knowledge models (ontologies) need to be updated as well on a regular basis.

In general, it is better to produce false alarms, than to miss real issues. It is probably impossible to be certain that *all* emerging risks are detected. A system cannot only scan more data, it is also a tool to support the user in organising the information. This helps the user in reducing the number of issues that are missed.

Quality issues

One important aspect for the quality of the system is determined by the filtering procedure used to filter out false alarms. The value of the used procedure is in general difficult to assert in an objective way, the stakeholders play an important role in validating the quality of the output of an emerging risks system. One of the next steps in improving emerging risks systems is to get a good grip on the prioritizing of the output information.

3.12 Presentation 8: Emerging Risks in the Dutch Food Supply Chain: Scoping Studies LEI - Thom Achterbosch

Summary

Thom Achterbosch (LEI-Wageningen University and Research Centre) has presented a study performed by several WUR institutes to examine the purpose of emerging risk identification and to identify relevant indicators connected to the host environment. The presentation presents the synthesis of these scoping studies, which is available in draft from the presenter. The final version becomes available from RIKILT in 2007.

Rationale

Emerging Risk identification becomes more and more important in the food supply chain. In recent years, the responsibility has shifted from the government towards the food chain partners (including the consumers). The globalisation of trade flows, the dynamic character of food industries, consumers and policies, and the wish to minimise the number of food related incidents, has lead to an increased interest in emerging risks identification.

With emerging risk identification, the WUR team refers to *a system or procedure aimed at identifying potential food hazards, allowing proactive interventions that prevent a potential hazard from becoming a risk*. In the four-year Wageningen UR program on Emerging Risks (see presentation of Lars Hulzebos),

the team has used the first year to perform host environment studies. The result of this activity was an insight in relevant indicators for risk identification.

Perspectives on emerging risks
The case studies resulted in the realisation that many different views on emerging risks exist at the different stakeholders. Each stakeholder has another perception on the necessary conditions to further build trust in the food safety system. A broad scope is necessary to keep all stakeholders positively involved.

Risk analysis from an emerging risks point of view is an intertwined activity; one has to anticipate on the assessment of emerging risks, one has to focus on communicating appropriate actions, and one has to work on preventing risks from re-emerging in the future.

Current behaviour of stakeholders
When an emerging risk approach is developed, the current behaviour of food chain partners and consumers is an interesting subject for research. The factors that influence producer and consumer behaviour comprise important information for the identification of risk, and the prioritising of signals on risk. When these factors are known, appropriate filters for sorting obtained emerging risks information can be created.

Conclusion
With the results of the host environment studies in mind, a case study on fish feed will be performed. One aspect of the future work is to link emerging risks assessment to risk profiling and to risk-benefit assessments.

No questions from the audience to this presentation.

3.13 Presentation 9: Workshop on Emerging Risks and Early Warning Systems FAO - Kisan Gunjal

Summary
Kisan Gunjal presented the FAO's Global Information and Early Warning System of Food and Agriculture (GIEWS).

History
In 1975, the GIEWS system on food and agriculture was established with a primary purpose to monitor the food supply and demand situation at national, regional, and global levels to provide early warnings of impending serious food shortages or food emergencies. The focus of GIEWS is on food security, *i.e.* the access to and availability of safe food. The GIEWS system is used to spot a shortfall in aggregate food supplies, the widespread lack of access to food, and cases of severe localised food shortage. The food crisis in the early 1970s in Western Africa was the main

reason to start monitoring the worldwide food situation. Since then the system is used for continuous monitoring of all member countries. Unfavourable prospects for countries are assessed. A broad approach is used: rainfall, earthquakes, social-economic factors, and war-conflict situations are taken into account as important indicators. In some cases a country can produce enough food, but it may happen that not all groups of the population have access to the produced food.

As an example of the worldwide coverage of the system, a map of the world was shown in the presentation, on which some 40 countries with detected food insecurity issues was shown. FAO considers emerging risks to be factors that will turn into a fact within a short time unless adequate mitigating measures are employed. The GIEWS system has maintained database since the early 1980s.

Publications

The GIEWS system provides a number of publications on food security. These are (i) crop prospects and food situation, (ii) food outlook reports, (iii) the Sahel reports, (iv) latest country updates, and (v) special reports and alerts. These reports are available over the internet. In the web-based interface, detected risks are projected on satellite obtained maps.

Conclusion

The FAO/GIEWS is the most globally complete system that monitors worldwide both natural disasters (heavy rainfall, drought, earthquakes, volcanoes, floods, locusts, avian influenza, etc.) and man-made disasters (war, civil strife, currency/economic problems, etc.) affecting country's food supply and food security. One can clearly see an increase in man-made disasters over the last thirty years.

Questions from the audience:

- *Are there specific crops that FAO is monitoring for food supply?* Answer from the author: *This is the case for food supply, but for general analysis FAO also looks at cash/export crops, and livestock.*
- *What is the timeframe of the FAO database, does it get data each year?* Answer from the author: *Scanning input is provided on a daily basis in collaboration with WFP (World Food Programme). Weather information, ground level as well as satellite based, is added to the database in 10 days intervals.*
- *Is the increase of emergencies factual, or is it due to an increased quality of the information flow?* Answer from the author: *It is not due to a different definition of emergencies. However, the monitoring has improved, so it is likely that we spot more cases of emergencies. The countries are also quicker in reporting emergencies.*
- *Are the used critical factors still the same as in the 1980s?* Answer from the author: *They have changed, they used to be mainly crop-oriented. Nowadays, more and more economic factors are included.*
- *Is there a weighing process in the use of the factors?* Answer from the author: *No, whatever is accessible is used.*

3.14 Presentation 10: The Future of Emerging Risk Systems For The Food Chain EFSA - Djien Liem

Summary
Djien Liem presented about the task and tools of EFSA, the European Food Safety Authority, with respect to emerging risks and early warning.

History
EFSA was founded in 2003 with the task to establish monitoring procedures for systematically searching for, collecting, collating, and analyzing information and data with a view to the identification of emerging risks in the fields within its mission. These fields are the areas of food and feed safety.

Activities
EFSA funded the EMRISK project. EFSA has requested advice from its Scientific Committee on the preferred functionalities an emerging risk system needs to establish, on procedures for evaluating and prioritising identified issues, and on an operational system to maintain appropriate contacts in a network that systematically collects information on emerging risks from identified sources. The Scientific Committee included its advice in a guidance document that has become available in July 2006 together with the report of the EMRISK project.

The Scientific Committee identified various data sources many of which are available in writing (e.g. publications, reports). Experts, stakeholders, NGOs, food agencies, and international organisations have also been identified as a relevant source of information.

Cooperation
EFSA strongly believes in cooperation with Member States and sister organisations to build its emerging risk capability and intends to investigate the functionality of early warning or horizon scanning systems that already exist. A few examples of these are:

- GPHIN: a tool developed by the public health agency of Canada. It is a secure, internet-based "early warning" system that gathers preliminary reports of public health significance in seven languages on a real-time basis.
- INFOSAN: the international food safety authorities network of the WHO. This system caters to the need to exchange food safety information and to improve collaboration among food safety authorities at national and international level.
- Pathfinder: developed by the Centres for Epidemiology and the Animal Health Centres for Emerging Issues.
- GOARN: the Global Outbreak and Alert and Response Network of WHO.
- GLEWS: the Global Early Warning and Response System.

Emerging Risk Procedure
EFSA is developing a procedure to detect and verify emerging risks. Such a procedure would probably consist of various filtering steps. The signals that then would remain could then be forwarded to a Scientific Panel for a more comprehensive risk assessment.

Conclusion
At the end of 2007, EFSA aims to have an operational horizon scanning tool in place (in collaboration with other organizations). Hereto, a global perspective, a holistic approach, close international collaboration, and multidisciplinary filtering are considered to be important. In order to let the system function properly, free exchange of information between Member States is important.

Questions from the audience:

- *Can you elaborate on system that you want to have next year?* Answer from the author: *We should at least have something that is partly based on an IT-system in house. We want to have procedures in place for further evaluating signals, filtering etc. Moreover, we want to add a structured way to dealing with possible relevant signals. This should be implemented as a first step.*
- *Do the experts have the possibility to work intensively on an issue on short notice? Our staff would like to contribute, but cannot without funding or planning.* Answer from the author: *We have tried to set up a list of organisations to assist EFSA in this work. The list is expected to be adopted by EFSA's Management Board before the end of 2006.*
- *Could you please elaborate on the issue of trade?* Answer from the author: *Foods are distributed all over Europe. Risks can spread quickly.*

3.15 Discussion Block IV

Discussion Block IV

In this discussion block, we focus on the future of Emerging Risks.

Gathering of data
Any emerging risk system has to have sufficient input data. FAO collects data from secondary publications, but also from information provided by member countries. The governments of these member states make sure that data are gathered. Some countries are assessed manually. In most cases, the manual assessment of data gets replaced by automated assessment, usually with an increase in the quality of the data.

Commitment of stakeholders
Governments can play an important role in ensuring the availability of relevant data. This is true for both the national and the international level. If the international aspect of emerging risk data is important, it is necessary that countries collaborate. An important aspect here, is the security

issue. Not all stakeholders are willing to share all information. Some parts of the data need to be kept secret, some part need to be made anonymous. Study has shown that some stakeholders would be interested in exchanging their anonymous information for money or for anonymous information of other stakeholders. In any case, the commitment of stakeholders to provide an emerging risk system with relevant data is very important.

Harmonization of emerging risk technology

Emerging risk systems is a topic on which many experts are working. To prevent systems from being developed in parallel, and thus to prevent a waste of effort from competition instead of collaboration, a harmonization effort needs to take place. One of the tasks of EFSA is harmonization. The participants of this workshop can see an important role for EFSA in this respect. EFSA has no budget though to grant research. A possibility to fulfill the coordination role would be to give input and advise on emerging risk projects.

3.16 Research Agenda

Please think for five minutes on the most important issue for developing and using future ER systems. We compose a list from this as a common research agenda.

The following items were mentioned:

- Work on an objective filtering of data signals.
- Exploit the holistic approach.
- Formulate clear system requirements by investigating current interaction between experts and their method of detecting emerging risks.
- Collaboration and coordination on national and international level needs to be promoted.
- Include incentives for food safety risk prevention in the private sector.
- Define the specificity (*i.e.* the number of signals that really indicate a risk, how many false signals) of holistic early warning systems.
- Accept a trial-and-error approach, explore the possibilities instead of focussing on the problems.
- Developers should work more closely together with stakeholders.
- Continue identification of relevant data sources for newly emerging issues in food and feed safety.
- "Better a simple working solution than looking for the absolute truth": a simple model is easier to accept for users.
- Identify true indicators and their weighing factors.
- Research how to take the "human factor" into account with filtering.
- Vertically integrate or coordinate information systems with the end users.
- Set up a communications network on (technological) developments designed to improve early hazard identification.
- Spread on a regular basis excerpts of signals identified by signalling meetings in veterinary and feed domain.

- Learn from earlier experiences, analyse problems and improve on them.
- We need a safe environment for all stakeholders.
- Wish: Voluntary reporting should be changed to obligatory reporting.

On the basis of this list of research issues, we have decided to investigate the possibilities to set up an IP-project. Wageningen UR shall take the initiative for this plan.

3.17 Summary of the Afternoon Sessions

The first session in the afternoon had a technical background, while the second session had a focus on policy aspects of early warning systems. On the basis of the discussion afterwards, we have identified some features that may be important in the usefulness of emerging risk systems. These are:

- A dynamic/self-learning character of used models: when models have the ability to learn from the predictions and from expert feedback on these predictions, the power of these models increases significantly.
- The quality of models/data. Data sources have to be of high quality to be of use for emerging risk detection.
- The distinction between searching for known or for unknown risks is important. The amount of information involved in the search for unknown risks is huge.
- With the development of emerging risk systems, the interaction with users needs to be taken into account. The users are not just clients but also co-developers.

Commitment of the stakeholders is of utmost importance. When governments and industries do not commit to deliver data, the usefulness of an emerging risk system decreases, due to a lack of relevant information. In the field of early warning, many initiatives exist to create emerging risk systems. It may be wise to stimulate collaboration instead of competition. EFSA may play an important role in harmonising efforts. We can also learn from history; FAO showed their 30 years of experience on the field of early warning.

Appendices

Appendix I – Presentations

Workshop Emerging Risks and Early Warning Systems

Fátima Kreft

AGROTECHNOLOGY & FOOD SCIENCES GROUP
WAGENINGEN UR

Content of this workshop introduction

- Background of the workshop
- Definitions
- Risks in the Food Chain
- Stakeholders
- Objective of the workshop
- Programme

Background of the workshop

- Workshop is part of project: “Emerging risks in Dutch Food Chain”
- Research project for Dutch Food Safety Authority (VWA); Min. Agriculture, Nature Management and Food Quality (LNV)
- Objective of project: develop procedure/system to identify potential risks on an early stage, allowing a proactive intervention on the potential risk.
- Duration: 4 years

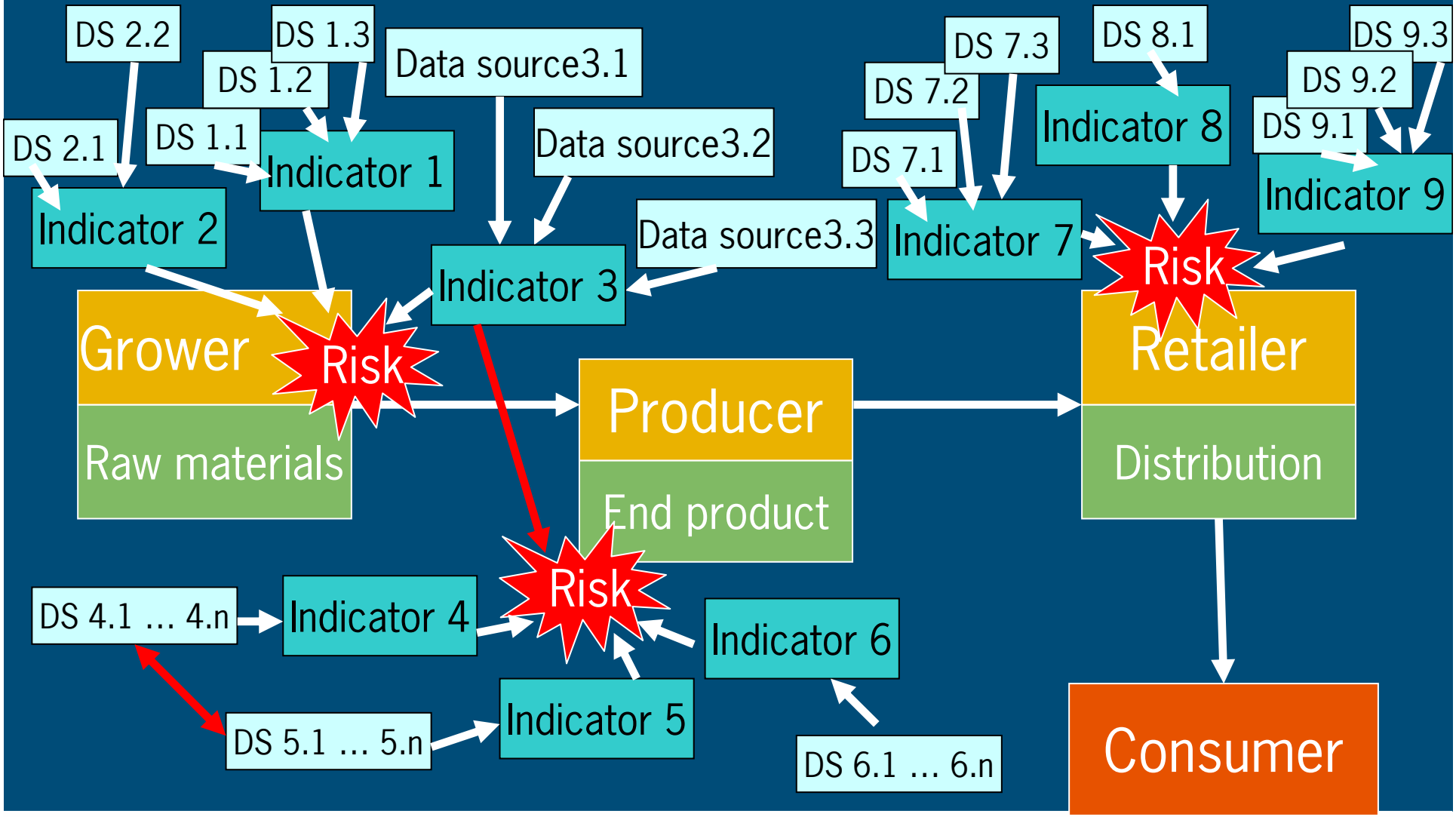
Why such project?

- Food safety is an important issue
- There is much public awareness and attention for food safety
- Increased complexity of food and feed production and distribution systems (eg. increased global trading)
- There is a need for pro-active prevention of risks

Definitions

- **Food hazard:** biological, chemical or physical agent in food or feed with the potential to cause an adverse health effect.
- **Emerging Risk:** potential food hazard that may become a risk for human health in the future.
- **Incident:** the use of the product can or will result in adverse health consequences for animals or human beings; divided in different classes depending on the degree of severity of the problem to animal and human health.
- **Early Warning System:** a system or procedure able to proactively identify and prevent a potential hazard to become a risk.

Emerging Risks in the Food Chain



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Operational description of an Early Warning System

- Monitor data sources
- Define levels for indicators in order to quantify the risk
- Take into account with interactions between data sources and between indicators
- Define how the risk propagates in the chain
- Define actions

Some questions…

- Which indicators are the most relevant?
- How much are the data sources related to the indicators?
- When should action be taken, and what action is necessary?
- What is the interaction between different data sources?
- How fast can a risk spread out in the chain?

Holistic approach – System design

- Indicators inside and outside the food chain
- Multidisciplinary approach covering:
  - Product and processing information
  - Climate
  - Economy
  - Consumer behavior
  - Government politics
  - etc
- International/global dimension

Who are the stakeholders

- Commercial companies direct involved in the production and distribution food chain
- National and European governmental institutions
- Scientists and experts dealing with food safety
- Consumers
- NGO's (environment organisations, consumer organisations, animal protecting organisations, etc)
- Press/Media

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More questions…

- How important is a certain risk to the different stakeholders?
- What is the risk perception?
- Does this perception affects the possibility to detect an emerging risk on an early stage?
- Are stakeholders willing to cooperate?

Objective workshop

- Learn from each others experience and knowledge
- Define contours of the ideal Early Warning System (future vision)
- Discuss role of stakeholders and their perception
- Exchange information

Result of the workshop

- Document containing:
  - Background information on speakers, short description of the system and specific information on relevant system issues (hand-outs)
  - Presentations of the speakers
  - Written report of the discussion
  - Link to website with the recorded film of today's presentations

Programme for the day

- Morning: 4 presentations and discussion blocks:
  - Discussion I: set up of the system
  - Discussion II: use of the system
- Lunch
- Afternoon: 5 presentations and discussion blocks
  - Discussion III: the quality of the system
  - Discussion IV: future of EWS for the food chain
- Get together and diner

End

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Epidemiological intelligence and risk assessment from a European point of view

Marco Baldari, MD IDS DTM&H, Senior Expert
European Centre for Disease Prevention and Control, Stockholm

Emerging risks & early warning – Wageningen - Oct 19th, 2006

ecdc
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

Why a new Centre?

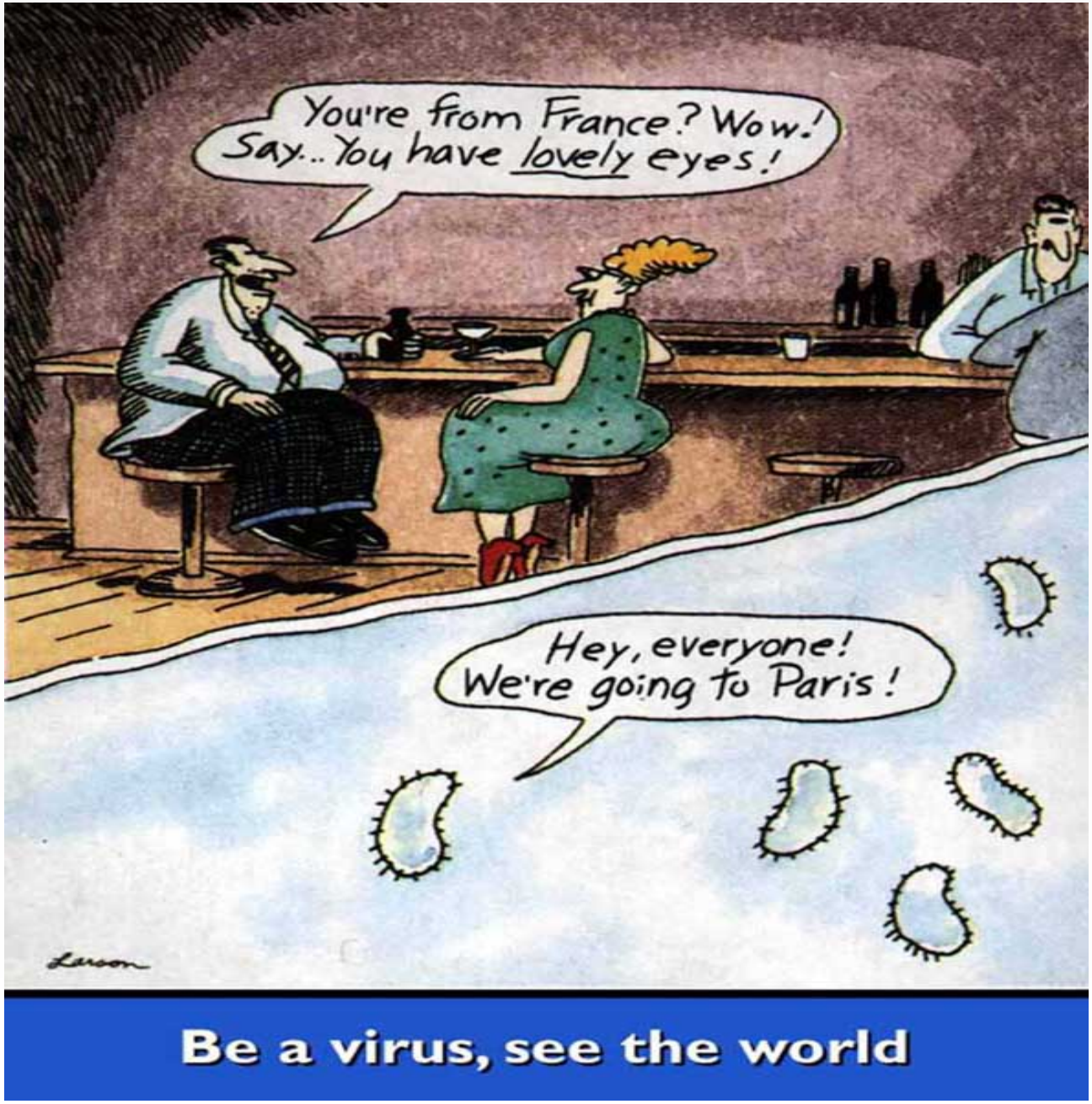
- EU got much larger (now EU 27 !)
- Limited coordination of response capacity
  - European surveillance networks
  - EWRS
- New threats emerge and old ones re-emerge (SARS, Pandemic flu, AMR, bioterror, etc.)
- International travel/commerce has enormously increased both in volume and in speed
- Europe is especially vulnerable (the "5th Freedom")

International barriers are falling down:
The Fifth Freedom

- Free [and fast] movement of people *
- F&F movement of services *
- F&F movement of goods *
- F&F movement of capital *
- F&F movement of micro-organisms

*Adapted from *Summary of Legislation - Internal Market*
http://europa.eu.int/scadplus/leg/en/s70000.htm

ecdc
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL



Mission and tasks of the Centre in the field of Epidemiological intelligence (851/2004/EC)

- ECDC shall
  - Establish, in cooperation with MS, procedures for the identification of emerging health threats
  - Identify, assess and communicate current and emerging communicable disease threats
  - Inform EC and MS about emerging health threats requiring their immediate attention
  - Communicate on emerging health threats, including to the public

Reg. 851/2004 of the European Parliament and of the Council, 21/4/2004

E.I.: Definition

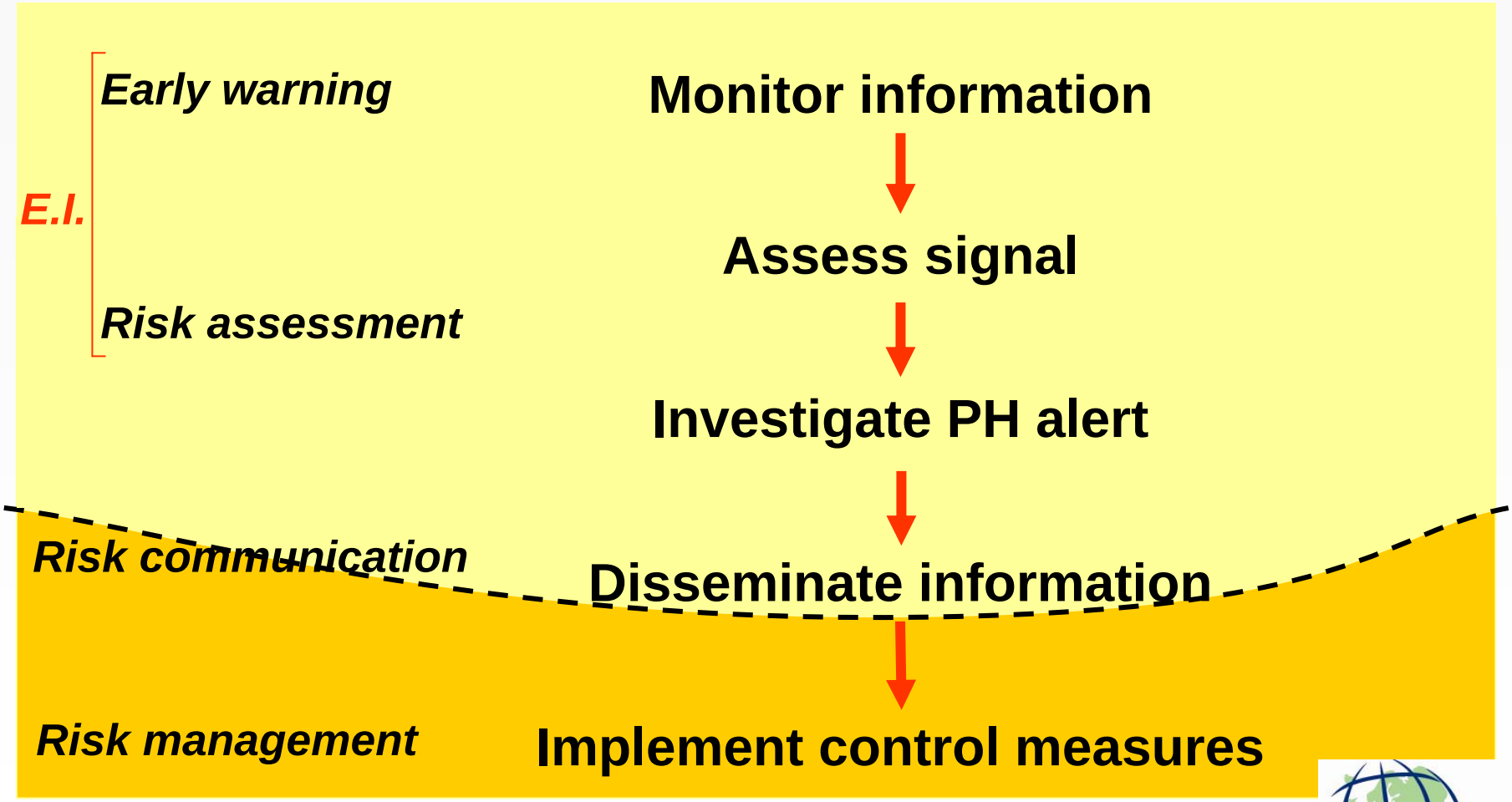
« Epidemic intelligence is the process to detect, verify, analyze, assess and investigate signals that may represent a threat to public health.

It encompasses all activities related to *early warning* but also to signal assessment and outbreak investigation »

History of E.I.

- Epidemic intelligence service at US-CDC established 1951, following to the start of the Korean War
- Founded by Alexander Langmuir – chief for 29 years
- Started as an early-warning system against:
  - biological warfare and
  - man-made epidemics
- 2 year epidemiology training programme for approx. 80 medical doctors, researchers and scientists
- Included also chronic diseases, environmental diseases and injuries
- Starting point for similar programs all over the world (FETP, TEPHINET, EPIET)

E.I., risk assessment & risk management



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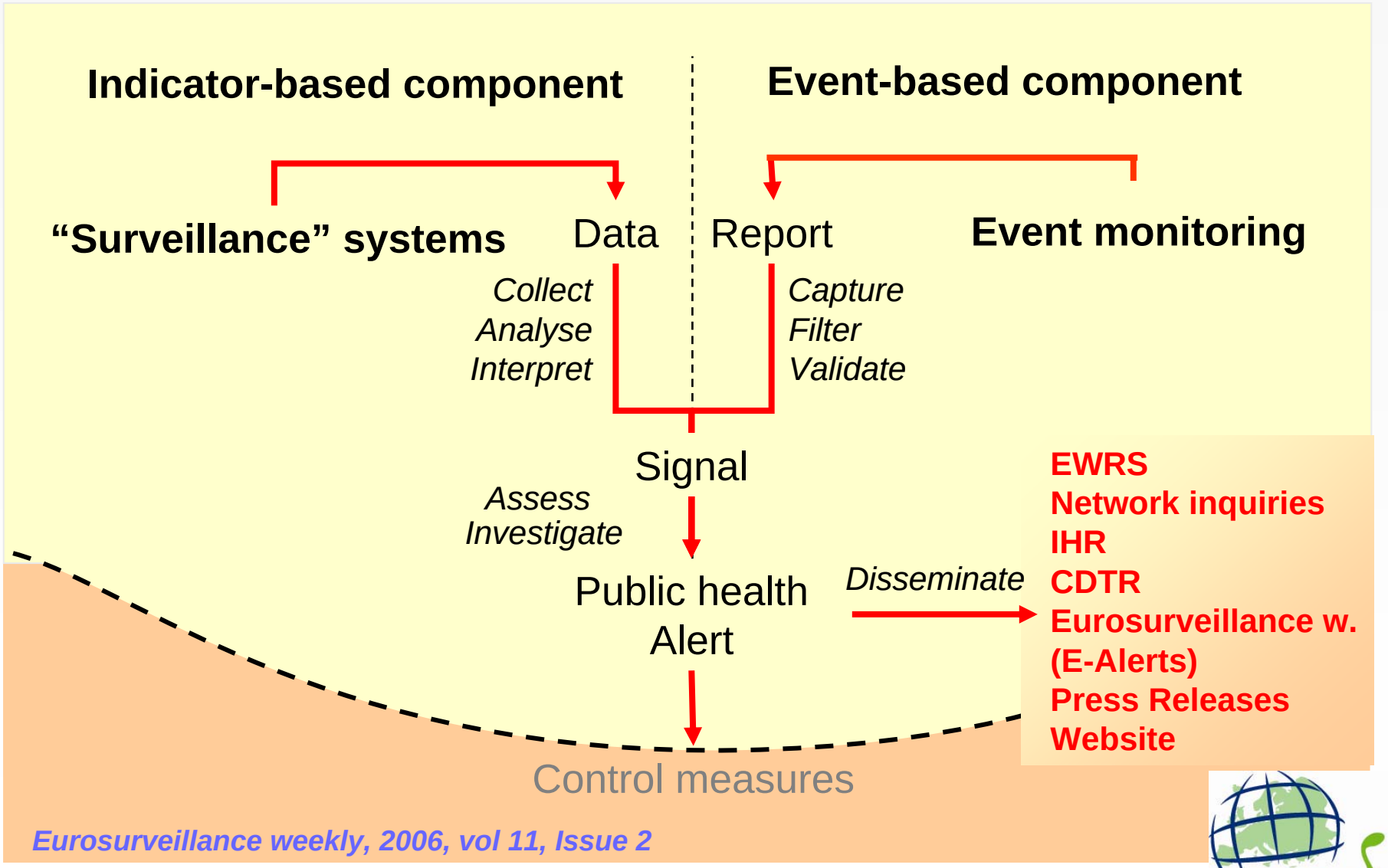
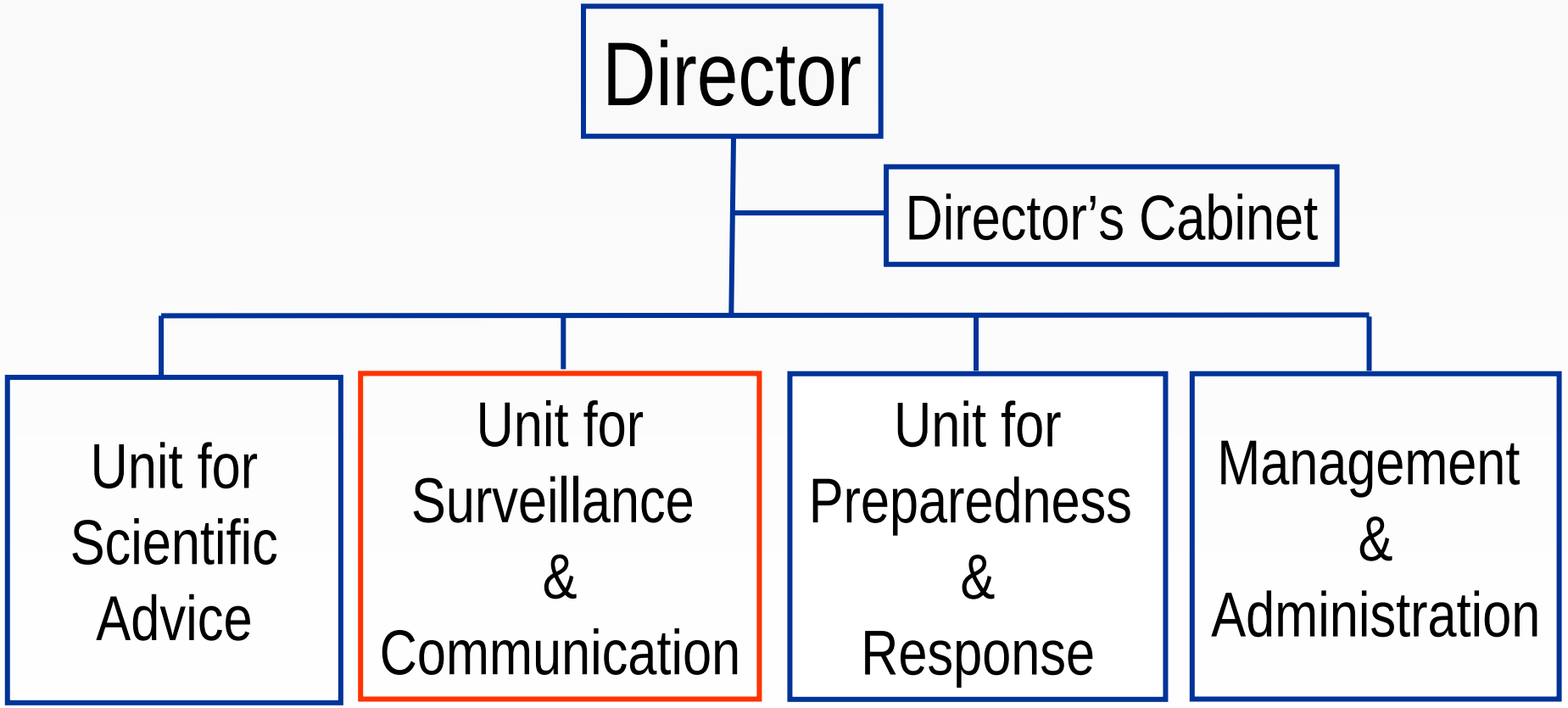
E.I. Framework



ECDC's internal structure



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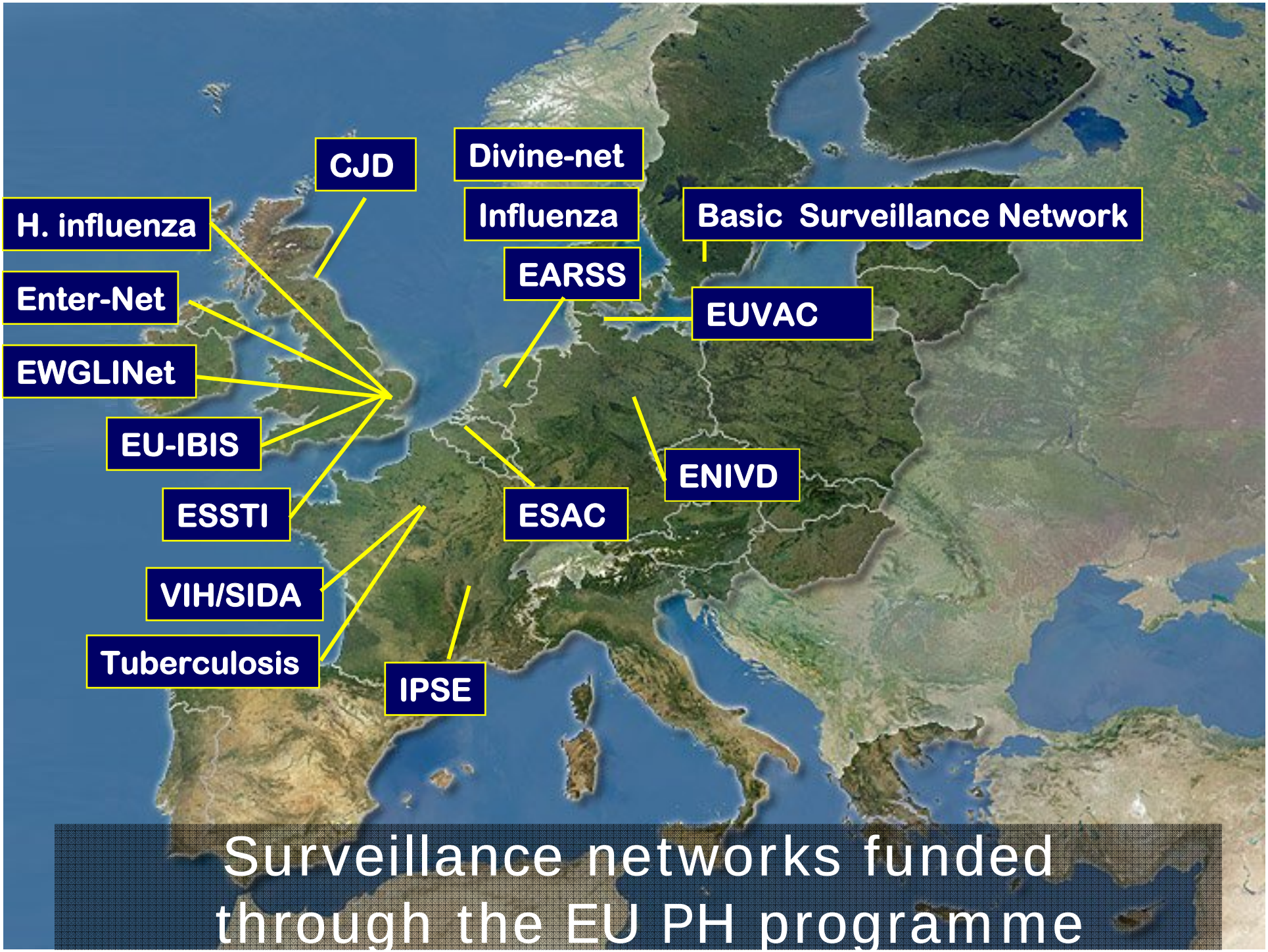

CJD
Divine-net
H. influenza
Influenza
Basic Surveillance Network
EARSS
Enter-Net
EUVAC
EWGLINet
EU-IBIS
ENIVD
ESSTI
ESAC
VIH/SIDA
Tuberculosis
IPSE
Surveillance networks funded through the EU PH programme

Indicator-based EI component - 1

A) **Health-care system data**:

- Identified risks
  - Mandatory notification
  - Laboratory surveillance
- Emerging risks
  - Syndromic surveillance
  - Mortality monitoring
  - Health care activity monitoring
  - Prescription monitoring
  - Poison centres

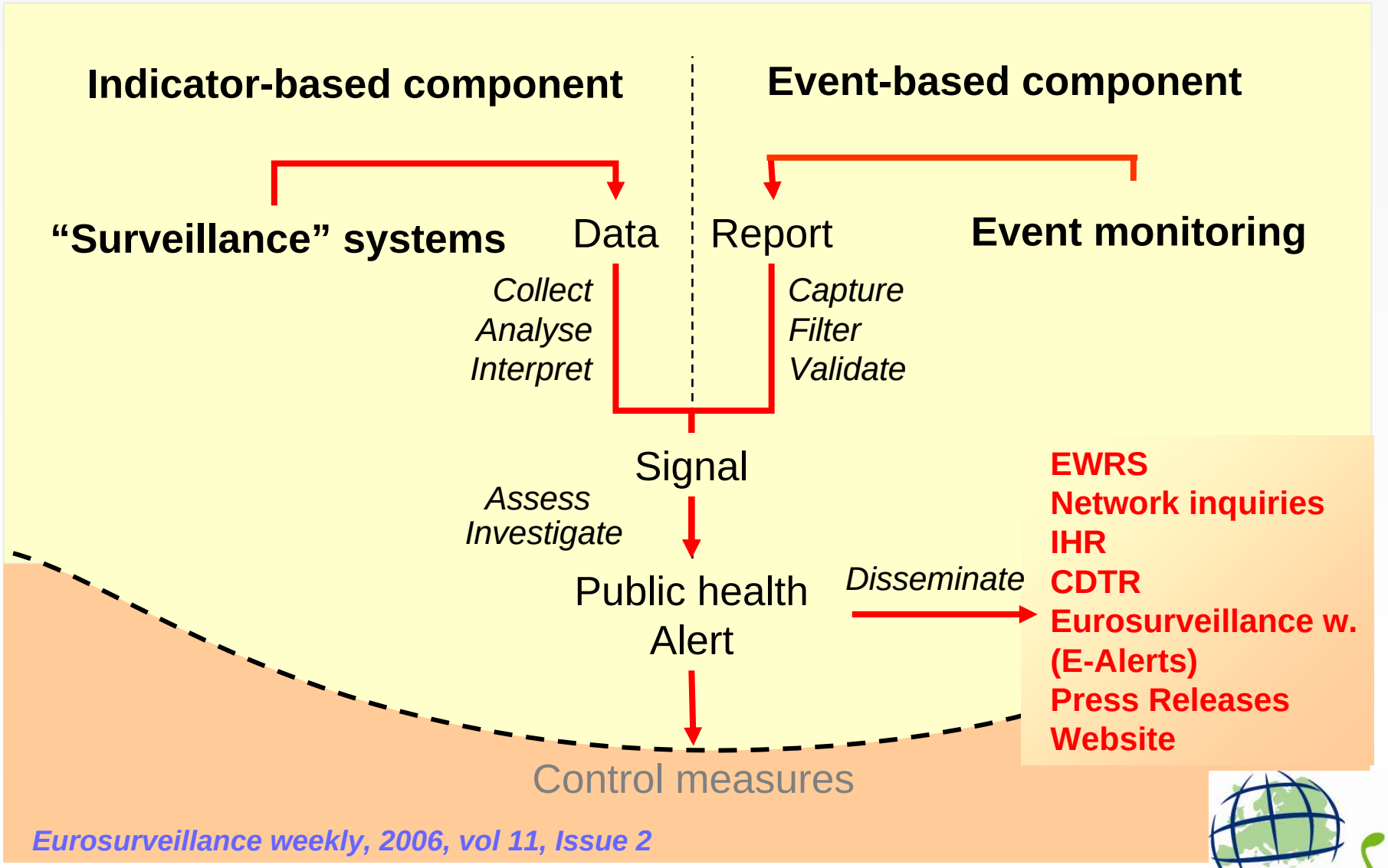
Indicator-based EI component - 2

B) Additional data sources:

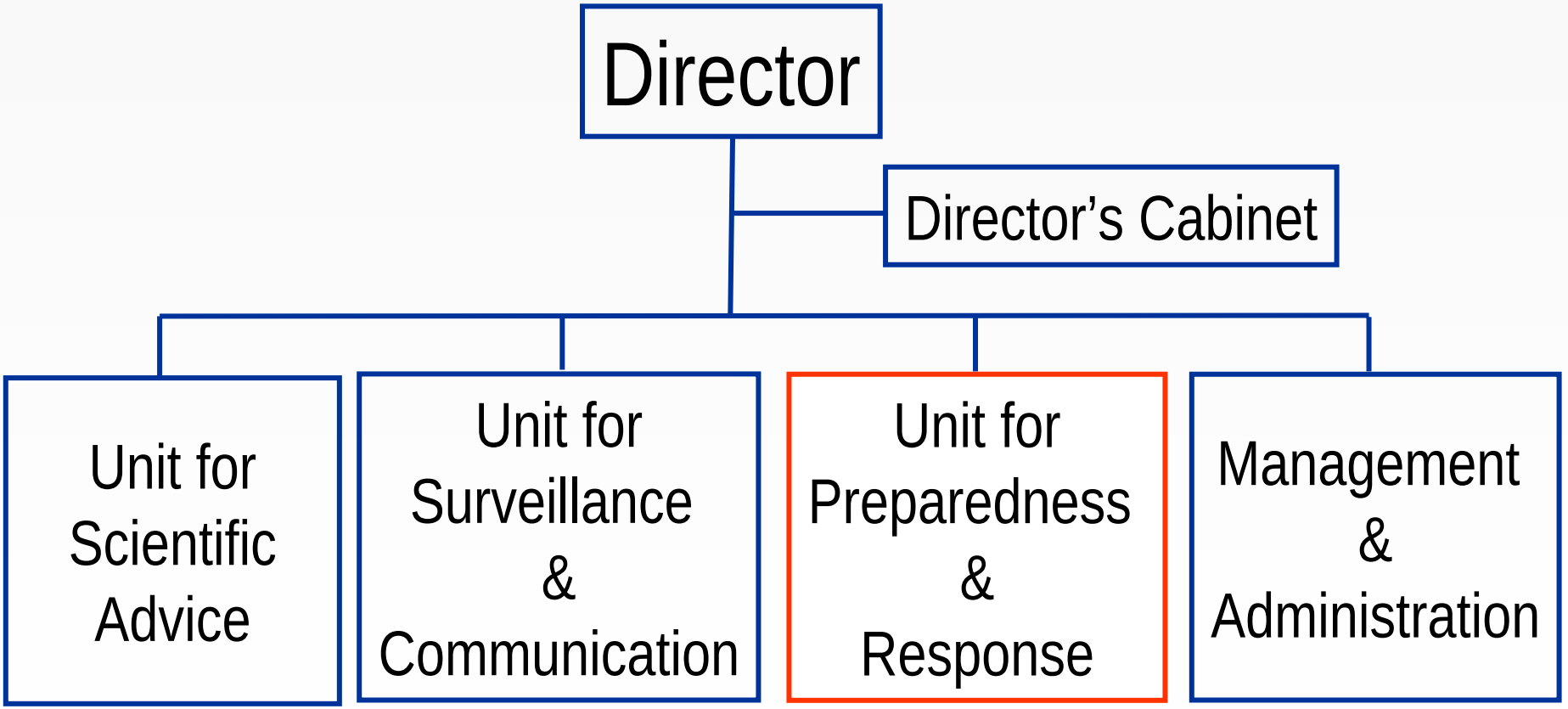
- Emerging risks

  - Behavioural surveillance
  - Environmental surveillance
  - Veterinary surveillance
  - Food safety/water supply
  - Drug post-licensing monitoring
  - Meteorological data

E.I. Framework



ECDC's internal structure



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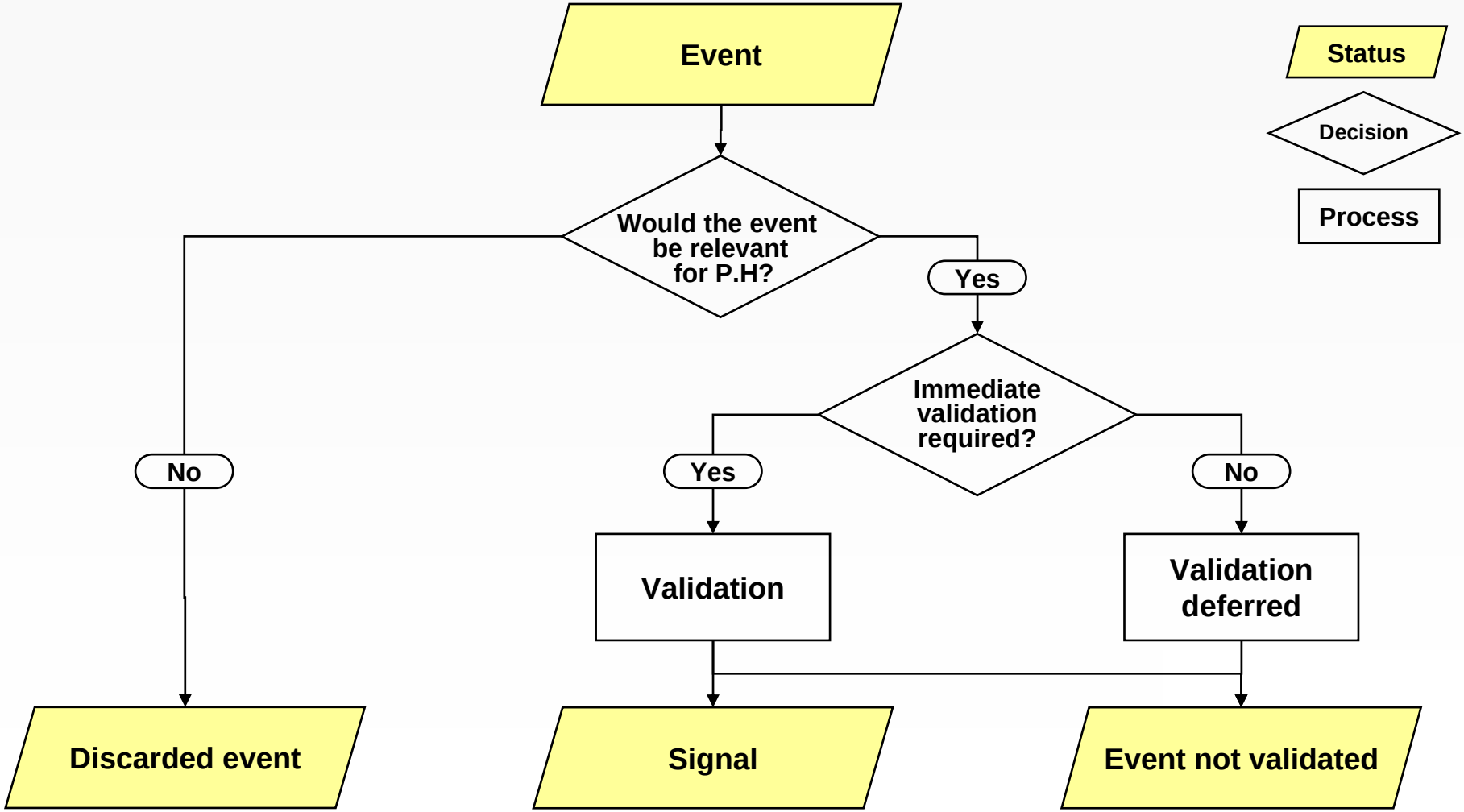
Sources routinely utilized for Event-based EI at ECDC

- EI focal points; partner organisations
- P.H. specialized mailing lists:
  - Confidential (EWRS, MediSys, Enternet, WHO-OVL, etc.)
  - Subscription (GPHIN, etc.)
  - Public (Promed, OIE alert ms., GoogleAlert etc.)
- Websites
  - National P.H. institutes (of EU MS and from abroad)
  - EU PH agencies/projects (Epinorth, Eurosurveillance, …)
  - International Health agencies (WHO, FAO, OIE, etc.)
  - Internat. news providers (Alertnet, EC press rew.,…)

From event to signal: filtering and validation



Event Validation

For the time being at least, ECDC has less strict criteria for validation than those adopted by WHO for verification. In IHR2005 terminology verification means the provision of information by a State Party confirming the status of an event within its territory.

Event validation

- Cross-checking independent sources
- Active search for additional information

Event Validation

- The systematic process by which ECDC checks the reality of reported events

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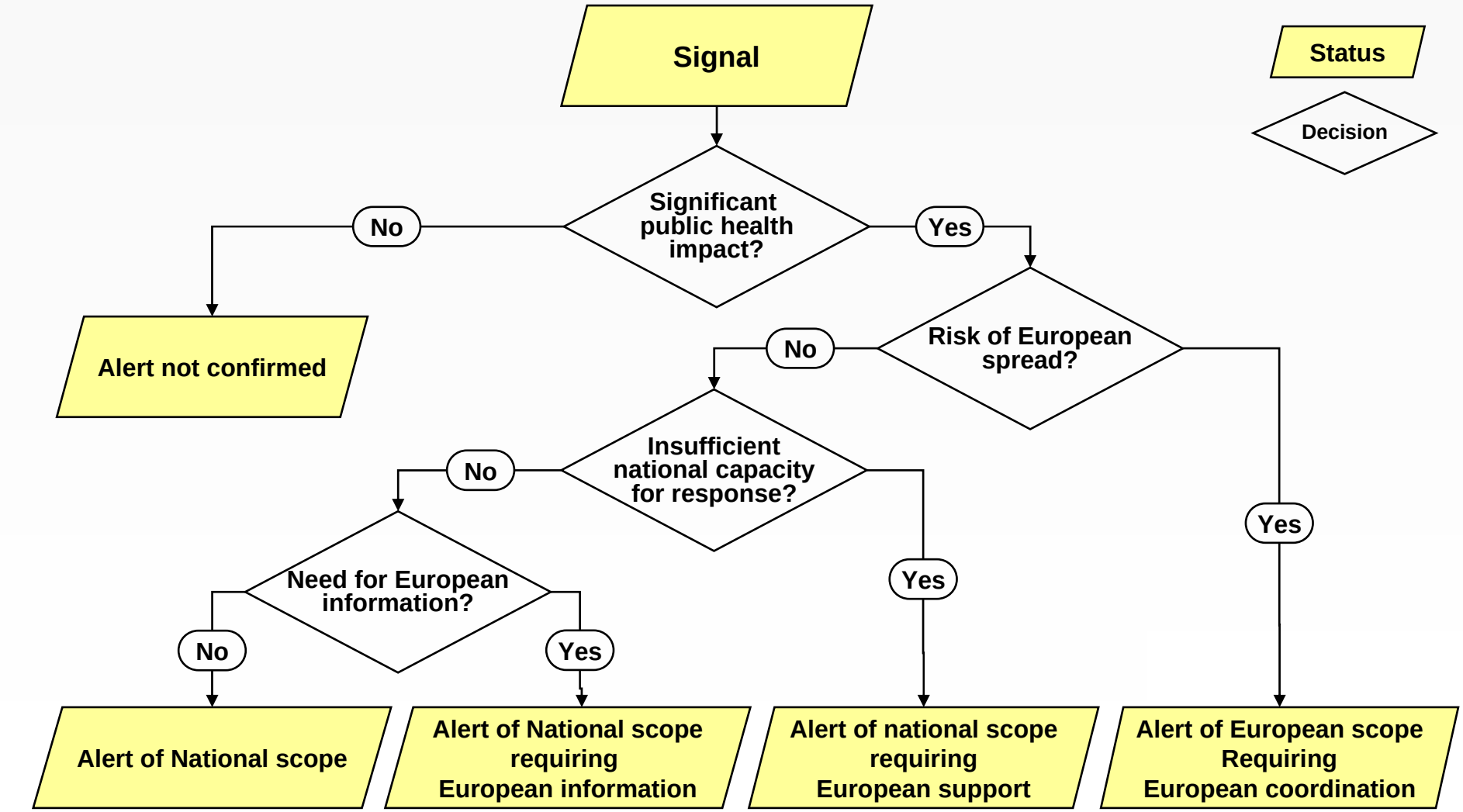
From signal to alert: assessment



Criteria for Signal Assessment :
Event's importance for P.H.

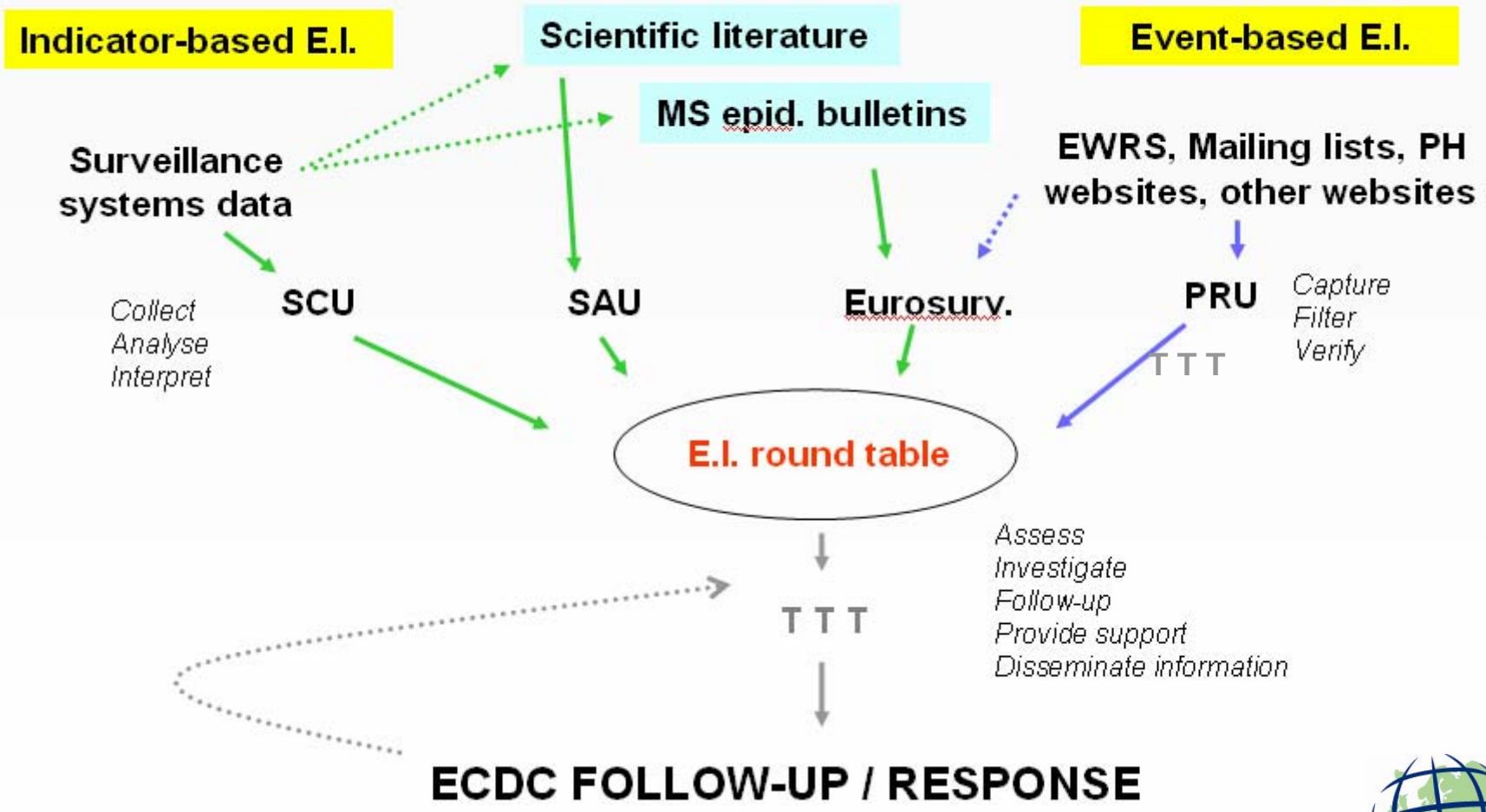
- High potential for spread
- High morbidity or mortality
- Limited treatment
- Infection control measures required
- Suddenly emerging disease
- Suddenly change in spread or resistance patterns
- Unknown aethiology (possibly c.d.)

Criteria for Signal Assessment :
Event's European dimension

- a) Events related in place and time across more than one MS
- b) Events related to a source to which citizens from more than one MS may have been exposed
- c) Risk of importation through trade and travel
- d) Exposure to a contaminated vehicle produced in a MS or imported with unknown level of distribution
- e) Affecting a single MS but requiring information of national health authorities of other European MS
- f) Affecting a single MS but requiring support from ECDC or other European MS
- g) Event receiving high media or political attention

Signal Assessment

ECDC daily coord. mtg. ('Round Table')



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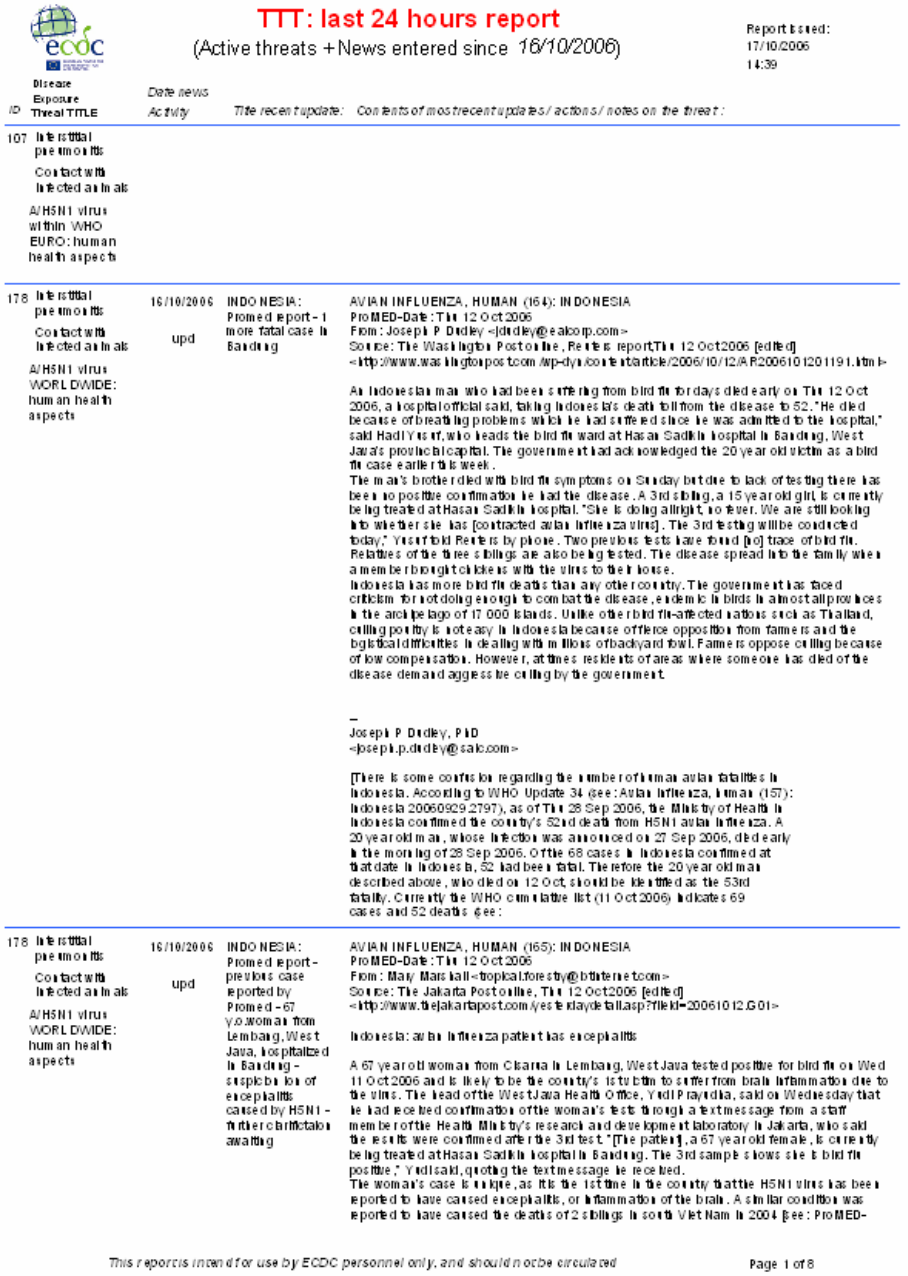
Signal Assessment

ECDC daily coordination meeting ('Round Table'). Tasks:

- Monitoring of the 'events' validation process
- Initial assessment of new signals
- Follow-up assessment of ongoing events
- Assessment of possible needs for an ECDC-facilitated response
- Monitoring of ECDC-facilitated responses
- Choice of events to be reported, and how

ROUND -TABLE :

INPUT



TTT: last 24 hours report

(Active threats + News entered since *16/10/2006*)

Report issued: 17/10/2006 14:39

ID	Disease Exposure Threat TITLE	Date news Activity	Title recent update:	Contents of most recent updates / actions / notes on the threat :
107	Interstitial pneumonitis Contact with infected animals A/H5N1 virus within WHO EURO: human health aspects			
178	Interstitial pneumonitis Contact with infected animals A/H5N1 virus WORLDWIDE: human health aspects	16/10/2006 upd	INDONESIA: Promed report - 1 more fatal case in Bandung	AVIAN INFLUENZA, HUMAN (164): INDONESIA ProMED-Date: Thu 12 Oct 2006 From: Joseph P Dudley <jdudley@eaicorp.com> Source: The Washington Post online, Reuters report,Thu 12 Oct 2006 [edited] <http://www.washingtonpost.com/wp-dyn/content/article/2006/10/12/AR2006101201191.html> An Indonesian man who had been suffering from bird flu for days died early on Thu 12 Oct 2006, a hospital official said, taking Indonesia's death toll from the disease to 52. "He died because of breathing problems which he had suffered since he was admitted to the hospital," said Hadi Yusuf, who heads the bird flu ward at Hasan Sadikin hospital in Bandung, West Java's provincial capital. The government had acknowledged the 20 year old victim as a bird flu case earlier this week. The man's brother died with bird flu symptoms on Sunday but due to lack of testing there has been no positive confirmation he had the disease. A 3rd sibling, a 15 year old girl, is currently being treated at Hasan Sadikin hospital. "She is doing all right, however. We are still looking into whether she has [contracted avian influenza virus]. The 3rd testing will be conducted today," Yusuf told Reuters by phone. Two previous tests have found [no] trace of bird flu. Relatives of the three siblings are also being tested. The disease spread into the family when a member brought chickens with the virus to their house. Indonesia has more bird flu deaths than any other country. The government has faced criticism for not doing enough to combat the disease, endemic in birds in almost all provinces in the archipelago of 17 000 islands. Unlike other bird flu-affected nations such as Thailand, culling poultry is not easy in Indonesia because of fierce opposition from farmers and the logistical difficulties in dealing with millions of backyard fowl. Farmers oppose culling because of low compensation. However, at times residents of areas where someone has died of the disease demand aggressive culling by the government. -- Joseph P Dudley, PhD <joseph.p.dudley@saic.com> [There is some confusion regarding the number of human avian fatalities in Indonesia. According to WHO Update 34 (see: Avian influenza, human (157): Indonesia 20060929.2797), as of Thu 28 Sep 2006, the Ministry of Health in Indonesia confirmed the country's 52nd death from H5N1 avian influenza. A 20 year old man, whose infection was announced on 27 Sep 2006, died early in the morning of 28 Sep 2006. Of the 68 cases in Indonesia confirmed at that date in Indonesia, 52 had been fatal. Therefore the 20 year old man described above, who died on 12 Oct, should be identified as the 53rd fatality. Currently the WHO cumulative list (11 Oct 2006) indicates 69 cases and 52 deaths (see:
178	Interstitial pneumonitis Contact with infected animals A/H5N1 virus WORLDWIDE: human health aspects	16/10/2006 upd	INDONESIA: Promed report - previous case reported by Promed - 67 y.o.woman from Lembang, West Java, hospitalized in Bandung - suspicion of encephalitis caused by H5N1 - further clarification awaiting	AVIAN INFLUENZA, HUMAN (165): INDONESIA ProMED-Date: Thu 12 Oct 2006 From: Mary Marshall <tropicalforestry@btinternet.com> Source: The Jakarta Post online, Thu 12 Oct 2006 [edited] <http://www.thejakartapost.com/yesterdaydetail.asp?fileid=20061012.G01> Indonesia: avian influenza patient has encephalitis A 67 year old woman from Cikarna in Lembang, West Java tested positive for bird flu on Wed 11 Oct 2006 and is likely to be the country's 1st to begin to suffer from brain inflammation due to the virus. The Head of the West Java Health Office, Yudi Prayudika, said on Wednesday that he had received confirmation of the woman's tests through a text message from a staff member of the Health Ministry's research and development laboratory in Jakarta, who said the results were confirmed after the 3rd test. "[The patient], a 67 year old female, is currently being treated at Hasan Sadikin hospital in Bandung. The 3rd sample shows she is bird flu positive," Yudi said, quoting the text message he received. The woman's case is unique, as it is the 1st time in the country that the H5N1 virus has been reported to have caused encephalitis, or inflammation of the brain. A similar condition was reported to have caused the deaths of 2 siblings in south Viet Nam in 2004 (see: ProMED-

This report is intended for use by ECDC personnel only, and should not be circulated

Page 1 of 8

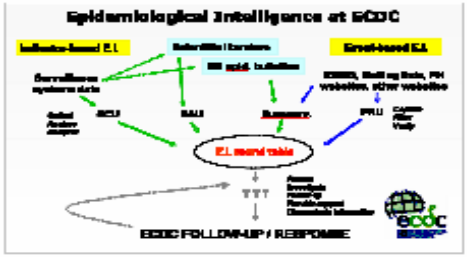
ROUND -TABLE :

OUTPUT

13-ott-06

Communicable disease threats daily report

This report only provides an elencation of threats under follow-up and simplly quotes main items discussed at the daily Round Table. For detailed information about each threat, please refer to the TTT db:
S:\Horizontal Projects\TTT\TTT readonly database.mdb



Active threats covered in the TTT as of 13/10/2006 :

ID	Threat TITLE	Ei. rep?	Contact	Last news	Summ rep date
107	A/H5N1 virus within WHO EURO: human health aspects	YES	P Hspe	27/09/2006	20/09/2006
178	A/H5N1 virus WORLDWIDE: human health aspects	yes	P Hspe	12/10/2006	11/10/2006
236	BULGARIA : Hepatitis A outbreaks in Svoge and Plovdiv	yes	P Hspe	06/10/2006	12/10/2006
45	CHIKUNGUNYA epidemics in the Indian Ocean region (and related imported cases)	yes	P Hspe	13/10/2006	12/10/2006
191	CHOLERA SITUATION WORLDWIDE : current WHO OVL reports	yes	P Hspe	12/10/2006	12/10/2006
205	DEMOCRATIC REPUBLIC OF THE CONGO : plague (bubonic and pulmonary)	yes	P Hspe	12/10/2006	12/10/2006
192	DENGUE SITUATION WORLWIDE	yes	P Hspe	11/10/2006	12/10/2006
244	KOSOVO (UN Administered Territory): viral meningitis outbreak	yes	P Hspe	06/10/2006	12/10/2006
209	NOROVIRUS outbreaks on cruise-ships	yes	EWRS	12/10/2006	12/10/2006
235	PANAMA: unknown disease producing profuse diarrhoea and neurological symptoms	Yes	P Hspe	13/10/2006	12/10/2006
86	POLIOMYELITIS : worldwide areas causing particular concern	yes	P Hspe	12/10/2006	12/10/2006
270	UK: imported case of cholera from India	yes	EWRS	13/10/2006	12/10/2006
29	CLOSTRIDIUM DIFFICILE 027 enteritis outbreaks in European countries	no	Diffe	18/09/2006	20/09/2006
240	GERMANY: salmonellosis due to Salmonella Hadar on the increase, in different regions	no	P Hspe	04/10/2006	04/10/2006
251	LATVIA: viral meningitis outbreak in Rezekne and in Ludza	no	P Hspe	28/09/2006	27/09/2006
150	MENINGOCOCCAL MENINGITIS SITUATION IN AFRICA : current WHO reports	no	P Hspe	18/05/2006	11/05/2006
269	SWEDEN: Salmonella Coeln – 5 cases reported of unusual serotype	no	P Hspe	10/10/2006	09/10/2006
261	UK, Netherlands and elsewhere in EU: Increase of cases of Legionnaire's disease	no	P Hspe	09/10/2006	20/09/2006

LATEST ROUND-TABLE REPORT

Roundtable date :
13/10/2006

Round Table timings:
Mon to Thu : h. 11:30
Fri : h. 14:00
Location: Crisis Room (at PRU)

Participants :
PRU : ☑ Vasconcelos,
SCU : ☑ Van de Laar,
SAU : ☐
EUS: ☑ Pettifer, C.
Other ECDC comp.: ☐
Guests : ☐

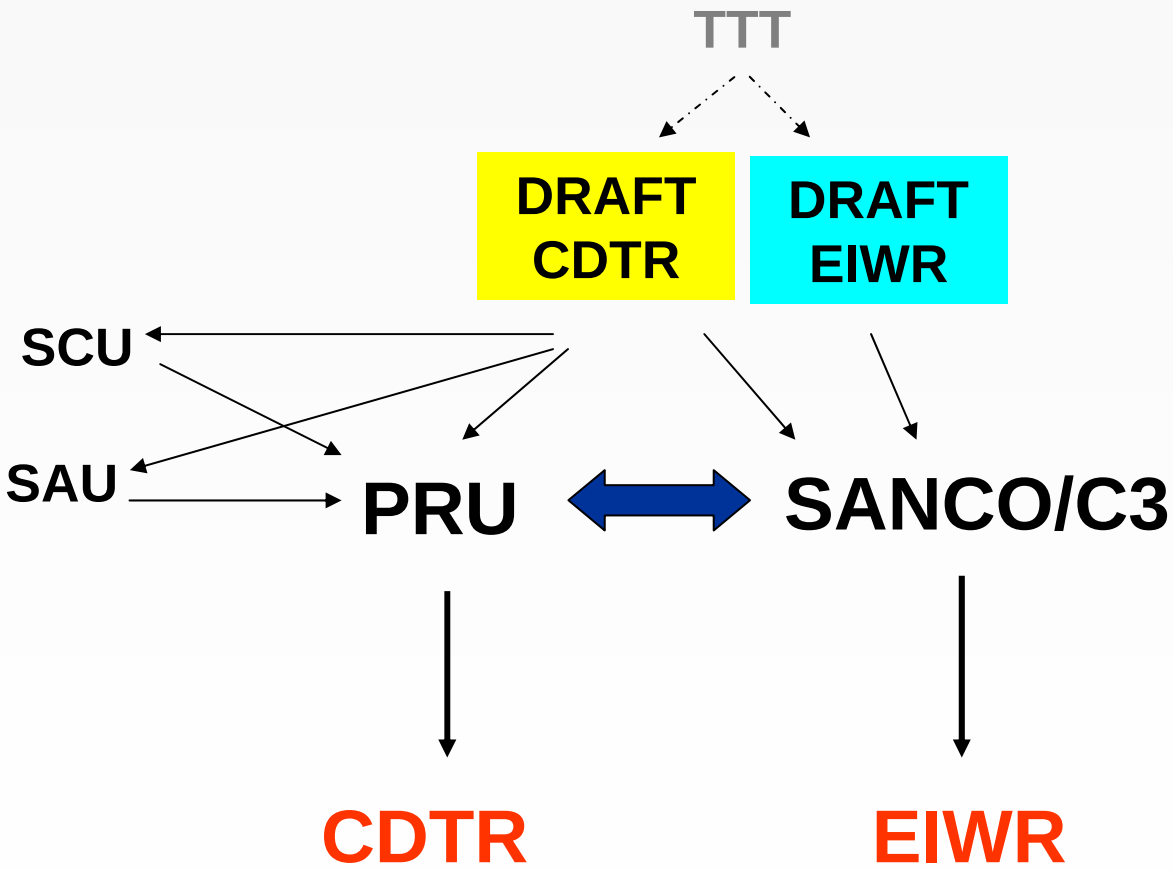
Analysed issues and conclusions (summary):

- H5N1: WHO OVL using media sources, mentioning "media indicated a new suspected case" in Indonesia - further nfomation pending
- Hepatitis A: to close until more news
- C.Diff: to close until new threat
- Enterovirus meningitis in Kosovo and Latvia: to close until more news
- Meningitis in Africa: no update on OVL this week
- Norovirus outbreak in Danube cruiseship: all measures taken - to be closed
- Unknown diease in Panama: to close after final official report
- Polio: OVL report: Yemen - first case this year; India: 360 cases - 10 times more than last year
- S. Coeln: keep open
- imported case Cholera UK: to close
- Chlamydia in one area in Sweden: increase of cases mentioned on media maybe due to lab tests - 2/3 were false negative - Marita will follow

Any comments about possible mistakes or relevant omissions are most welcome, and should be readily addressed to RT participants (taking into account the general EI scheme at ECDC: see header).

Signal Assessment

ECDC – SANCO C3 weekly teleconference



EIWR: the ECDC/C3 bulletin for the EC

Epidemic Intelligence Weekly Report: 26 August 2005 (week 34)
Not for public distribution
Please note that this report may contain sensitive information and should not be divulged outside the Commission services or the ECDC.
Prepared by SANCO-C3 Health Threat Unit in collaboration with ECDC

Event / Disease	Date	Location	Description / Response	Action	Source of info	Last update	Contact in SANCO C3
Avian influenza in birds 	24/05/05	Republic of China, Russian Federation, Kazakhstan Tibet	Outbreaks of influenza H5N1 in domestic geese and ducks confirmed in Novosibirsk region of Russia, and Pavlodar region of Kazakhstan (WHO-European region). National authorities of both countries have reported spread of infection in birds (with deaths) in other region further westbound following migration routes of birds toward Caspian and Black sea. **Bird flu (OIE confirmed H5N1) reached Novosibirsk by end of July.**	**Following last week's request of the Commission 23 MS plus Norway reported through the EWRS measures undertaken in response to the events in Russia. MS are regularly updating their situation concerning measures underatken** Life poultry and feathers import from Russia and Kazakhstan banned. **ECDC starting from this week will prepare and distribute through the EIWR a risk monitoring report (see annex).** **The web page on influenza on EUROPA website (maps, tables, etc.) will be regularly updated on the basis of the information and data provided by the ECDC.** **http://europa.eu.int/comm/health/ph_threats/com/Influenza/ai_recent_en.htm** **Teleconference with SANCO C3, SANCO E2, EFSA and ECDC has been carried out on 23/08 to strengthen proper communication.** **Next teleconferences will be done on 30/08** **Meeting of the Working group on AI of the Standing Committee on the Food chain and Animal health on 25/08 in Brussels involving representatives from**	EU Delegations in Asia, EWRS, WHO OIE, FAO, MedISys, EISS GPHIN, Promed	26/08/05 	F. Karcher, M. Ciotti

Keeping track of and report threats

HELP

Threat Tracking Tool

(DATA ENTRY INTERFACE)

Edit threats:

- Open single threat form
- Open specific threat by ID number

Search and edit threats:

- Near/ongoing ECDC ation
- By DISEASE
- By affected COUNTRY
- By PATHOGEN

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Preparedness and Response Unit

Visualize listings and edit threats:

- ALL ACTIVE THREATS
- Threats to WHO-EURO Countries
- World-wide threats

Work on and see main reports:

- Insert ISRM | Further ADDENDA
- Rewiev items for EWRS report
- SEE cdtr-ewrs | EXPORT cdtr-ewrs
- Send Draft CDTR to TEXT FINAL REVISION
- Produce CDTR- WEB edition
- Write daily roundtable report (DRR)
- View DRR | Mail DRR

Additional rep. menu | Further functions and data analysis

Version for screen resolution 1280x960

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EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

Threat Tracking Tool

Additional Reports menu:

- Daily updates to the weekly rep.
- ECDC internal rep (all active threats)
- issues outside external reports
- closed threats
- LATEST 24h news/actions

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Preparedness and Response Unit

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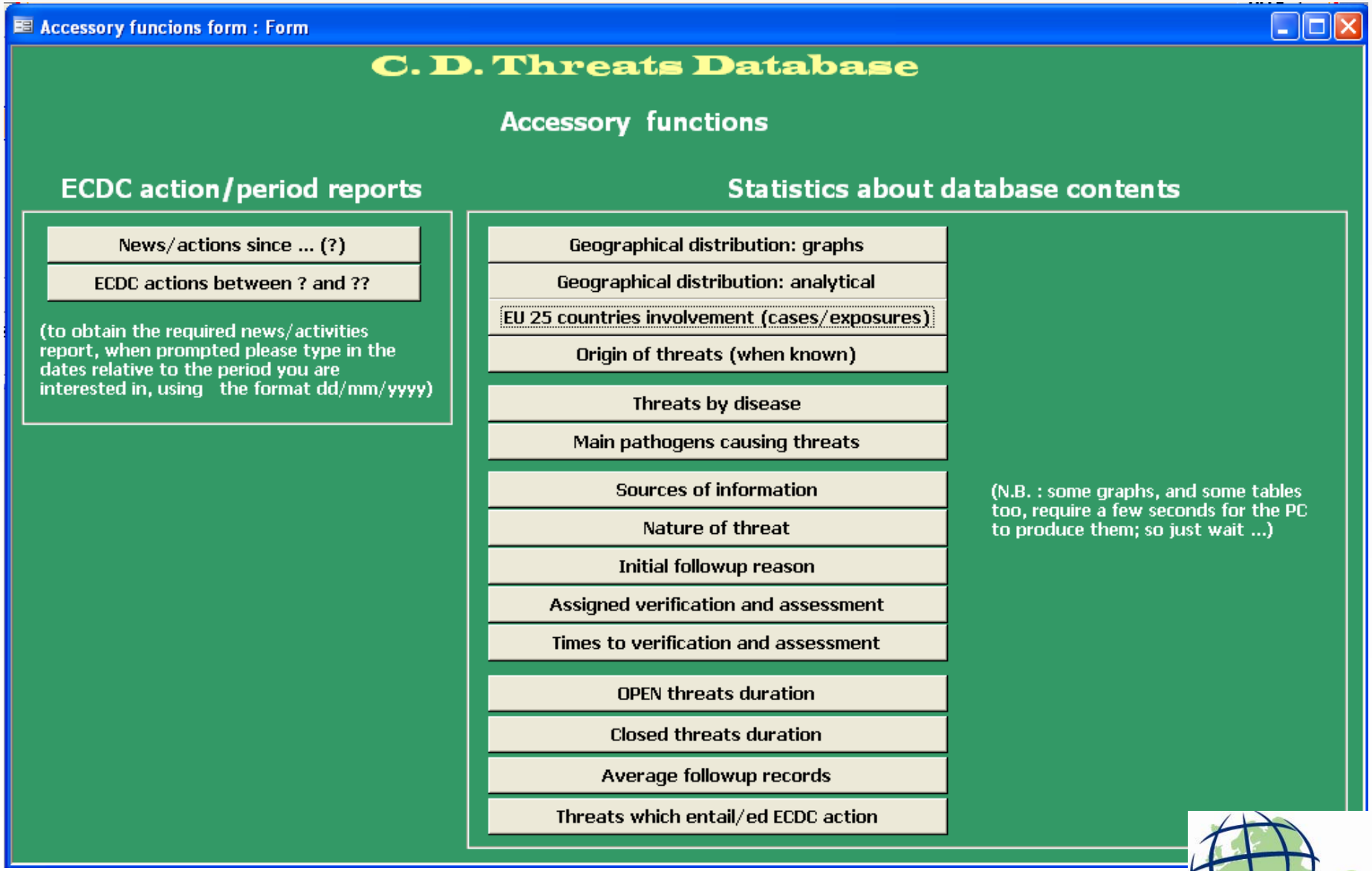
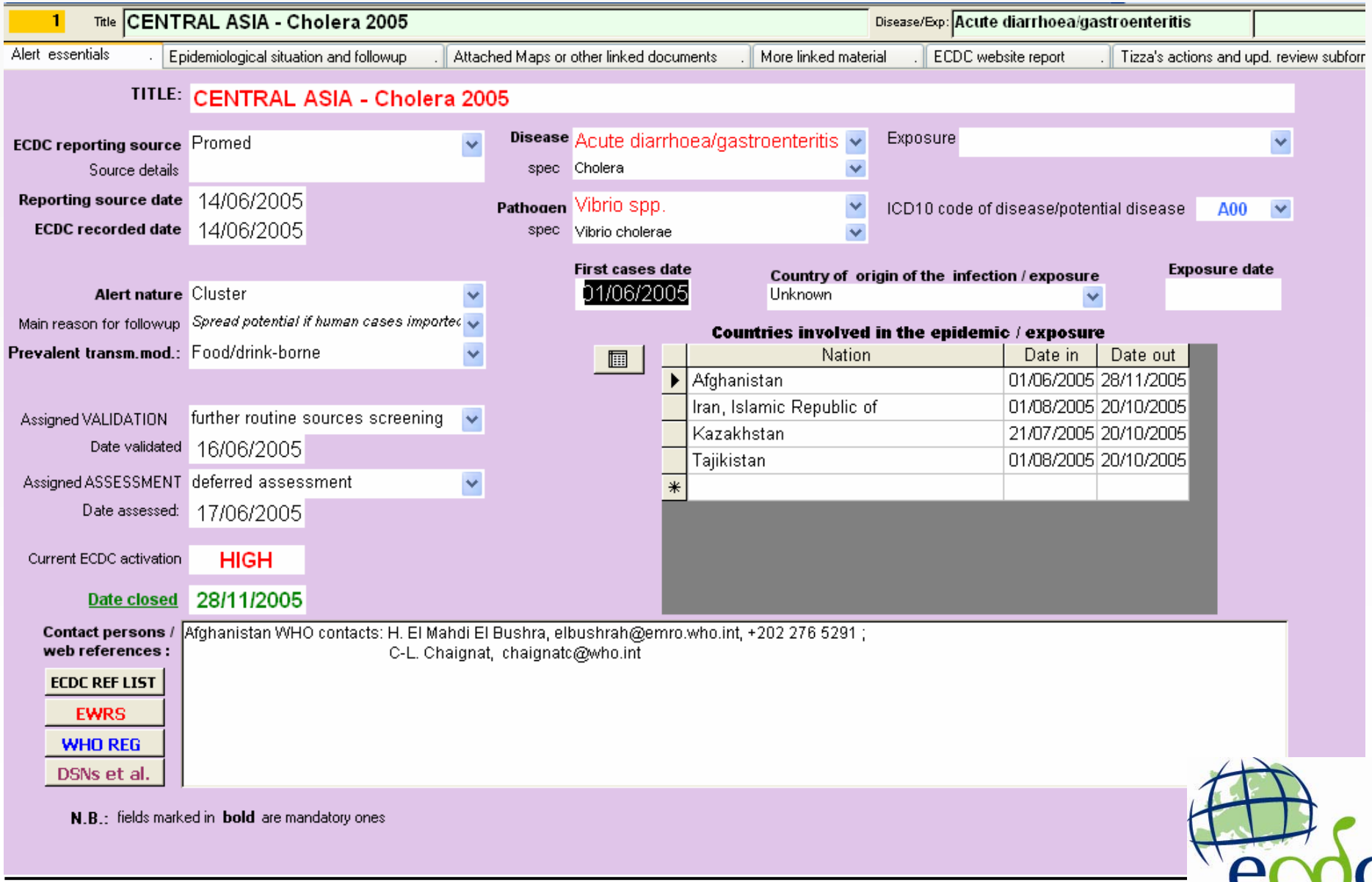
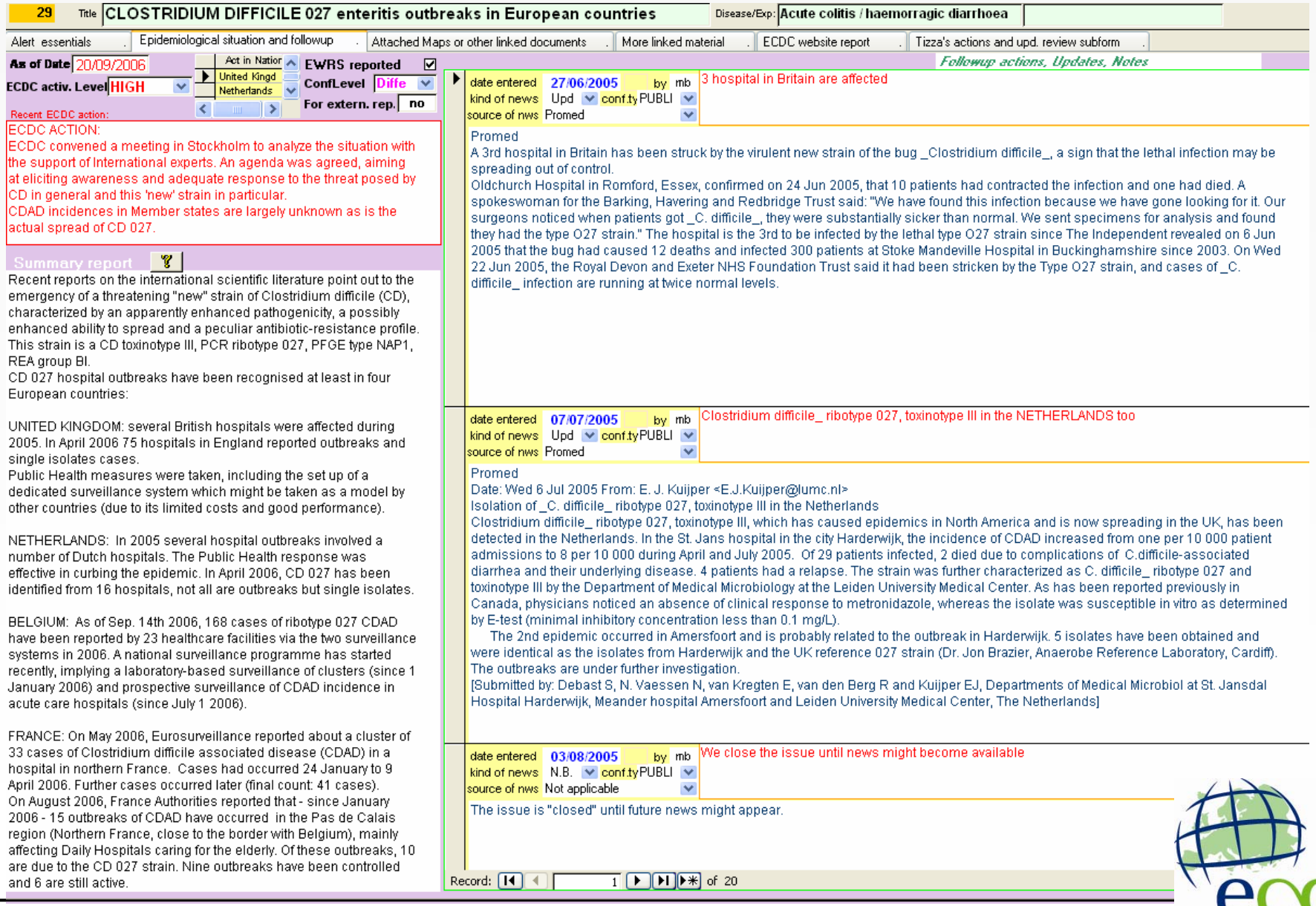
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL


Accessory funcions form : Form
C. D. Threats Database
Accessory functions
ECDC action/period reports
News/actions since ... (?)
ECDC actions between ? and ??
(to obtain the required news/activities report, when prompted please type in the dates relative to the period you are interested in, using the format dd/mm/yyyy)
Statistics about database contents
Geographical distribution: graphs
Geographical distribution: analytical
EU 25 countries involvement (cases/exposures)
Origin of threats (when known)
Threats by disease
Main pathogens causing threats
Sources of information
Nature of threat
Initial followup reason
Assigned verification and assessment
Times to verification and assessment
OPEN threats duration
Closed threats duration
Average followup records
Threats which entail/ed ECDC action
(N.B. : some graphs, and some tables too, require a few seconds for the PC to produce them; so just wait ...)

Event Registration



Event follow-up



29 Title: CLOSTRIDIUM DIFFICILE 027 enteritis outbreaks in European countries
Disease/Exp: Acute colitis / haemorragic diarrhoea

Alert essentials | Epidemiological situation and followup | Attached Maps or other linked documents | More linked material | ECDC website report | Tizza's actions and upd. review subform

As of Date 20/09/2006
ECDC activ. Level HIGH
Act in Natior
United Kingd
Netherlands
EWRS reported
ConfLevel Diffe
For extern. rep. no

Recent ECDC action:
ECDC ACTION:
ECDC convened a meeting in Stockholm to analyze the situation with the support of International experts. An agenda was agreed, aiming at eliciting awareness and adequate response to the threat posed by CD in general and this 'new' strain in particular.
CDAD incidences in Member states are largely unknown as is the actual spread of CD 027.

Summary report

Recent reports on the international scientific literature point out to the emergency of a threatening "new" strain of Clostridium difficile (CD), characterized by an apparently enhanced pathogenicity, a possibly enhanced ability to spread and a peculiar antibiotic-resistance profile. This strain is a CD toxinotype III, PCR ribotype 027, PFGE type NAP1, REA group BI.
CD 027 hospital outbreaks have been recognised at least in four European countries:

UNITED KINGDOM: several British hospitals were affected during 2005. In April 2006 75 hospitals in England reported outbreaks and single isolates cases.
Public Health measures were taken, including the set up of a dedicated surveillance system which might be taken as a model by other countries (due to its limited costs and good performance).

NETHERLANDS: In 2005 several hospital outbreaks involved a number of Dutch hospitals. The Public Health response was effective in curbing the epidemic. In April 2006, CD 027 has been identified from 16 hospitals, not all are outbreaks but single isolates.

BELGIUM: As of Sep. 14th 2006, 168 cases of ribotype 027 CDAD have been reported by 23 healthcare facilities via the two surveillance systems in 2006. A national surveillance programme has started recently, implying a laboratory-based surveillance of clusters (since 1 January 2006) and prospective surveillance of CDAD incidence in acute care hospitals (since July 1 2006).

FRANCE: On May 2006, Eurosurveillance reported about a cluster of 33 cases of Clostridium difficile associated disease (CDAD) in a hospital in northern France. Cases had occurred 24 January to 9 April 2006. Further cases occurred later (final count: 41 cases).
On August 2006, France Authorities reported that - since January 2006 - 15 outbreaks of CDAD have occurred in the Pas de Calais region (Northern France, close to the border with Belgium), mainly affecting Daily Hospitals caring for the elderly. Of these outbreaks, 10 are due to the CD 027 strain. Nine outbreaks have been controlled and 6 are still active.

Followup actions, Updates, Notes

date entered 27/06/2005 by mb — 3 hospital in Britain are affected
kind of news Upd conf.ty PUBLI
source of nws Promed

Promed
A 3rd hospital in Britain has been struck by the virulent new strain of the bug _Clostridium difficile_, a sign that the lethal infection may be spreading out of control.
Oldchurch Hospital in Romford, Essex, confirmed on 24 Jun 2005, that 10 patients had contracted the infection and one had died. A spokeswoman for the Barking, Havering and Redbridge Trust said: "We have found this infection because we have gone looking for it. Our surgeons noticed when patients got _C. difficile_, they were substantially sicker than normal. We sent specimens for analysis and found they had the type O27 strain." The hospital is the 3rd to be infected by the lethal type O27 strain since The Independent revealed on 6 Jun 2005 that the bug had caused 12 deaths and infected 300 patients at Stoke Mandeville Hospital in Buckinghamshire since 2003. On Wed 22 Jun 2005, the Royal Devon and Exeter NHS Foundation Trust said it had been stricken by the Type O27 strain, and cases of _C. difficile_ infection are running at twice normal levels.

date entered 07/07/2005 by mb — Clostridium difficile_ ribotype 027, toxinotype III in the NETHERLANDS too
kind of news Upd conf.ty PUBLI
source of nws Promed

Promed
Date: Wed 6 Jul 2005 From: E. J. Kuijper <E.J.Kuijper@lumc.nl>
Isolation of _C. difficile_ ribotype 027, toxinotype III in the Netherlands
Clostridium difficile_ ribotype 027, toxinotype III, which has caused epidemics in North America and is now spreading in the UK, has been detected in the Netherlands. In the St. Jans hospital in the city Harderwijk, the incidence of CDAD increased from one per 10 000 patient admissions to 8 per 10 000 during April and July 2005. Of 29 patients infected, 2 died due to complications of C.difficile-associated diarrhea and their underlying disease. 4 patients had a relapse. The strain was further characterized as C. difficile_ ribotype 027 and toxinotype III by the Department of Medical Microbiology at the Leiden University Medical Center. As has been reported previously in Canada, physicians noticed an absence of clinical response to metronidazole, whereas the isolate was susceptible in vitro as determined by E-test (minimal inhibitory concentration less than 0.1 mg/L).
The 2nd epidemic occurred in Amersfoort and is probably related to the outbreak in Harderwijk. 5 isolates have been obtained and were identical as the isolates from Harderwijk and the UK reference 027 strain (Dr. Jon Brazier, Anaerobe Reference Laboratory, Cardiff). The outbreaks are under further investigation.
[Submitted by: Debast S, N. Vaessen N, van Kregten E, van den Berg R and Kuijper EJ, Departments of Medical Microbiol at St. Jansdal Hospital Harderwijk, Meander hospital Amersfoort and Leiden University Medical Center, The Netherlands]

date entered 03/08/2005 by mb — We close the issue until news might become available
kind of news N.B. conf.ty PUBLI
source of nws Not applicable

The issue is "closed" until future news might appear.

Record: 1 of 20

ecdc
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

ECDC external Reports / Alerts range

- Early Warning and Response System (EWRS) messages
- EIWR (for the European Commission)
- CDTR (ECDC Weekly Bulletin)
- Eurosurveillance (and E-alerts)
- Ad-hoc epidemiological updates
- ECDC website

ECDC/PRU routine internal reports

- Latest 24 hours news report
- Open threats report
- Daily Roundtable report
- Single threat *dossier*

CDTR: ECDC's Weekly Bulletin

ECDC weekly communicable disease threats report 05/05/2006

CDTR

this report is made availableto authorised users only , and it should not be circulated

EWRS-ONLY INFORMATION IS NOT REPORTED

ID	First case/s Info source *Source date*	Disease Exposure Threat TITLE	Countries involv.	Summ rep date *Last news:*	Summary report: ECDC action:
45	28/03/2005 *Public* *07/07/2005* *Web*	Syst. disease: fever **CHIKUNGUNYA epidemics in the Indian Ocean region** **PHs**	French Southern Territories India Seychelles	04/05/2006 *03/05/2006*	Since the start of the outbreak in March 2005 248,000 cases are estimated to have occurred in La Reunion. Transmission rate declined since the beginning of March 2006. The decline now proceeds, but at a slow rate. Still about 3,000 cases/week keep occurring (vs. 47,000 cases/week in February 2006, when the epidemic reached its peak). Detailed reports about this outbreak can be found in the INVS website, including an estimate about Chikunguniya impact on general mortality in La Reunion (the disease per se is generally mild, but there are exceptions, and the elderly are more exposed to serious consequences). See also the fact sheet about "Chikungunya fever – information for travellers" on ECDC's website (www.ecdc.eu.int) INDIA: since December 2005: 231,324 (no fatalities) cases reported in Maharashtra, Karnataka and Andhra Pradesh Districts. 51 Districts are affected. Recent reports refer about 78 000 new cases in Bangalore district where no cases were reported before. Other countries in the same region (Indian Ocean) currently affected by Chikungunya epidemics of lesser magnitude keep on reporting new cases, since the beginning of 2005: MAYOTTE (5 834), SEYCHELLES (8 818 cases), MAURITIUS (1200) and COMORE. IMPORTED CASES in EU: Chickungunya imported cases affecting travellers have been reported from France (307), Germany (17), Belgium (12), UK (9), Czech Republic (1) and Norway (1). In France, an health care worker who had taken blood samples from a patient was infected apparently for failing to follow adequate personal protection procedures. ECDC action: a CHIKV factsheet is provided, on ECDC's website A technical meeting was held in Stockholm on 30 March 2006. A c conclusions has already been circulated to the ECDC Advisory For Eurosurveillance editorial advisors in MS were requested to provid

Verified on: 07/07/2005
Assess. on: 08/07/2005

Daily updates to the CDTR

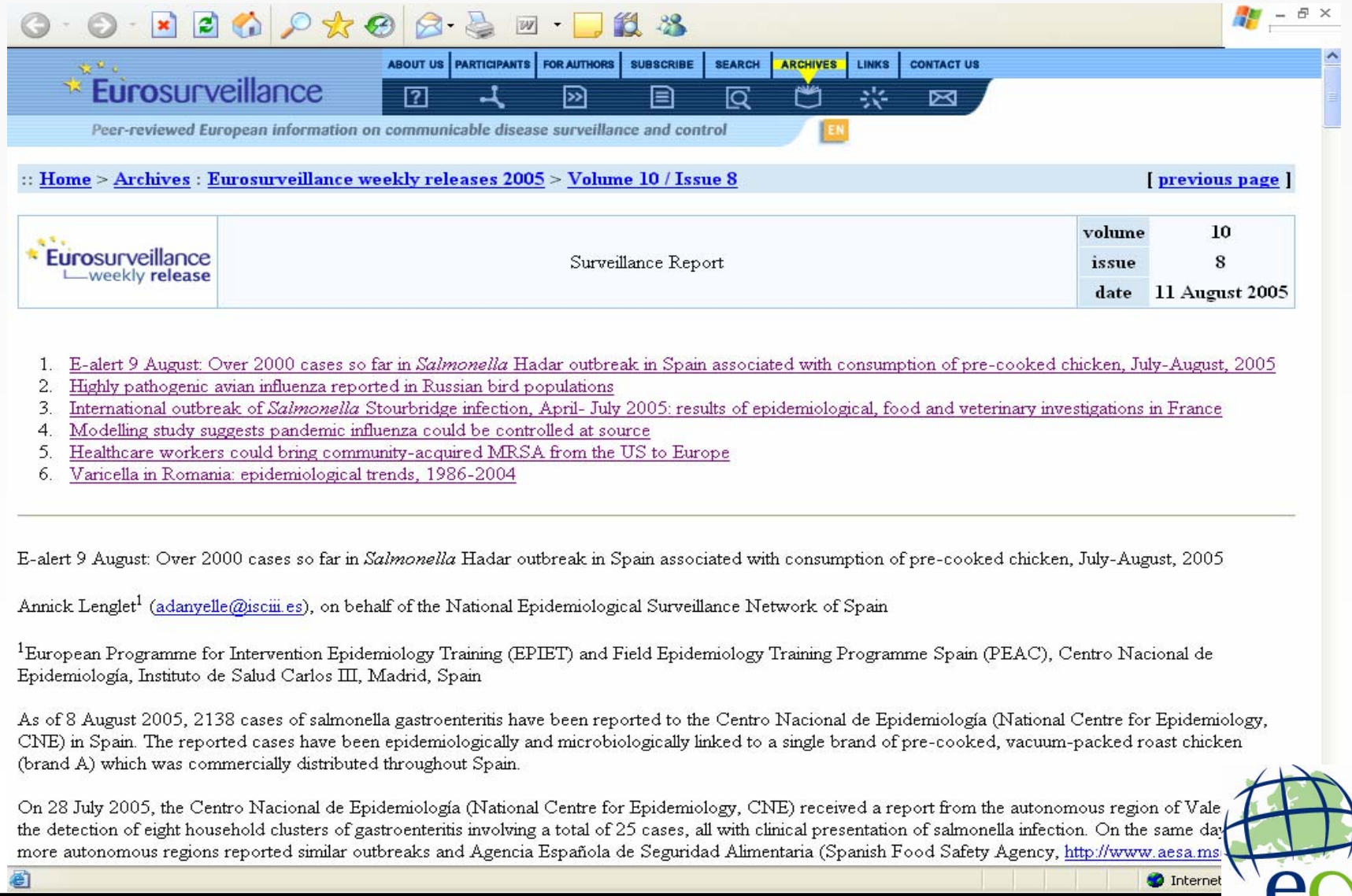
ECDC daily update on communicable disease threats 08/05/2006

for an epidemiological summary of each item please refer to the latest issue of the CDTR (ECDC's weekly bulletin)

EWRS-ONLY INFORMATION IS NOT REPORTED

ID	First case/s	Threat TITLE	Countries involv.	Summ rep date	**Cumulative developments since last CDTR weekly issue:**
45	28/03/2005 Verified on: 07/07/2005 Assess. on: 08/07/2005	**CHIKUNGUNYA epidemics in the Indian Ocean region**	French Southern Territories India Seychelles	08/05/2006	INVS update on May 4, reports 255,000 estimates cases (avearage of 3,000/week). The disease is mentioned in 213 death certificates.
191	Verified on: Assess. on:	**CHOLERA SITUATION WORLDWIDE : current WHO reports**	Angola Sudan	04/05/2006	No news since the last CDTR issue.
29	01/01/2003 Verified on: 27/06/2005 Assess. on: 28/06/2005	**CLOSTRIDIUM DIFFICILE 027 enteritis outbreaks in European countries**	Belgium France Netherlands United Kingdom	26/01/2006	Last week's Eurosurveillance reports a cluster of 33 cases of Clostridium difficile associated disease (CDAD) in a hospital in northern France. 29 patients (88%) had simple diarrhoea and four developed pseudomembranous colitis. Cases occurred in geriatrics wards (n=16), reabilitation wards (n=6), one surgical ward (n=2) and one medical ward (n=2). Control measures were based upon international guidelines and reinforcement of standard precautions and hand hygiene (using water), contact precautions (gloves and gowns), isolation or cohort CDAD patients, environmental cleaning (with hypochlorite) and geriatrics ward for a week [6, 7]. CDAD patients, their families a

Eurosurveillance: weeky & monthly



Eurosurveillance

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Peer-reviewed European information on communicable disease surveillance and control

:: Home > Archives : Eurosurveillance weekly releases 2005 > Volume 10 / Issue 8 [previous page]

Eurosurveillance weekly release

Surveillance Report

volume	10
issue	8
date	11 August 2005

1. E-alert 9 August: Over 2000 cases so far in *Salmonella* Hadar outbreak in Spain associated with consumption of pre-cooked chicken, July-August, 2005
2. Highly pathogenic avian influenza reported in Russian bird populations
3. International outbreak of *Salmonella* Stourbridge infection, April- July 2005: results of epidemiological, food and veterinary investigations in France
4. Modelling study suggests pandemic influenza could be controlled at source
5. Healthcare workers could bring community-acquired MRSA from the US to Europe
6. Varicella in Romania: epidemiological trends, 1986-2004

E-alert 9 August: Over 2000 cases so far in *Salmonella* Hadar outbreak in Spain associated with consumption of pre-cooked chicken, July-August, 2005

Annick Lenglet[1] (adanyelle@isciii.es), on behalf of the National Epidemiological Surveillance Network of Spain

[1]European Programme for Intervention Epidemiology Training (EPIET) and Field Epidemiology Training Programme Spain (PEAC), Centro Nacional de Epidemiología, Instituto de Salud Carlos III, Madrid, Spain

As of 8 August 2005, 2138 cases of salmonella gastroenteritis have been reported to the Centro Nacional de Epidemiología (National Centre for Epidemiology, CNE) in Spain. The reported cases have been epidemiologically and microbiologically linked to a single brand of pre-cooked, vacuum-packed roast chicken (brand A) which was commercially distributed throughout Spain.

On 28 July 2005, the Centro Nacional de Epidemiología (National Centre for Epidemiology, CNE) received a report from the autonomous region of Vale
the detection of eight household clusters of gastroenteritis involving a total of 25 cases, all with clinical presentation of salmonella infection. On the same da
more autonomous regions reported similar outbreaks and Agencia Española de Seguridad Alimentaria (Spanish Food Safety Agency, http://www.aesa.ms

Internet

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Eurosurveillance: E-alerts

E-alert 9 August: Over 2000 cases so far in *Salmonella* Hadar outbreak in Spain associated with consumption of pre-cooked chicken, July-August, 2005

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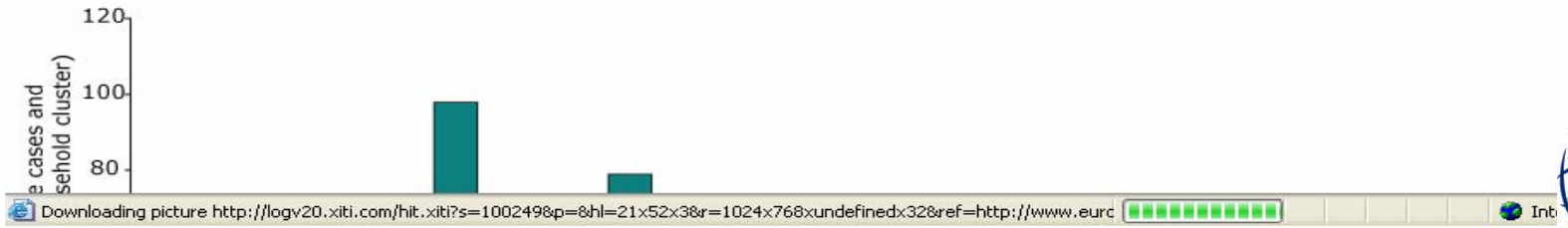
Descriptive Epidemiology

A total of 1983 cases were part of household clusters. Of the people at risk, 74% developed symptoms (1011 cases out of 1363 people at risk in 373 clusters and single cases for which we have this information). Seventeen out of 19 autonomous regions have been affected by this outbreak with Valencia, Murcia, Andalucia and Castilla La Mancha accounting for 60% of all cases. A total of 234 patients have been admitted to hospital and one death has been recorded (in a man aged 90 years). Symptom onset per household cluster or single case ranges from 21 July to 5 August, with peaks on 25 and 29 July (Figure). However, as the implicated brand A chicken product is vacuum-packed and has a shelf-life of at least 3 weeks, it is expected that cases will continue to be reported during August. At present, the CNE has information on age and sex distribution for 253 cases (12% of total). Fifty five per cent of these cases are in men and 45% are in women. The age group most affected is 25-34 years (24% of all cases) followed by 35-44 years (17%) and 45-54 years (13%). In the age group 0-4 years and >74 years, 9 and 6 cases have been recorded respectively. A retrospective case-control study is ongoing.

Figure. Date of symptom onset for 651 household clusters and 155 single cases of *Salmonella* Hadar infection in 17 autonomous regions of Spain, 21 July- 8 August 2005*.



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Ad-hoc epidemiological updates

17 January, 2006 – 18:30

ecdc

EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

Epidemiological update on Avian Flu (H5N1) among humans and poultry in Turkey - confidential

The following update on the situation in Turkey is based on information from World Health Organization, the joint WHO/EC/ECDC team in Ankara and other sources. Most of the information is in the public domain and will be available through the ECDC web-site. However, please consider this information as confidential, and check on WHO web site before you disseminate it further.

As of 17:00 on Tuesday 17 January, there are 21 cases confirmed cases as compared to 20 yesterday. The Ministry of Health has reported that the newly confirmed case is from Erzurum in eastern Turkey, but no further details are currently available. Among 19 cases for which age is available, 3 are 0-4 years, 12 are 5-14 years, and 4 are 15 years and older. Twelve of the cases were males and 8 females. The 21 confirmed cases are originating from 9 provinces: Agri (8), Van (2), Ankara (3), Kastamanou (2), Samsun (1), Corum (1), Sivas (1) Sanliurfa (1) Erzurum (1) and Siirt (1). All cases were hospitalized within the first 10 days of January 2006.

There is no indication of human-to-human transmission.

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ECDC's website (includ. CDTR online)

ecdc
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

Mini-conference EMRisk 19th october 2006 Nol in 't Bosch, Wageningen Wilfrid van Pelt

Vigilance and signalling of human infectious disease events in the Netherlands

Wilfrid van Pelt, also on behalf of the "Early-Warning Committee"

rivm
Rijksinstituut voor Volksgezondheid en Milieu

Infectious disease control in The Netherlands

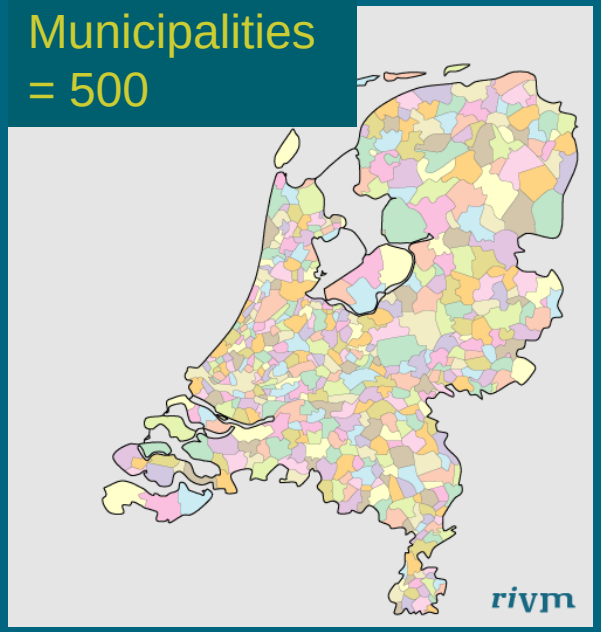
- Public health coordination at national level
- Regional level is responsible for disease control

- Recent large outbreaks, “Crisis”:
  - Legionella (1999)
  - Avian Influenza H7N7 (2003)
  - Rubella (2005)
  - MRSA (2006)

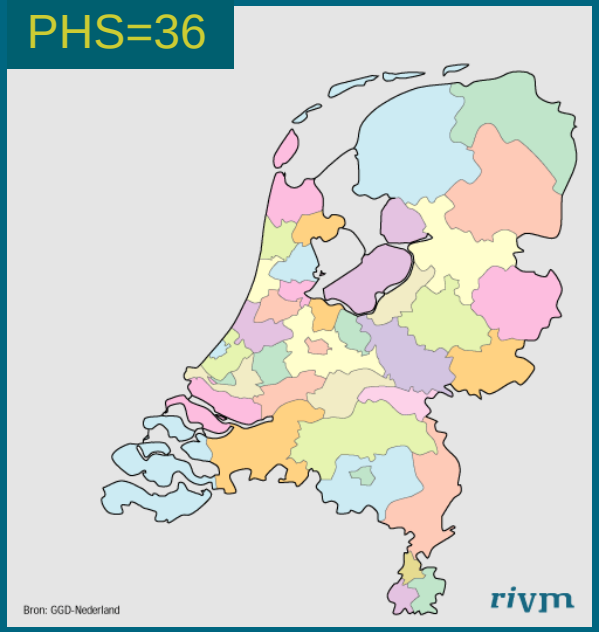
Infectious disease control in the Netherlands

- 36 Regional / municipal health services:
  - responsible for control of infectious diseases
  - notification of communicable diseases to Inspectorate and RIVM

Municipalities = 500



PHS=36



•decentralized control and Responsibility

•national control policy:

>1 region

LCI guidelines

crisis OMT

Vigilance, signalling of events

- Signals
- From RIVM (notifications, lab reports, algorithms), PHS, LCI, WHO, promed, ECDC, EWRS, int. alert networks
- 1st Verification
  also outbreak investigation
- (RIVM) Centre Infectious Diseases Control (CIb)
- "Signalling Committee",
  a weekly meeting of experts
  microb, clin, vet, epid, VWA
- Scrutiny of signals and judgment: further investigation, alert, action?
- Weekly Report
- to Inspectorate and Minist. of Health, PHservices, Food SafetyA, Animal Health Service

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Signaleringsoverleg - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit

Address http://webje.rivm.nl/sign_overleg/index.html Go Links

RIJKSINSTITUUT VOOR VOLKSGEZONDHEID EN MILIEU
NATIONAL INSTITUTE OF PUBLIC HEALTH AND THE ENVIRONMENT

Volksgezondheid / Infectieziekten / Signaleringsoverleg

Home Contact

- Introductie Sign. overleg
- Verslagen index
- Signaal index
- ISIS
- Infectieziekten Bulletin

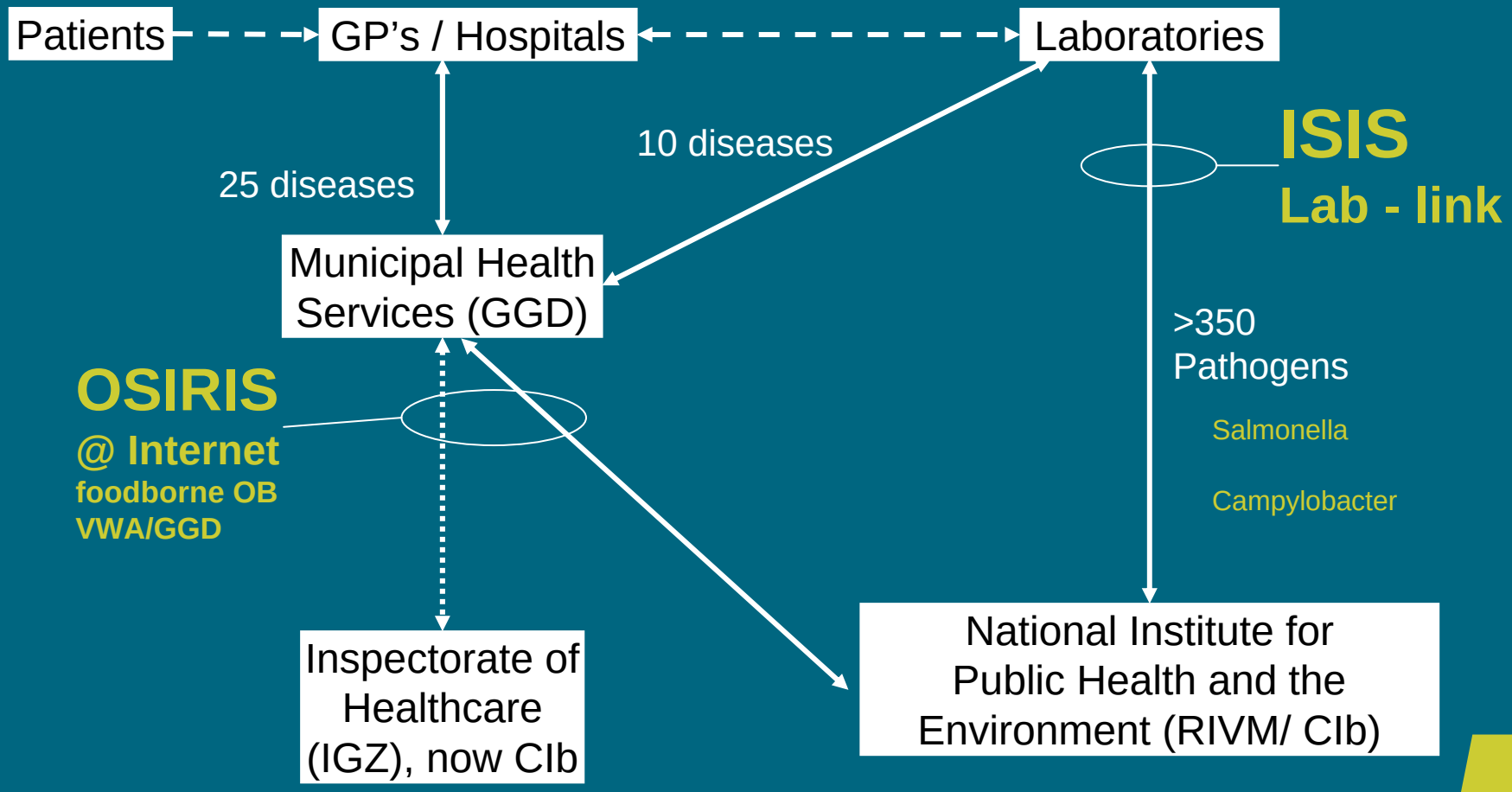
455	Coxackie B virus	30-05-2002		3
454	Entamoeba histolytica	16-05-2002		2
453	Hepatitis A-virus	25-04-2002		1
452	Plasmodium spp.	23-05-2002		2
451	Onbekende verwekker	25-04-2002		1
450	Onbekende verwekker	25-04-2002		1
449	Hepatitis A-virus	18-04-2002		1
448	Prion	18-04-2002		1
447	Enterobacter sakazakii	18-04-2002		1
446	Campylobacter jejuni	18-04-2002		1
445	Shigella flexneri	18-04-2002		1
444	Chlamydia trachomatis	18-04-2002		1
443	Neisseria gonorrhoeae	18-04-2002		1
442	Pseudomonas aerogunosa	11-04-2002		1
441	Mazelen virus	13-06-2002		2
440	Escherichia coli	11-04-2002		1
439	Brucella spp.	18-04-2002		2

Signaal 446
Campylobacter jejuni

18-04-2002

In de regio Zuid-West hebben vorige week drie groepen van een basisschool een zuivelboerderij bezocht. De boer heeft hen rauwe melk aangeboden. Van de 90 kinderen zijn er 20 ziek. Klachten zijn langdurige diarree en hoge koorts. Het drinken van rauwe melk wordt gezien als één van de risicofactoren voor gastro-enteritis.

Disease reporting in The Netherlands



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Salmonella and Campylobacter are NOT notifiable!

Reason

- GP needs no regional/national help
- normally a selflimiting disease,
- no antibiotic treatment necessary

Consequences

- Only severe cases are laboratory diagnosed
- Sentinel laboratories, 50-65% coverage
- Special permissions needed to get to patient: 1st laboratory, 2nd GP.

→Loss of time in case of outbreak, incomplete data

Early Warning

- Signals from surveillance
  - Algorithms, manual analysis
- Rumours
  - Professional network, media, public
    - Human, veterinary, environmental
- International bulletins / Alert systems
  - MMWR, WER, ProMED, EWRS, RASFF, ENTERNET, etc

Importance of information

"Early-Warning" of medium / long term trends and prevention

- health policy (proactive)

Detection of "outbreaks"

- urgent/rapid action (reactive)

Timeliness / resources / collaboration

Algorithm for detection of outbreaks

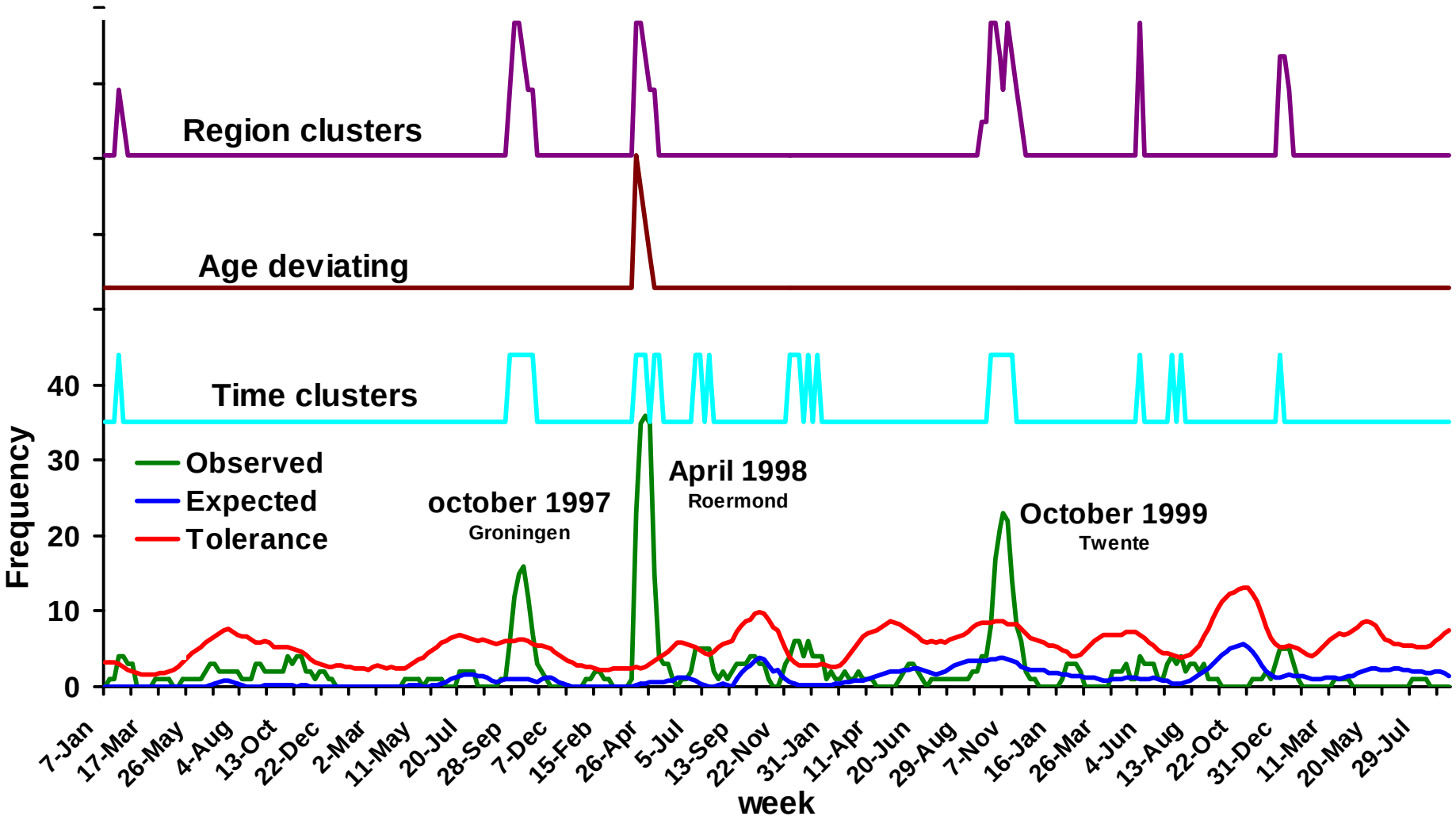
Prospectively expected frequencies and tolerances

- Optimising sensitivity and specificity

  Not miss outbreaks but also not too much false alarms

- time-geography and time-age clusters and demographic aberrations

Explosions of S. Typhimurium ft 20



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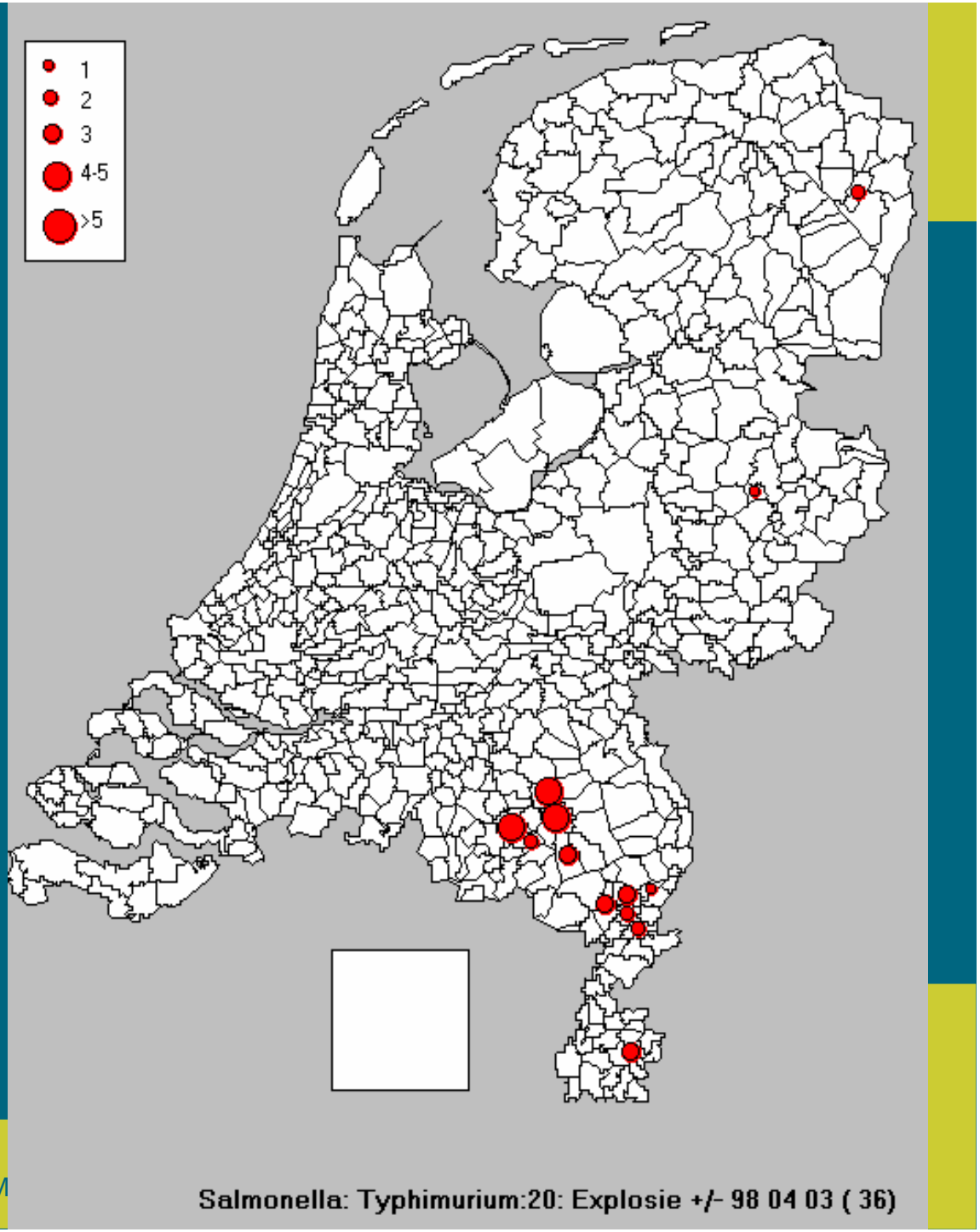
Early-Warning application

1st step signal verification:

region

Silver wedding:

- Case-control study rPHA
- Coburgerham, salting process insufficient



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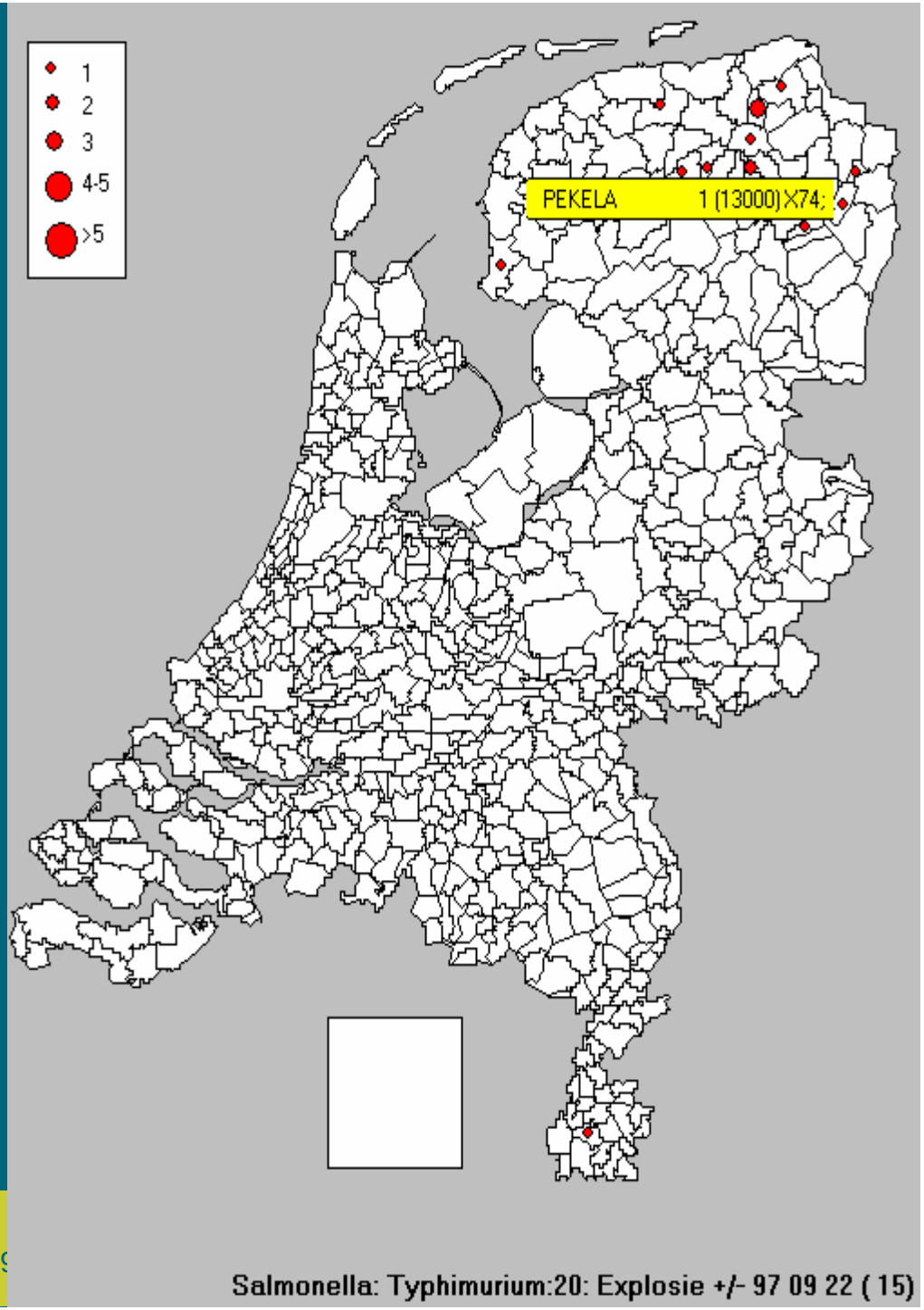
1st step
signalverification:

region-crossing

Place, Age, Gender

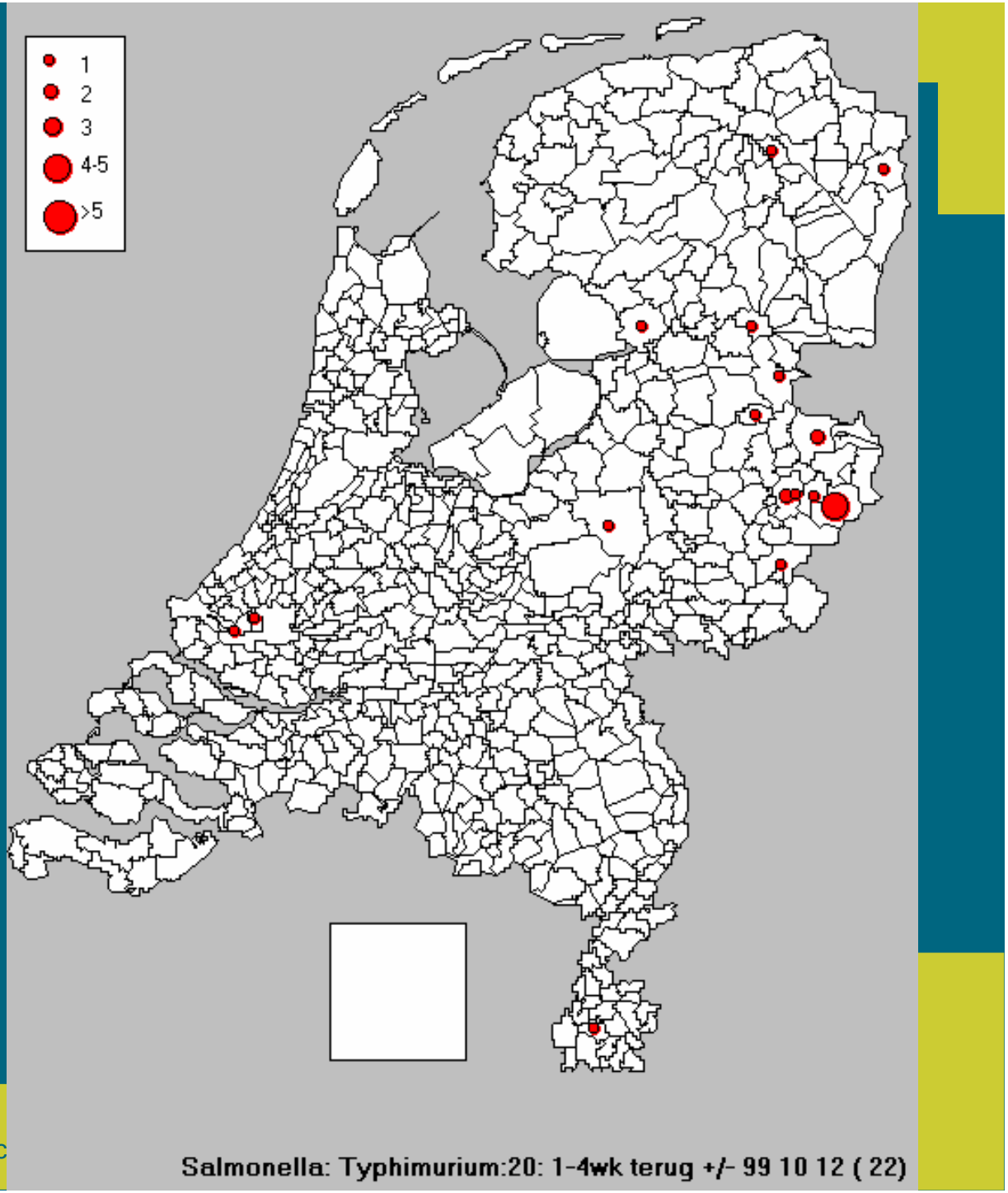


1st step signalverification:

precedent

No cause found:

- RIVM trawling questionnair, too late
- Animal Health Service, no clou in region



Explosion of Salmonella Typhimurium DT104 cases

In the after summer of 2005 an explosion of DT104 infections occurred, resulting in an extra 167 lab-confirmed cases of salmonellosis

(tip of the Iceberg).

This means an estimated 4.000 extra cases of gastro-enteritis in the general population.

An estimated 65 hospital uptakes

And an estimated 5 extra cases of death due to the infection within 2-years

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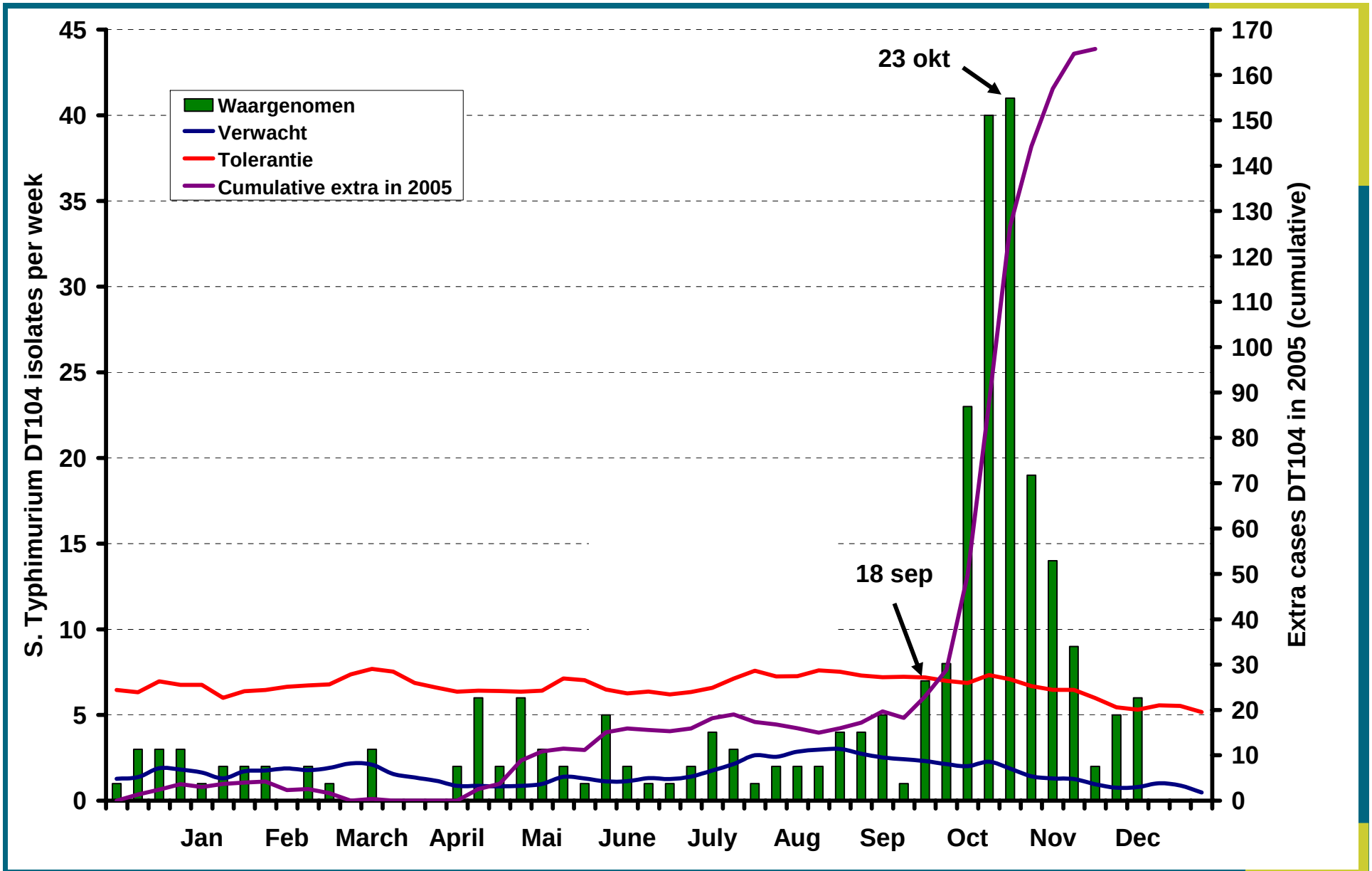

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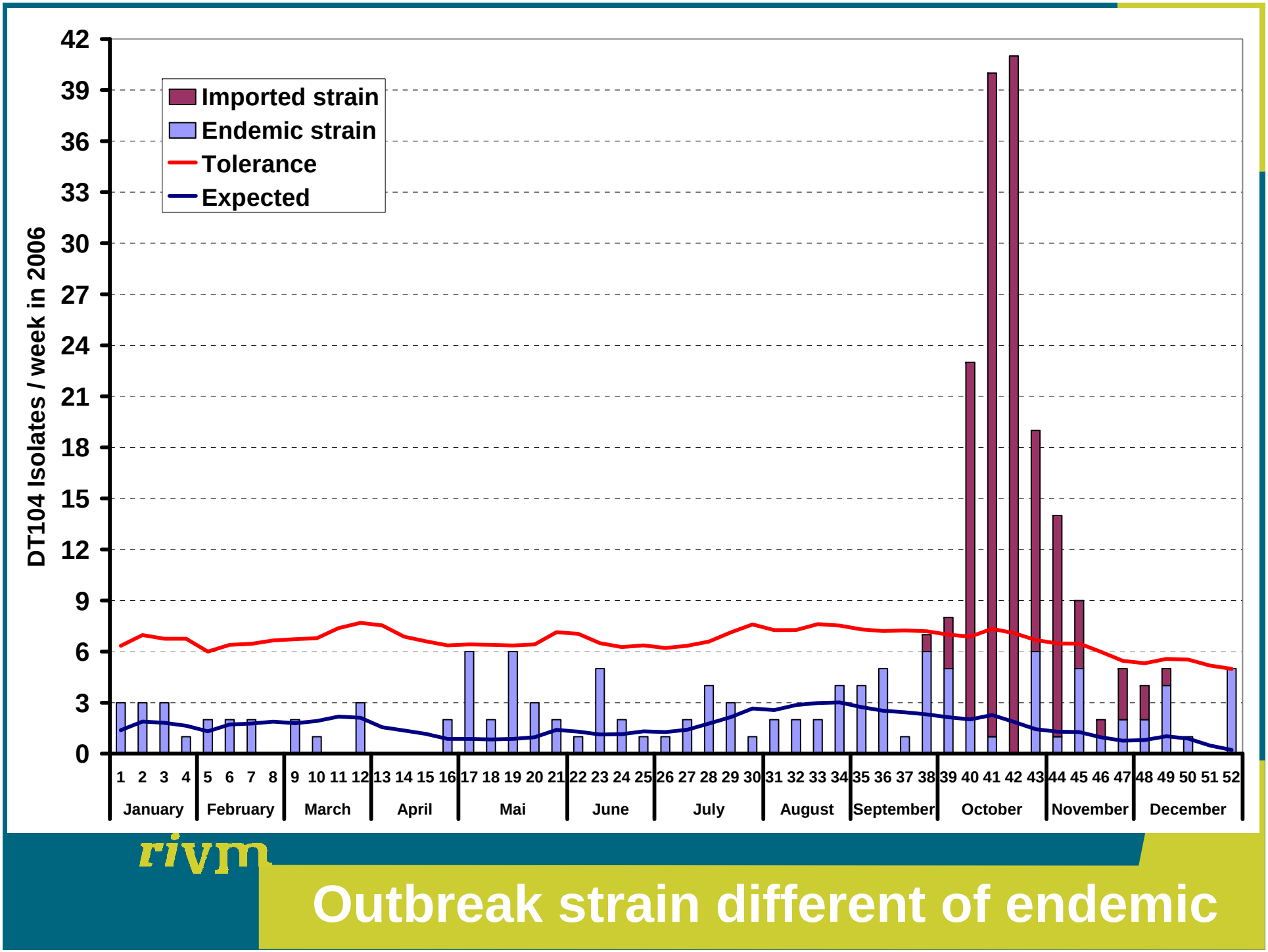
Endemic or imported???

Outbreak investigation

- Case-control study, ENTERNET-request
- Molecular typing of bacterial isolates (RIVM-LIS)
  - Genotyping: PFGE and MLVA (NPHI) unique for explosion
  - DNA-fingerprint identical Carpaccio event Denmark July 2005 involving imported beef (ENTERNET-request)



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Outbreak strain different of endemic

Case-control study

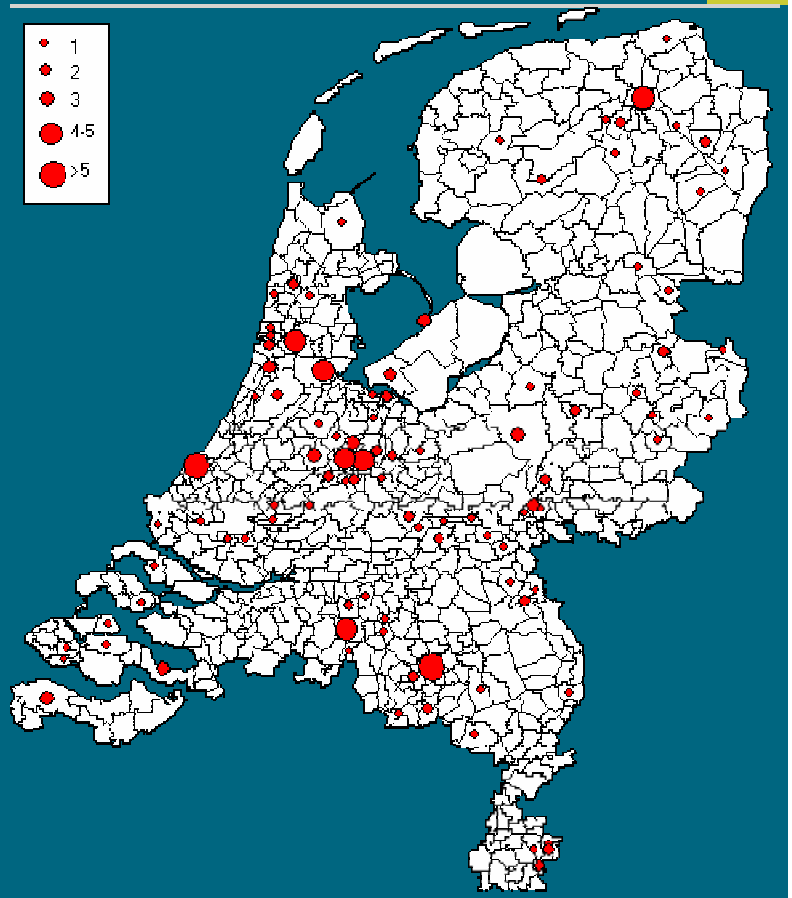
Case Control study

- Cases (109 eligible)
- Controls (411 eligible)

Result

– Filet-Americain OR 4.2 (1.5–12.0)

– Mobile-Caterer OR 4.9 (1.1–22.1)



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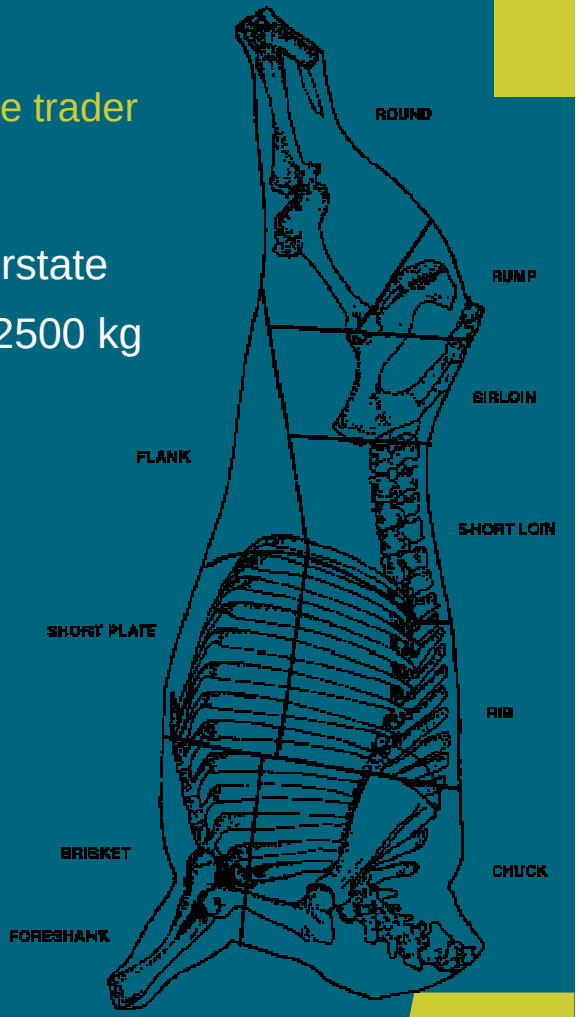
- Trace-back of incriminated foodstuff VWA (Food and Consumer Product Safety Authority)
  - General Food Law > RASFF-signal outbreak DK with details on incriminated beef transported through Holland.

  No succes trace-back half september

Traceback by VWA, october 2005

October new try: 3 Dutch companies (May): 2 ship catering, 1 wholesale trader

- Wholesale trader:
  - 1000 kg > within portion of 2500 kg > exported to EU-memberstate
  - 2000 kg > within portion of 3000 kg > exported to England > 2500 kg back to NL > 1000 kg to DK and 21 kg to Dutch butcher
- Butcher:
  - Portion sold for barbecue meat
  - Portion sold to restaurant in Germany
  - 7 kg still present!!!!
- Rest batch:
  - STM DT 104 with identical DNA-profile found!!



Conclusion 2005 DT104 outbreak

Imported contaminated beef caused two outbreaks in Europe in raw meat products

- Netherlands: filet americain
- Denmark: carpaccio

Trace-back succesfull. But if really started after the DK-signal (ENTERNET/RASSF) withdrawal could have prevented cases

Main portion not traceable anymore or already consumed

ENTERNET feed-back and MLVA-testing by the Norwegian PHI, extremely usefull!! (tandem publication in E&I)

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Signal Salm. Enteritidis Pt 4b

- Monday 27/11: cluster in Salmonella database NRL
  - 12 cases, regionally clustered (1st time in Holland)
  - 2 isolates q-control beansprout (sample 26/10, later 2e 15/11)
- Actions 27-30/11 o.a
  - informing MPH, IPH, LCI, FIS, RIVM-signalling club
  - info Enter-net partners: no problem, rare→Dutch problem
  - beansprout-producer (indir.); inspection 30/11
  - 1st questionnair: egg, chicken or beansprout
- Case-control study 30/11-14/12 (n=25):>>Beansprout!!
- Link: cases and sellingpoints BS-producer

Beansprouts

Conclusion:

- Bact. test, distribution 5 days, consumption 5-7, 1st day of illness>>detection RIVM 21 days

  Faster detection is needed!!!

Result:

- Seed destroyed, prevented many more cases
- spring 2001 re-inspection all b.s. companies
- Adaptation foodlaw on allowance pathogens in raw foodproducts

(Duynhoven, Pelt et al. 2002 EID)

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The End

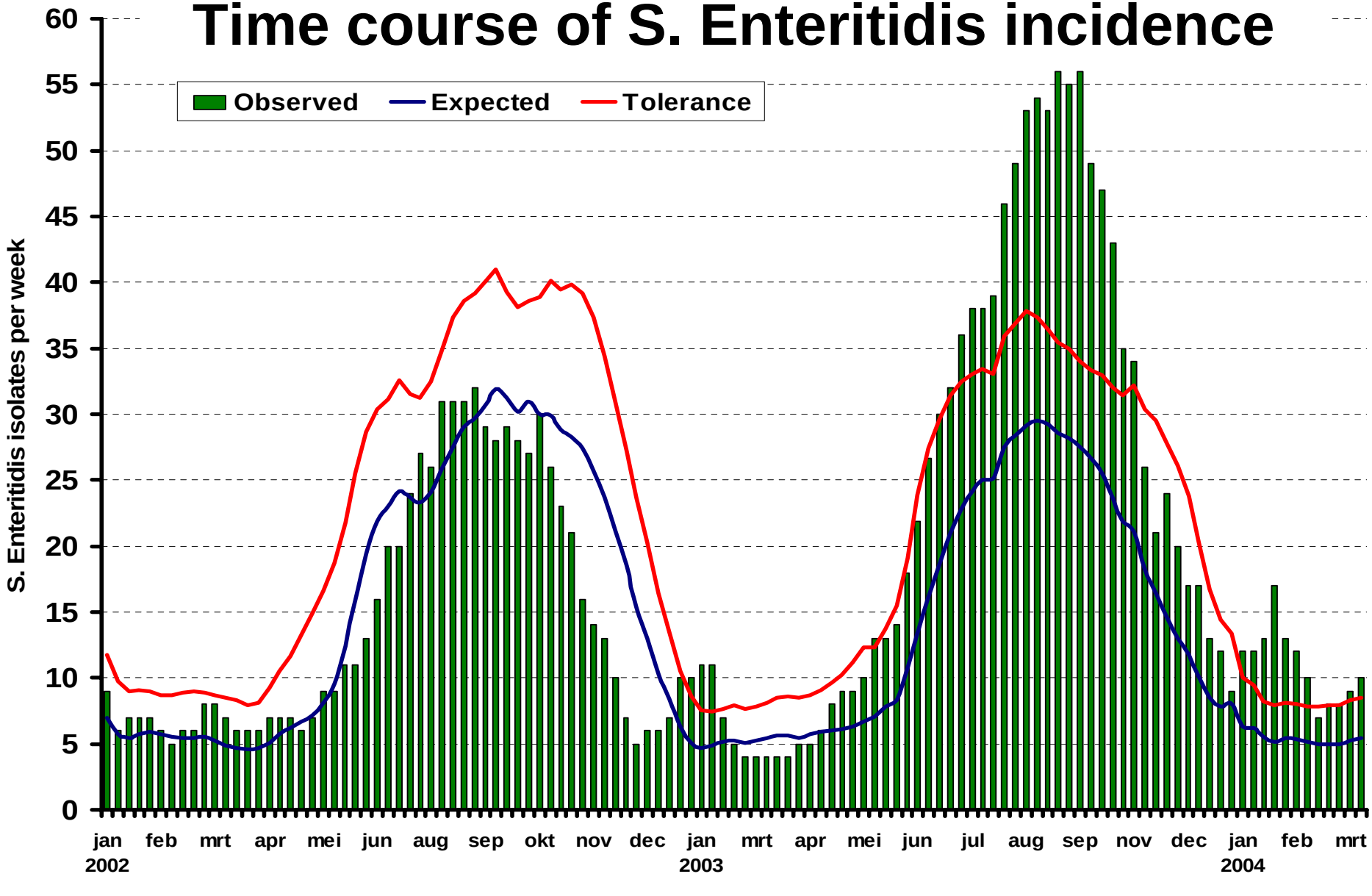
Explosion of Salmonella Enteritidis cases

In the summer of 2003 an explosion of S. Enteritidis infections occurred, resulting in an extra 540 lab-confirmed cases of salmonellosis.

This means an estimated 7.500 extra cases of gastro-enteritis in the general population.

And an estimated 8-11 extra cases of death due to the infection

Time course of S. Enteritidis incidence



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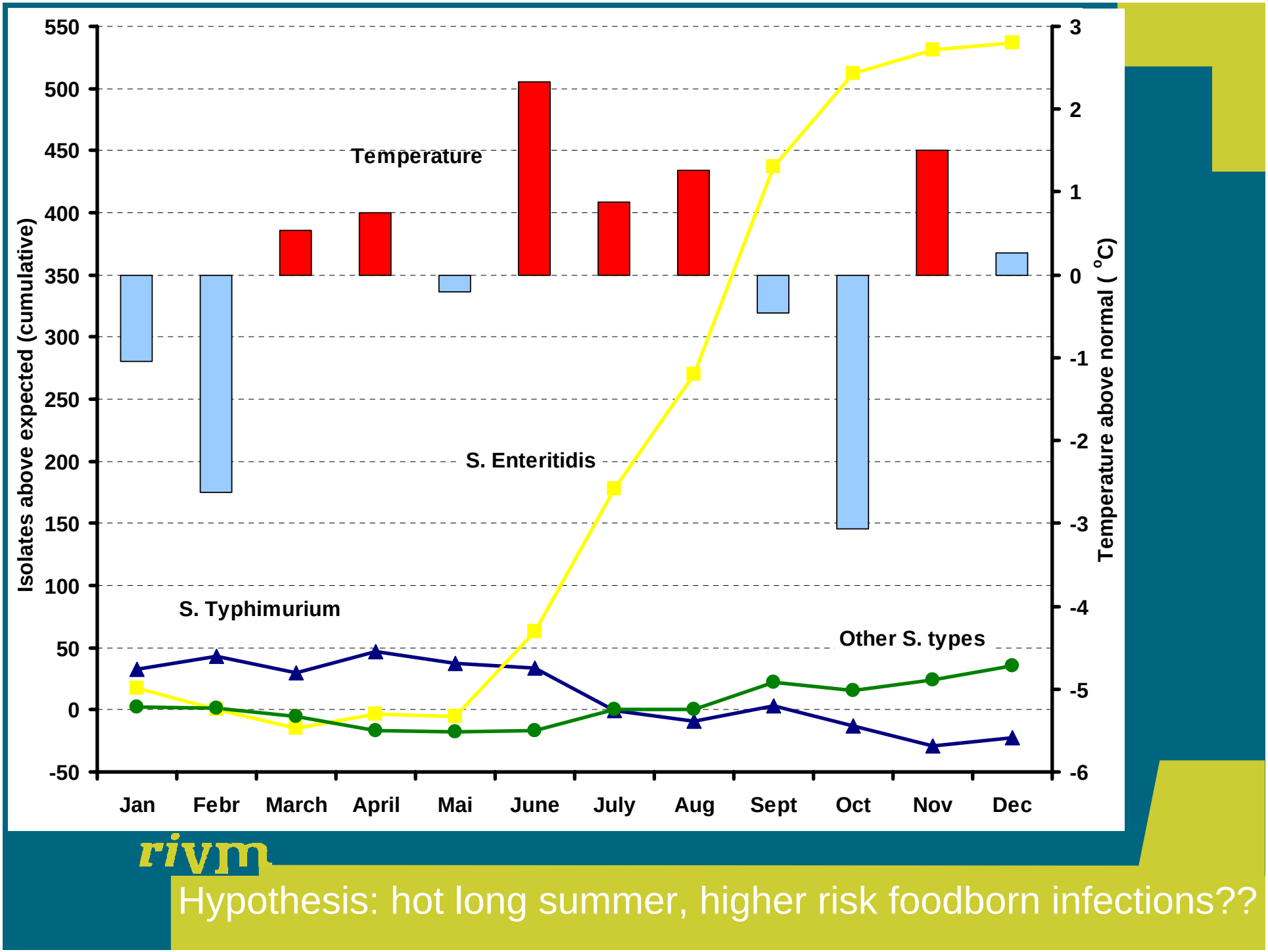
Above tolerance: June-October 2003 & 1st months 2004



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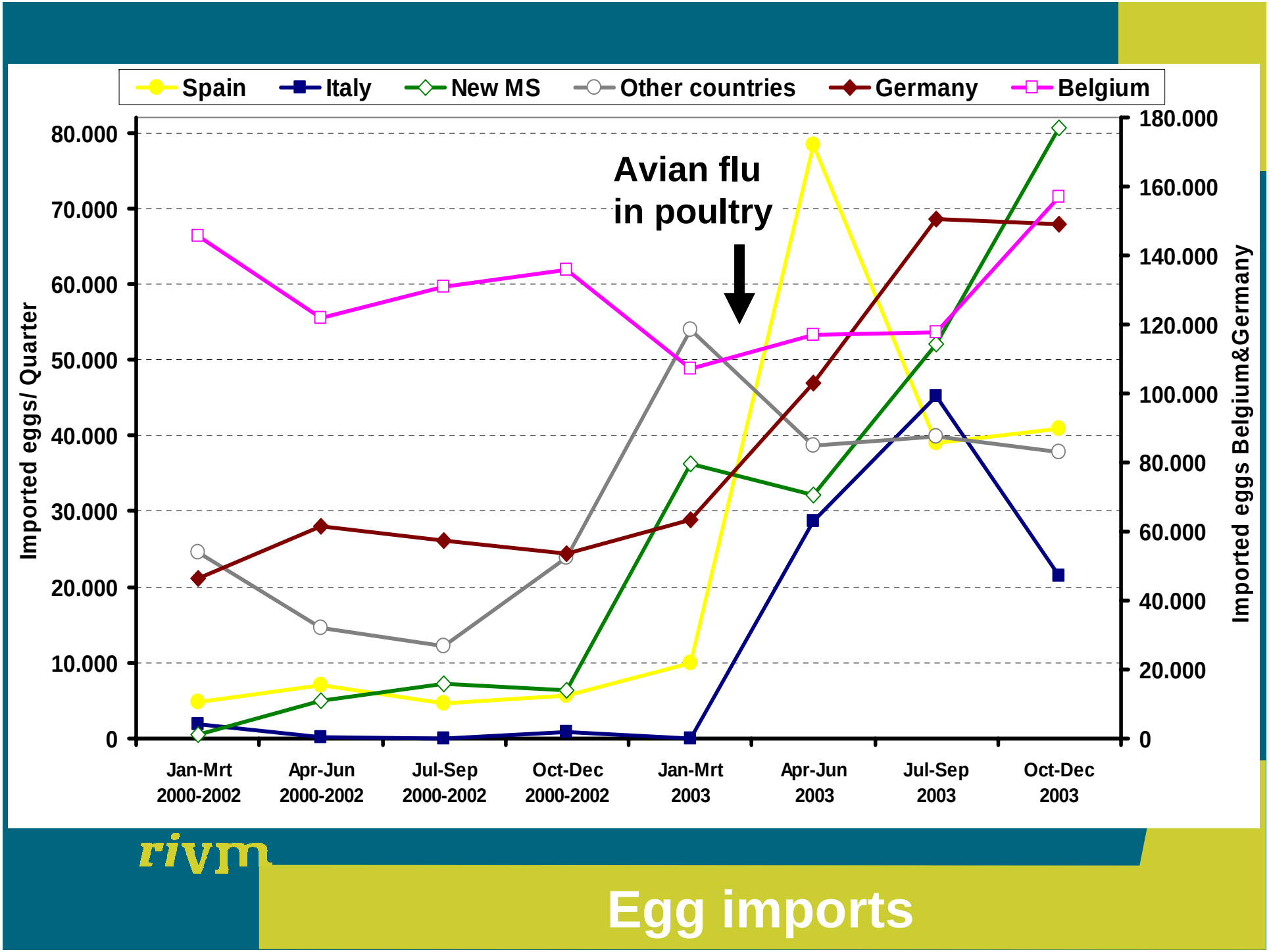
Hypothesis: hot long summer, higher risk foodborn infections??



rivm

Egg imports

Emerging Risks and Early Warning Systems

(and Horizon Scanning)

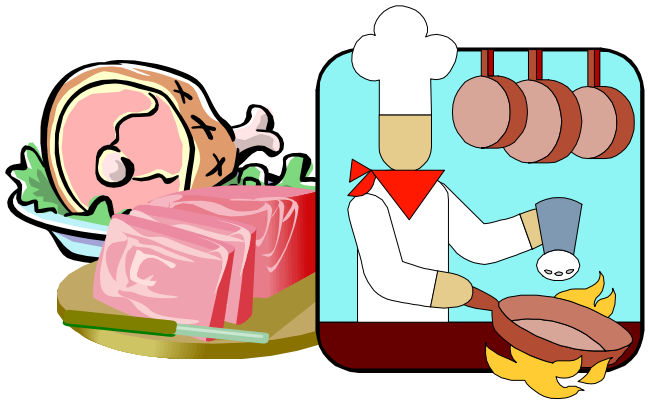
Marion Wooldridge

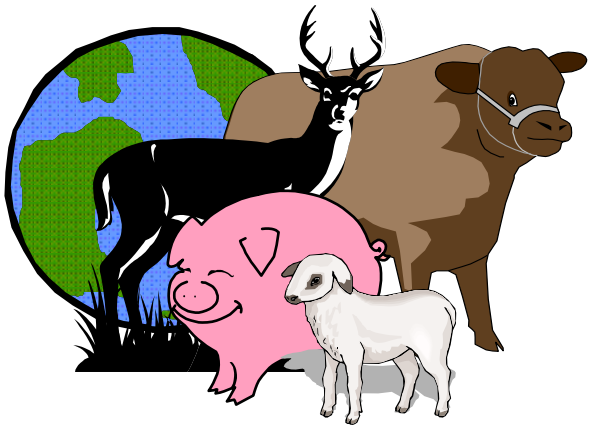
VLA, UK

October 19th 2006,

Wageningen,

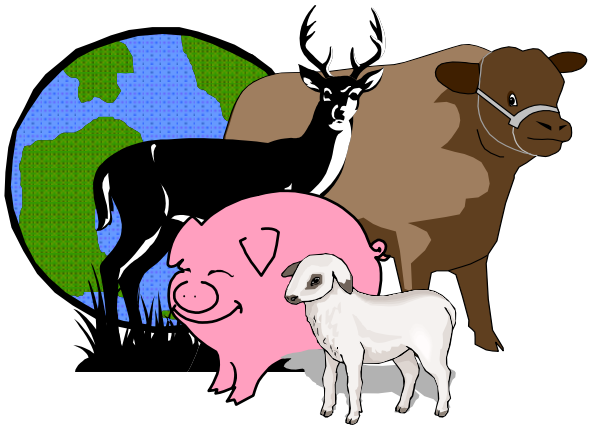
The Netherlands





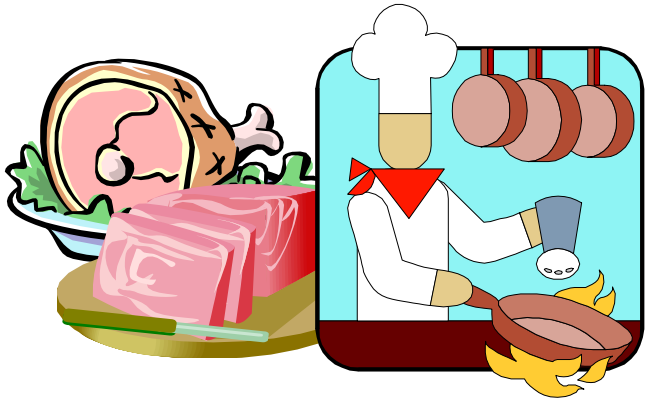
Outline of talk

- VLA - purpose and structure
- Farmfile/VIDA - surveillance ‘Horizon Scanning’
  - an overview
- Statistical ‘Horizon scanning’
  - the Salmonella example
- Outbreak investigations
  - maximising the ‘early warning’ value
- Summary



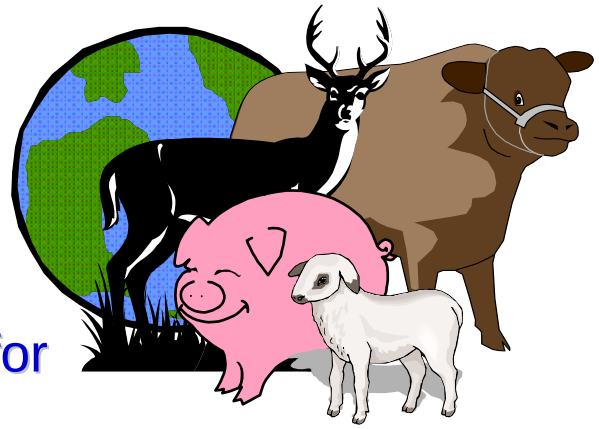
VLA - purpose

- A Defra Science Agency:
  - Surveillance for…
    - Identifying trends and changes
    - Identifying new diseases/pathogens
    - To supply Defra with info and ‘early warnings’
  - Underpinned by….
    - Research
    - Reference Labs
  - VLA Science Strategy for….
    - Animal health and welfare
    - Veterinary public health
      - i.e. zoonoses, food safety etc



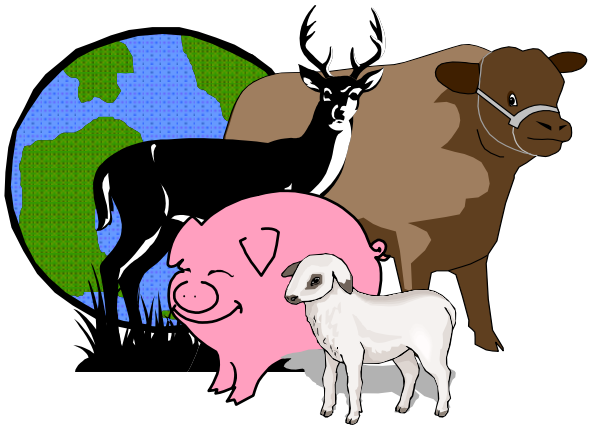
VLA - Structure

- Network of laboratories
  - RLs (Regional labs):
    - England, Wales, & one in Scotland
    - VIOs (Veterinary Investigation Officers)
      - Investigate farm cases/outbreaks (scanning surviellance)
      - Project work (targetted sampling)
      - Record findings in appropriate database
        - e.g Farmfile/VIDA; Salmonella database etc.
  - HQ at Weybridge
    - Most research (e.g Bacti, Viro, CERA etc)
      - Analysis of database data (mostly in Centre for Epidemiology & Risk Analysis; CERA)



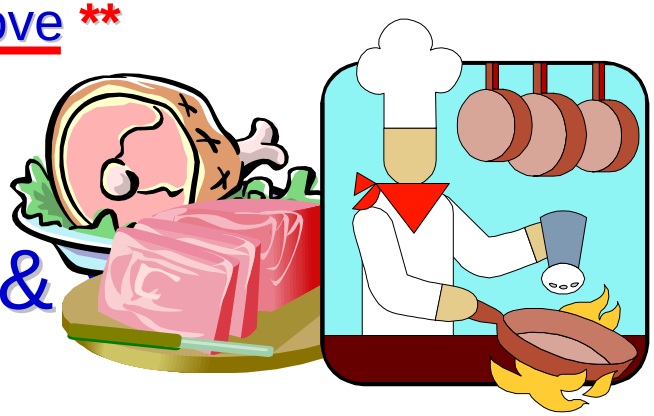
Farmfile/VIDA - 'Horizon Scanning'

- Database of all scanning surveillance at RLs
  - All investigations entered electronically at RL
    - Farm and animal details
    - Clinical picture
    - Samples, tests & diagnosis
      - Or code for not diagnosed -
        - 'early warning' potential**
  - CERA keeps database
    - Routine reports & ad hoc analyses
      - trends are/can be identified
      - 'early warning' potential**
  - **Species Groups may be alerted



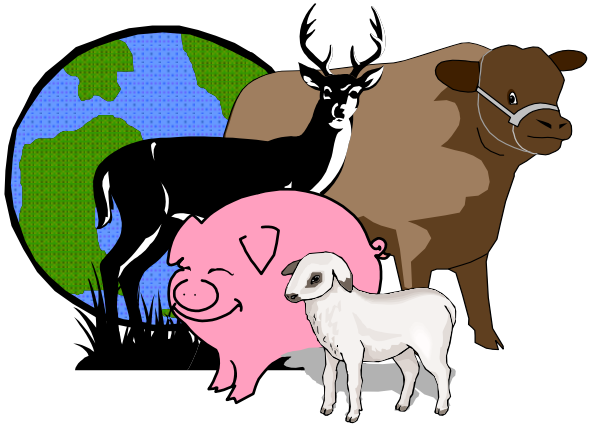
Statistical 'Horizon Scanning'

- Project work and statutory databases
  - Targetted surveillance plus legal notifications
    - e.g the Salmonella database
    - all Salmonella identifications
- Trend identification
  - Statistical method developed in CERA
  - Salmonella Typhimurium in Cattle
    - baseline threshold (rolling); warning if above **
    - accounts for seasonality
    - still some methodological issues
- Roll-out now to other pathogens & VIDA non-diagnoses



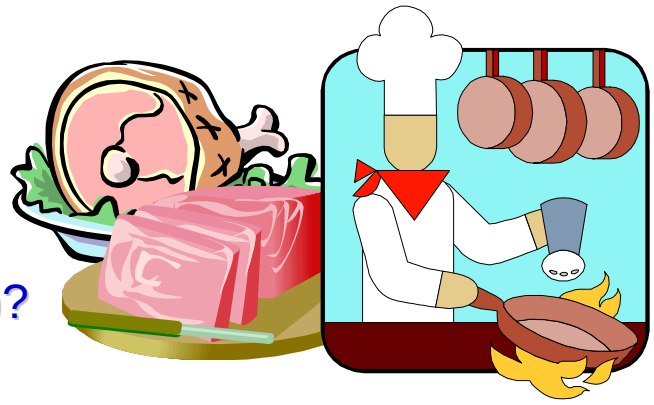
Outbreak investigations - maximising the value - 1

- Specialist ‘Species groups’ set up
  - Cattle, Small Ruminant, Pigs, Poultry, Wildlife
    - VIOs with specialist interest & knowledge (VIO chair),
    - reps from e.g. Bacti, Viro, Pathology, CERA etc
- Planned system…..
  - Chair notified if:
    - Undiagnosed case ‘of interest’
    - Unexplained trend
    - Cluster of ‘undiagnosed syndrome’
  - Investigation started with ‘appropriate’ priority



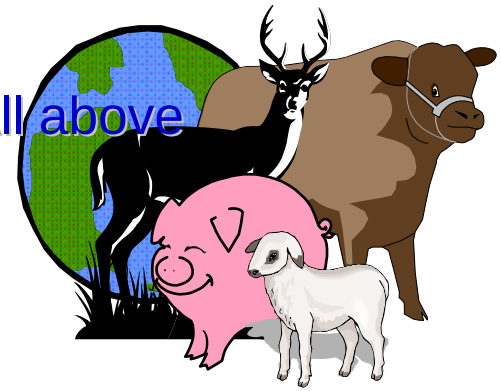
Outbreak investigations - maximising the value - 2

- Rapid farm level qualitative risk assessments (RAs)
  - Current ‘Seedcorn’ project for assessing ‘incident’
  - Standardised (questionnaire & pathway) method for rapidly estimating risks of:
    - Pathogen/disease spread on farm/off farm
    - Risks to farm workers/in contact humans
    - Foodborne or animal product spread
  - And therefore deciding…..
    - Who needs notifying immediately?
    - What safeguards are needed urgently (if any)?
    - Long term research?



Summary

- Large network - labs, VIOs, researchers
- Scanning surveillance with routine data collection & analysis
- Targetted/statutory surveillance with routine data collection & analysis
- Species groups and on-farm RAs
- ‘Delivering Intelligent Surveillance’
  - Current project to maximise integration of all above



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Systematic identification of emerging risks: a holistic approach

Wim Ooms

Food and Consumer Product Safety Authority

The Netherlands

Structure of the presentation

1. Introduction
2. Holistic approach
3. Developments and examples
   - sectors and indicators
   - information sources
4. Conclusions

Background

1. General Food Law (EFSA, article 34)
2. Act on independent Risk Assessment by VWA (Staatsblad 2006, 247)
3. Food production (increased complexity)
4. Food supply chain (fork to farm)
5. From reactive towards proactive systems

Approach

Goal

To develop a system or procedure aimed at proactively identifying and preventing a potential hazard from becoming a risk

Motto

Be realistic: ask for the impossible !

Emerging risks

Definition (provisional)

A potential food, feed or diet related hazard that may become a risk for human health in the (near) future

Types of emerging hazards

1. Unidentified new form(s) of a (group of) known hazard(s), e.g. a “new” mycotoxin
2. Not-well known hazard, e.g. acrylamide
3. Re-emerging hazard, e.g. avian influenza

Identification of known risks

Cause-effect analysis

Usually the cause of the occurrence of hazards is sought in food, feed or diet related matters

Assumption

Knowledge of food, feed or diet related matters will provide all relevant information on hazards

Identification of emerging risks

Question

Will we be able to identify new, emerging risks by knowledge of food, feed or diet related matters ?

Answer

Knowledge of food, feed and diet related matters is essential but not sufficient to identify emerging risks

VWA approach

Task

Widening our horizon: analyse the environment related to the feed and food supply chain

Projects

1. PERIAPT in 2004 (sponsor: EC, DG Research)
2. EMRISK in 2005 (sponsor: EFSA)

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1. Introduction
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3. Developments and examples
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4. Conclusions

Widening our horizon

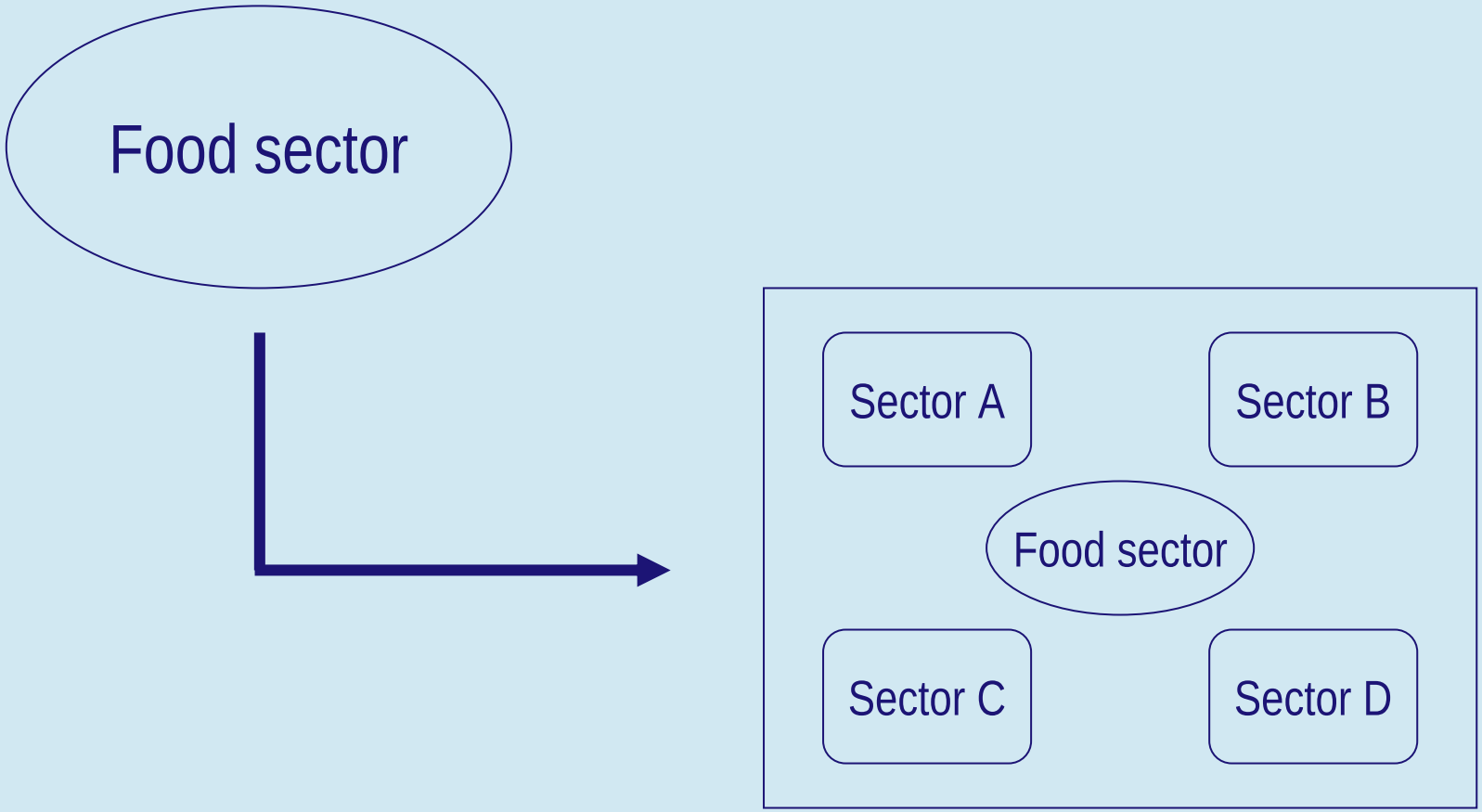
Holistic approach

Statement

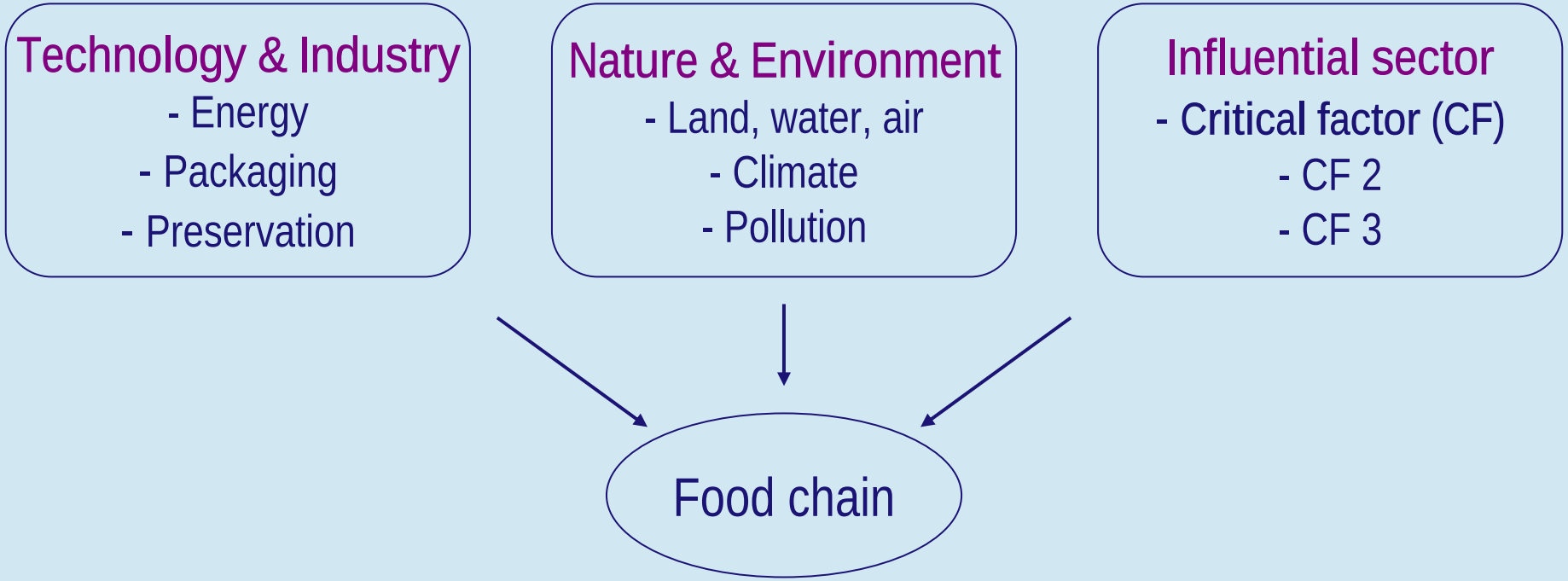
For the identification of emerging hazards we:

1. Use information available within the food supply chain
2. Look for information available outside the food supply chain

Availability of information



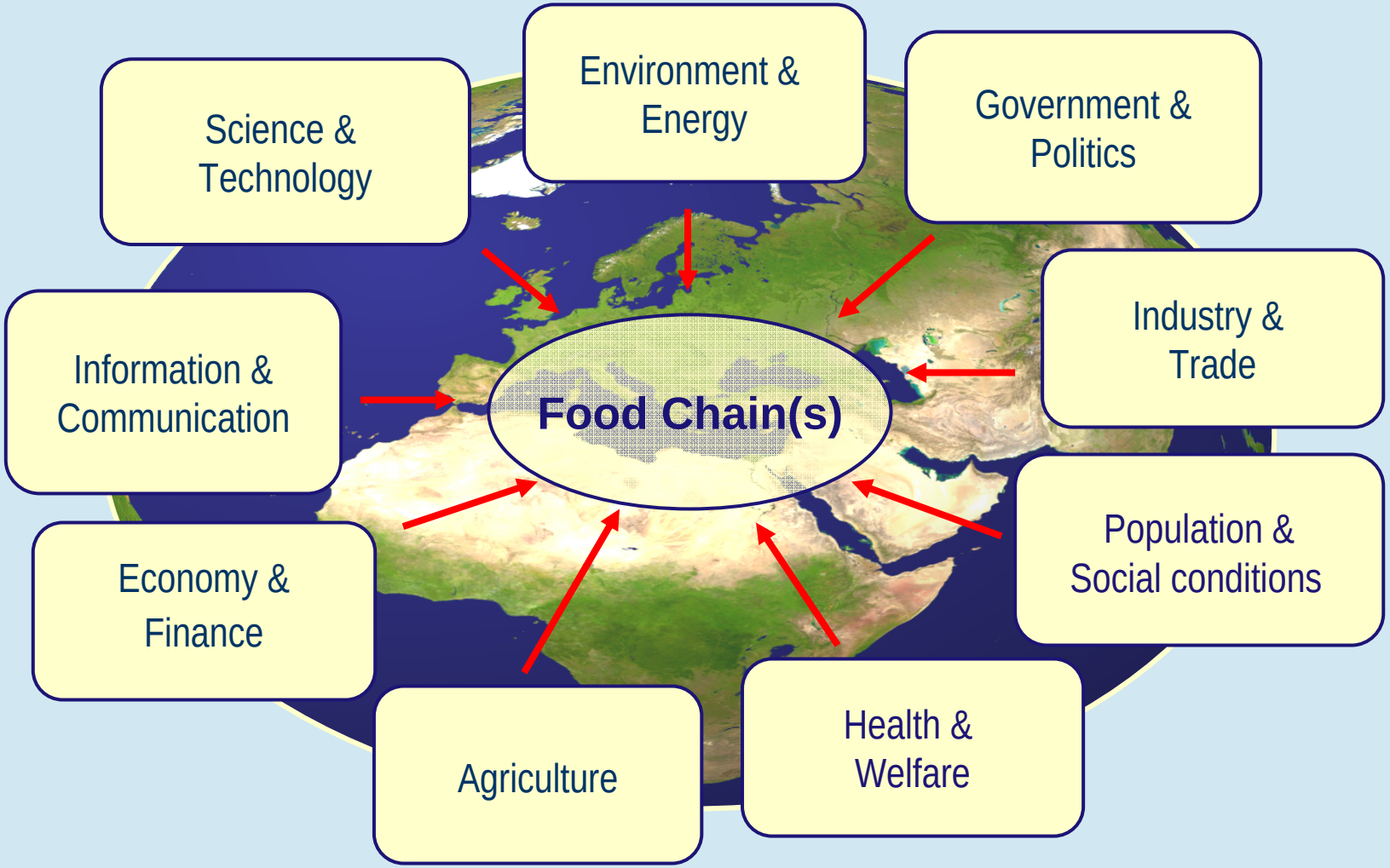
2. Holistic approach



Conclusions workshop Bonn

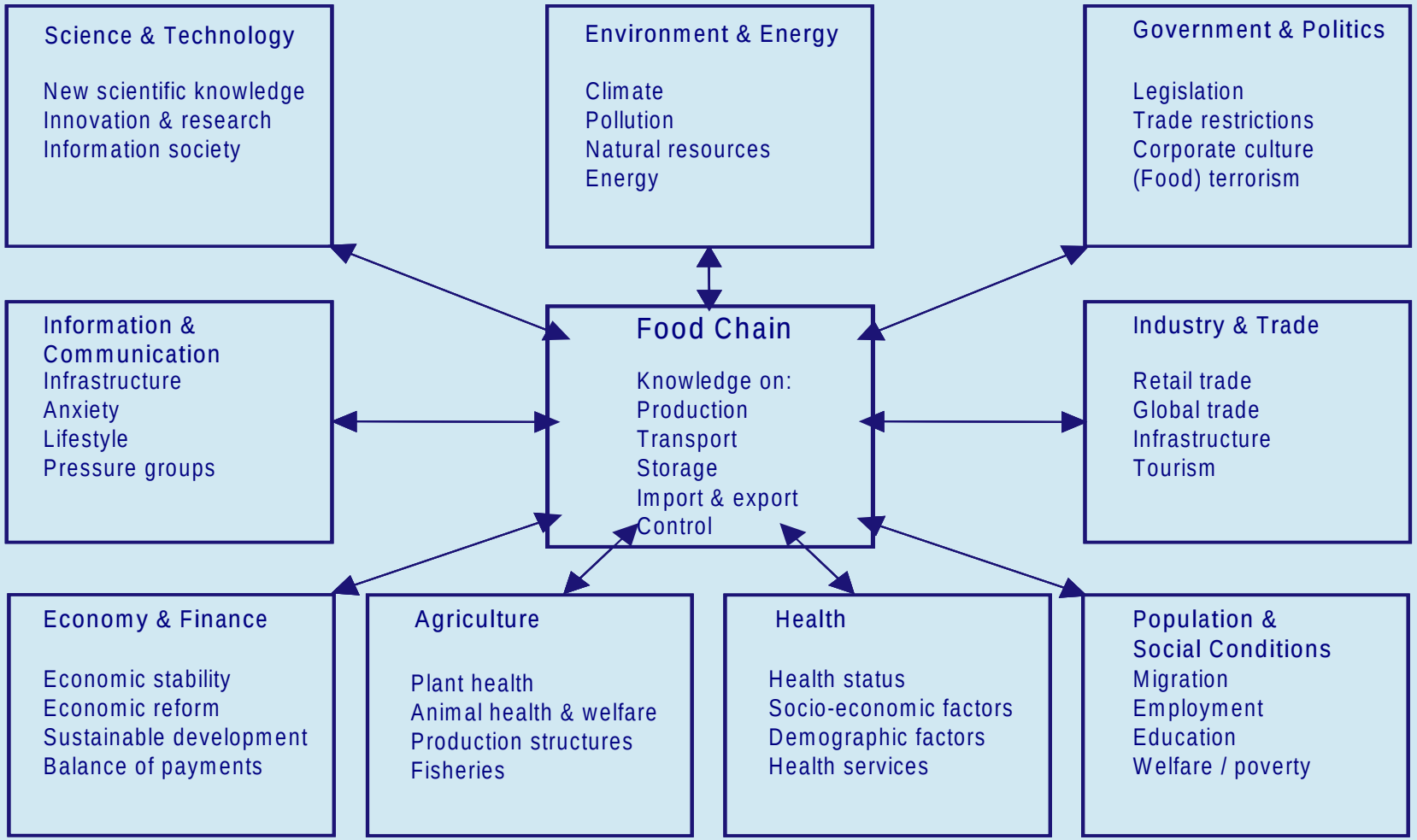
1. **Approval of holistic approach** (difficult but worthwhile pursuing)
2. **Analyse possibilities and constraints** (work out several options)
3. **Use focus groups** (study feasibility for specific group of hazards, e.g. mycotoxins)

Host Environment Analysis



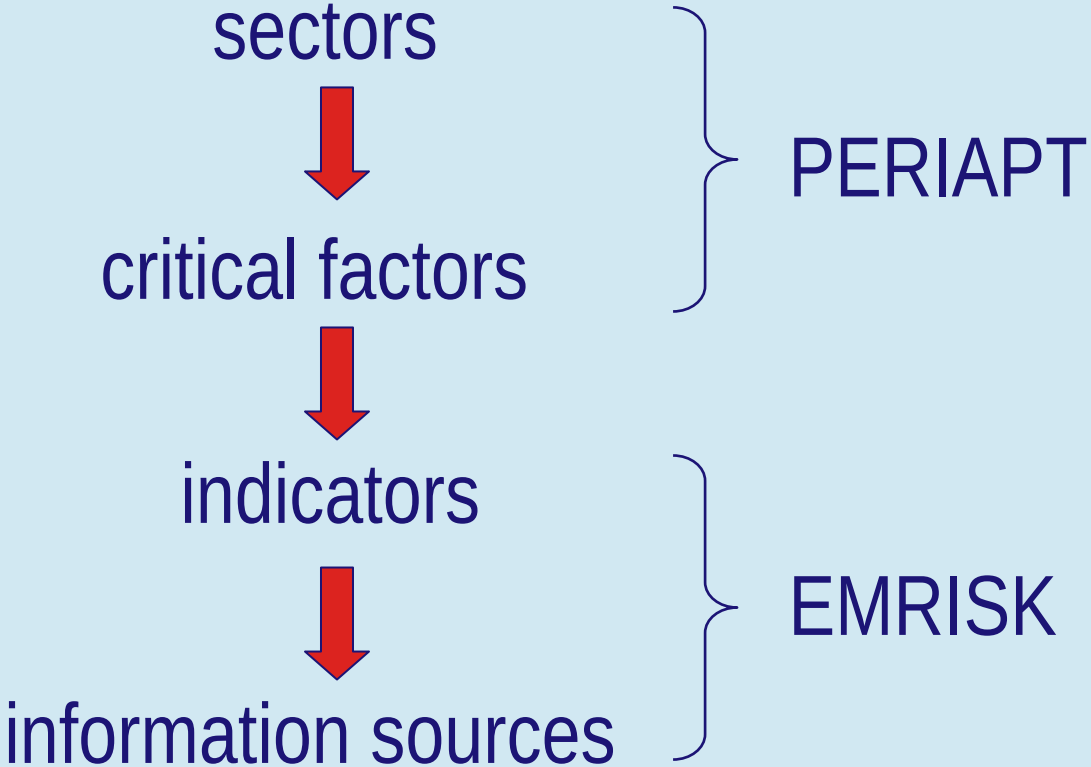
2. Holistic approach

Host environment analysis



2. Holistic approach

How to get relevant information ?



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Structure of the presentation

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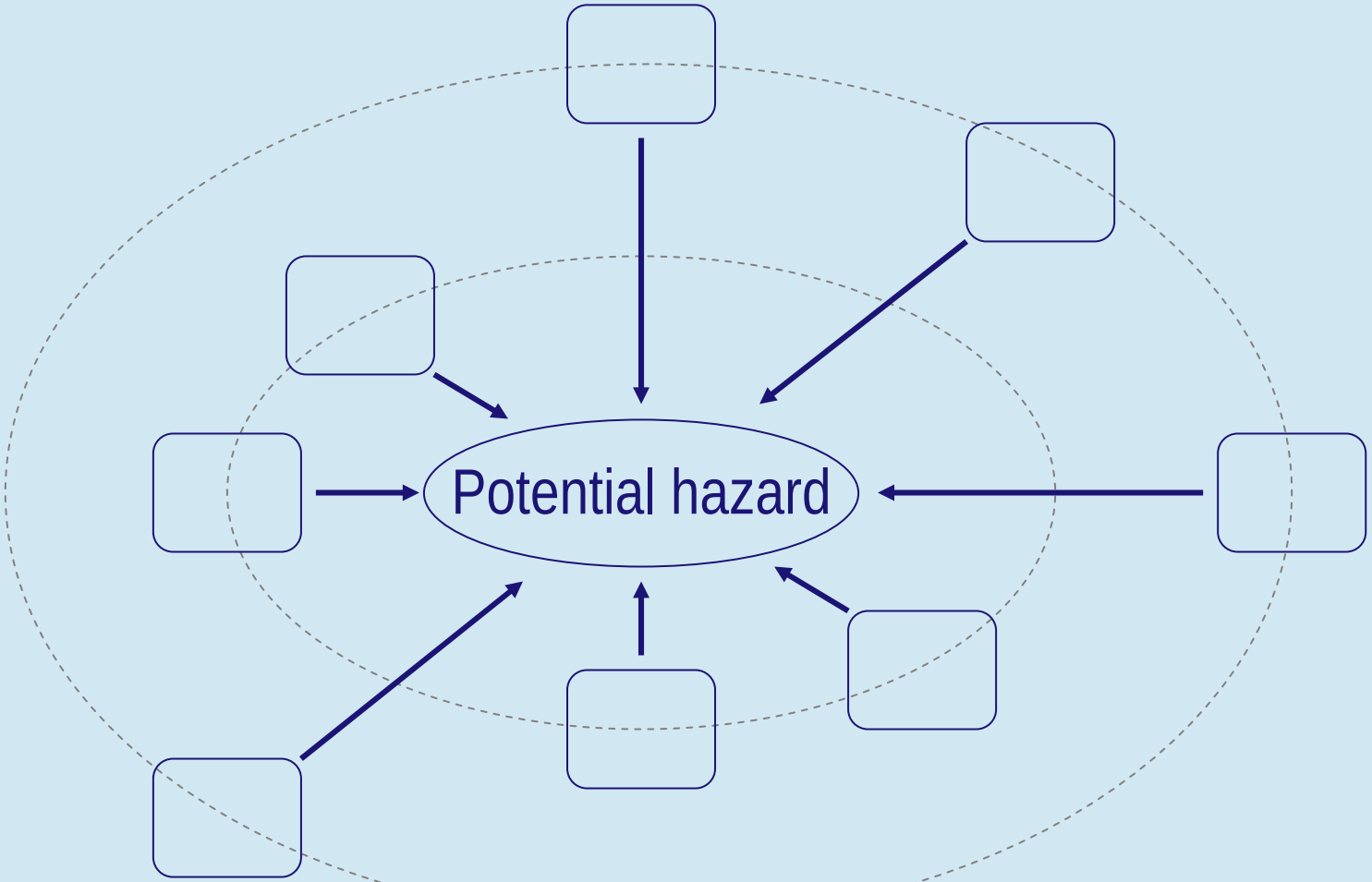
How to use and identify sectors, indicators and information sources?

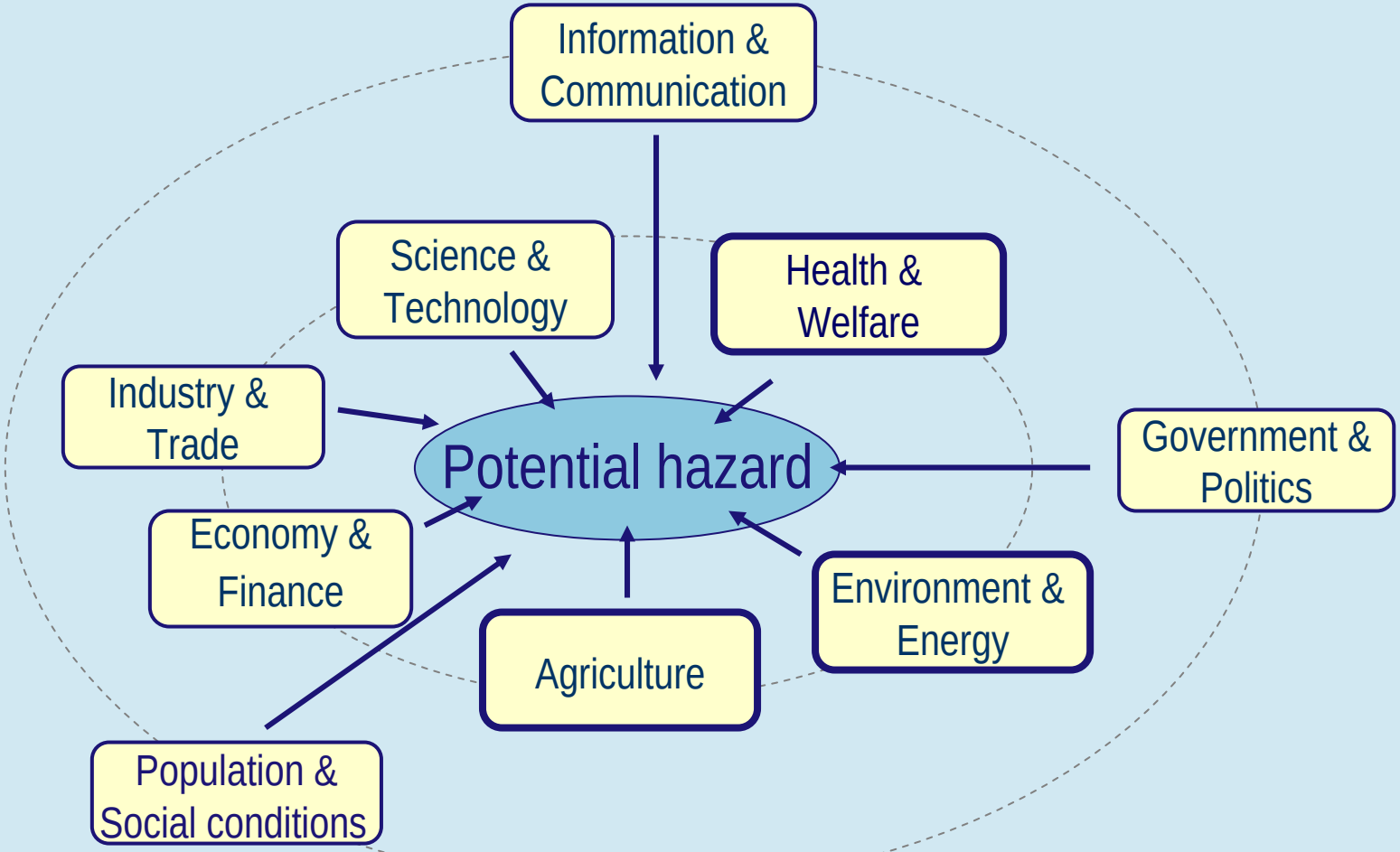
Examples

1. Application of sectors and indicators
2. Application of key words
3. Application of information sources
4. Practical example for DON (mycotoxin)

Proximity of sectors (indicators) to hazards



Proximity of Sectors to Hazards



Restructuring sectors

Primary sectors

Science & Technology
Environment & Energy

Health & Welfare
Agriculture
Economy & Finance

Industry & Trade

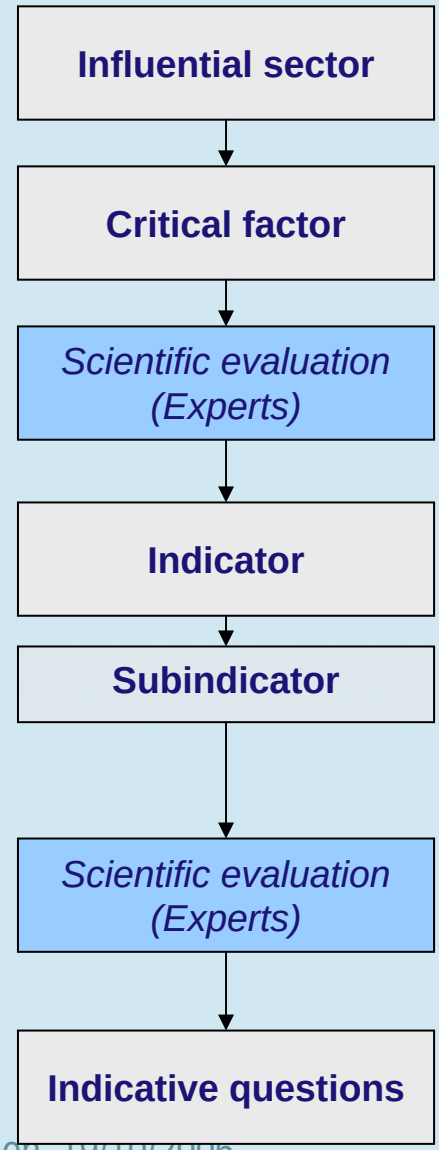
Secondary sectors

Government & Politics

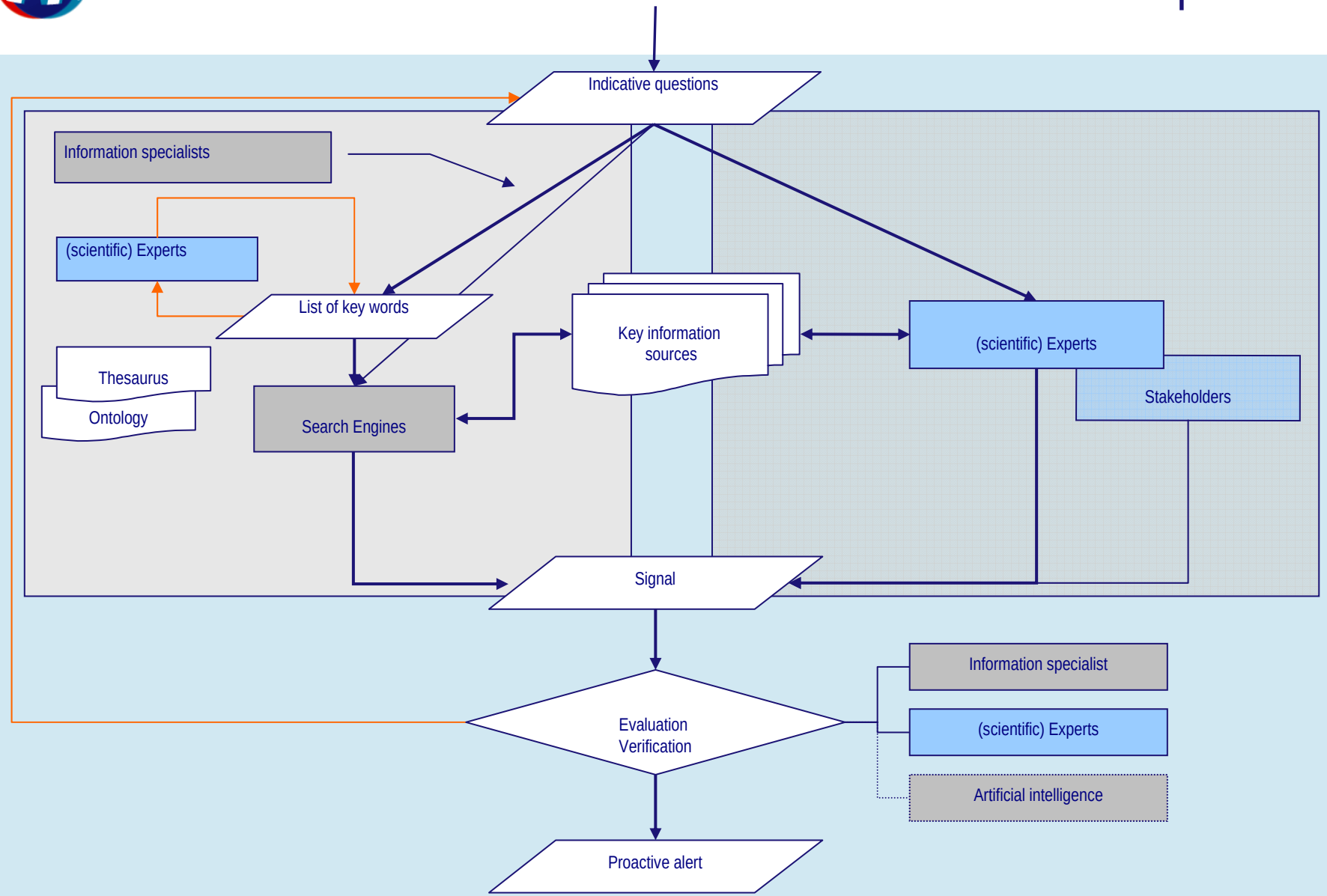
Population & Social conditions

Information & Communication

3. Developments



3. Developments



Application of sectors

1. OECD – driving forces

   Emerging Systemic Risks in the 21st century

   Demography, Environment, Technology, Society and Economy

2. Eurostat

   EUROPE - Eurostat - Queen Tree

Application of indicators

1. European Environmental Agency

   EEA - Themes - Indicators

2. EC - DG Sanco – ECHI

   ECHI - Health Indicators

Application of keywords

using thesauri and ontologies

1. EuroVoc

   EUROVOC

2. AgroVoc

   FAO – Agrovoc

   AGRIS - ICIMOD Library

Application of information

1. FIVIMS

   FAO - the FIVIMS Programme

2. GIEWS

   FAO - Global Information and Early Warning System on Food and Agriculture

Application of expert networks

1. WHO - INFOSAN

   International Food Safety Authorities Network

2. ProMED

   Program for Monitoring Emerging Diseases

Practical example for mycotoxins

1. DON website

   DON demo - Ontario Weather Network

   Fusarium - Ontario Weather Network

2. DON indicators
   - Rain (amount)
   - Tave, Tmax
   - Relative humidity

} urgency, importance, relationship, time dependency

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Structure of the presentation

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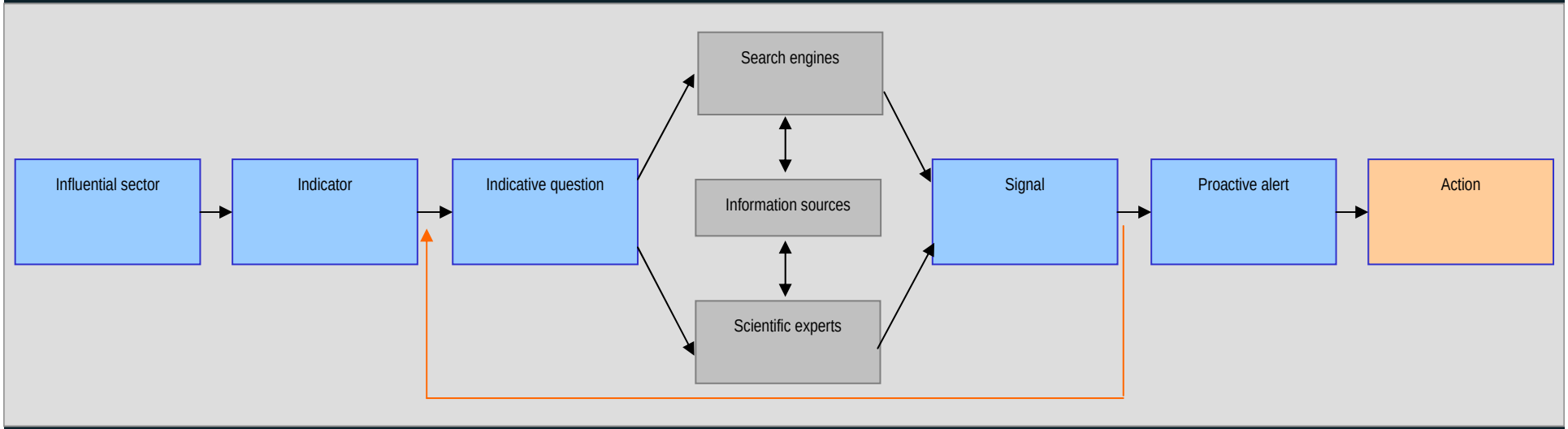
Conclusions

1. **Holistic approach is feasible** (difficult but worthwhile pursuing)
2. Information can be obtained from sectors by using indicators
3. Practical, global examples are available



Flow diagram of the basic processes within the early warning system

A systematic approach to identify and evaluate emerging risks (in food and feed) to human health[1]

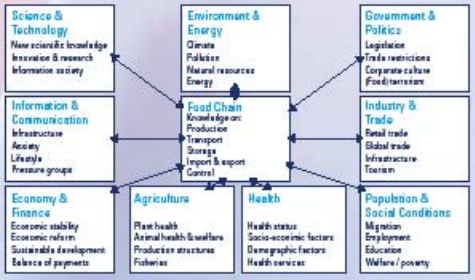
B.W. Ooms, H.P.J.M. Noteborn, M.J.B. Mengelers; Food and Consumer Product Safety Authority (VWA), the Netherlands

Question

How to identify and evaluate new, unforeseen and re-emerging risks (in food and feed) to human health proactively and systematically? Is it asking for the impossible?

As we are living in a dynamic world the host environment will be dynamic as well. Therefore most processes should be iterative.

Development of the host environment hypothesis
Production systems, trade, process technology, consumer behaviour and perception, climate, political and socio-economic situations are dynamic and interrelated which reflects itself in a changing world. Food and feed production chains are part of this changing world.



Research

But how does this facilitate the identification of new, unforeseen and re-emerging risk? Measurable indicators should be identified within the influential sectors. Major changes in these indicators lead to signals which should be evaluated regarding their potential impact on human health. How to organise this?

Selection of indicators
The most sensitive and ready-to-use indicators should be selected.

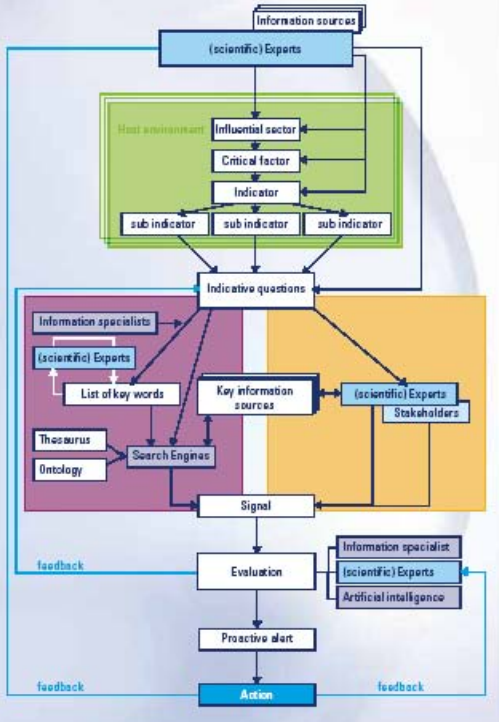
Technical resources
It is expected that the number of signals and the speed by which they are generated can be increased by the utilisation of automated scanning or search systems.

Environment of trust
How to behave in situations of new scientific findings in terms of food safety and public health is not only a scientific issue, but an issue of trust, perception and fear factors.

Conclusion

It is possible (?.....)

Proposed system and role of experts



"We knew there would be so many questions we couldn't answer about human foodstuffs, and great pressure on our small research group. We didn't want to scare people unnecessarily since we knew too little yet about the problem."

Collaborating institutes within PERARP and EMRISK:
Food and Consumer Product Safety Authority, the Netherlands (co-ordinator) | Federal Office of Consumer Protection and Food Safety, Germany

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What's next?

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Recommendations

1. Finalise the analysis of possibilities and constraints in programming transnational research on emerging risks
2. Use one (or more) specific call(s) to describe a practical strategy
3. Develop institutional linking for a coordinated approach for the identification of emerging risks

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Acknowledgement

PERIAPT:

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L. Szponar (IZZ, Poland)

H. Noteborn (VWA, Netherlands)

M. Mengelers (VWA, Netherlands)

EMRISK:

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H. Marvin (RIKILT, Netherlands)

M. Pineiro (FAO, Italy)

S. Van Boxstael (FAVV, Belgium)

A. Epp (BfR, Germany)

S. Reynolds (CSL, United Kingdom)

C. Bruschke (OIE, Paris)

H. Noteborn (VWA, Netherlands)

M. Mengelers (VWA, Netherlands)

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Thank you for your attention!

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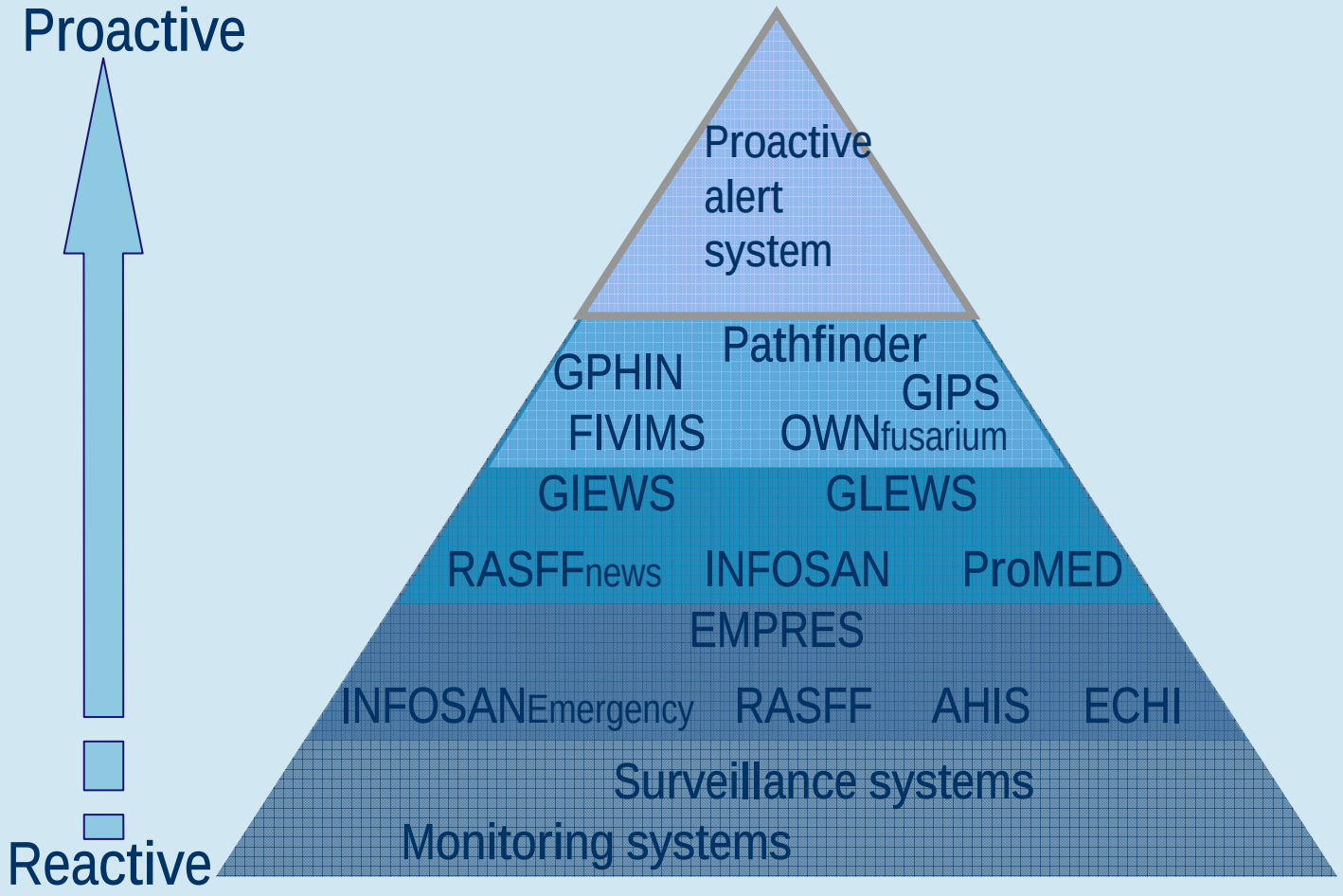
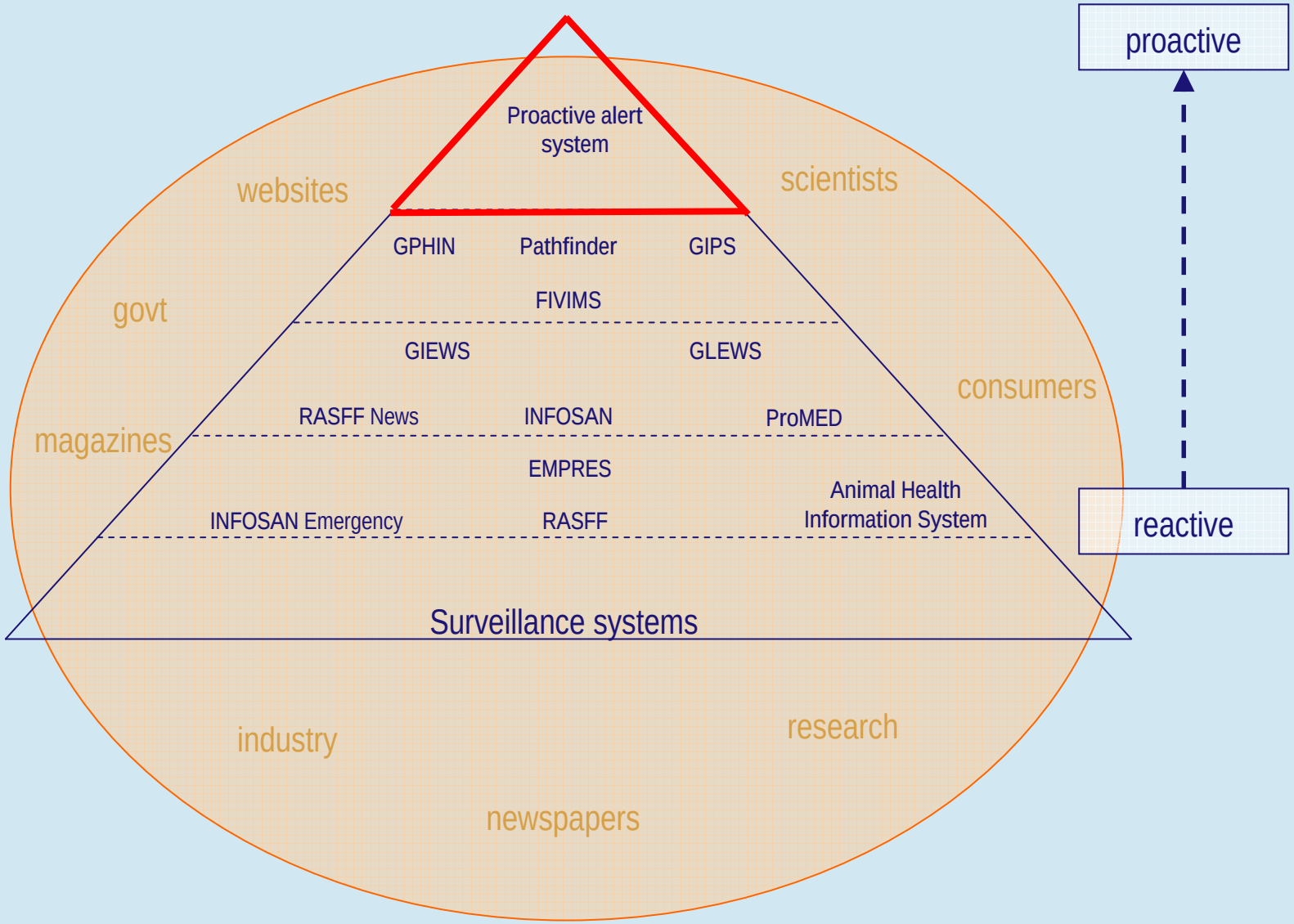
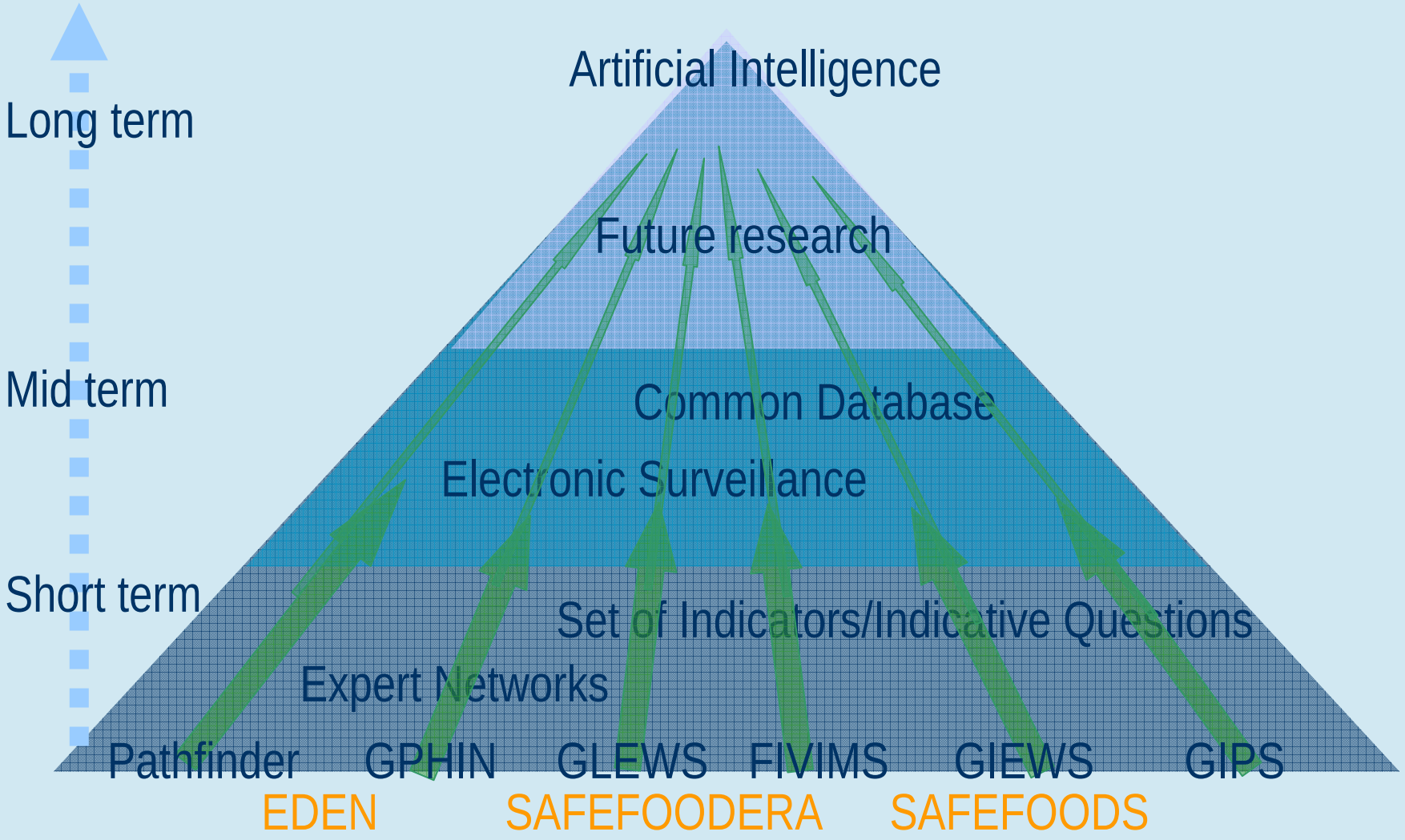
Structuring Existing Systems




proactive
Proactive alert system
websites
scientists
GPHIN
Pathfinder
GIPS
govt
FIVIMS
GIEWS
GLEWS
consumers
magazines
RASFF News
INFOSAN
ProMED
EMPRES
Animal Health Information System
INFOSAN Emergency
RASFF
reactive
Surveillance systems
industry
research
newspapers

European Proactive Alert System(s)



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Abbreviations Existing Systems

EMPRES: Emergency Prevention System for Transboundary Animal&Plant Pests and Diseases (FAO)
GPHIN: Global Public Health Intelligence Network (Public Health Agency of Canada)
GLEWS: Global Early Warning System for Animal Diseases including Zoonoses (FAO, OIE and WHO)
GIEWS: Global Information and Early Warning System on Food and Agriculture (FAO)
RASFF: Rapid Alert System for Food and Feed (EC)
GIPS: Global Issues Prediction System (Weber Shandwick – Cmi consulting)
INFOSAN: International Food Safety Authorities Network (WHO)
AHIS: World animal health information system (OIE)
ProMED: Program for Monitoring Emerging Diseases (FAS, Federation of American Scientists; ISID, International Society for Infectious Diseases)
Pathfinder (Centers for Epidemiology and Animal Health's Center for Emerging Issues (CEI); USDA)
FIVIMS: Food Insecurity and Vulnerability Information and Mapping Systems (FAO)
OWNfusarium: Ontario Wheather Network on Fusarium (University of Guelph);
EHCI: European Health Critical Indicators (DG SANCO)

Early Identification of Emerging Risks

Project "Food Informatics"

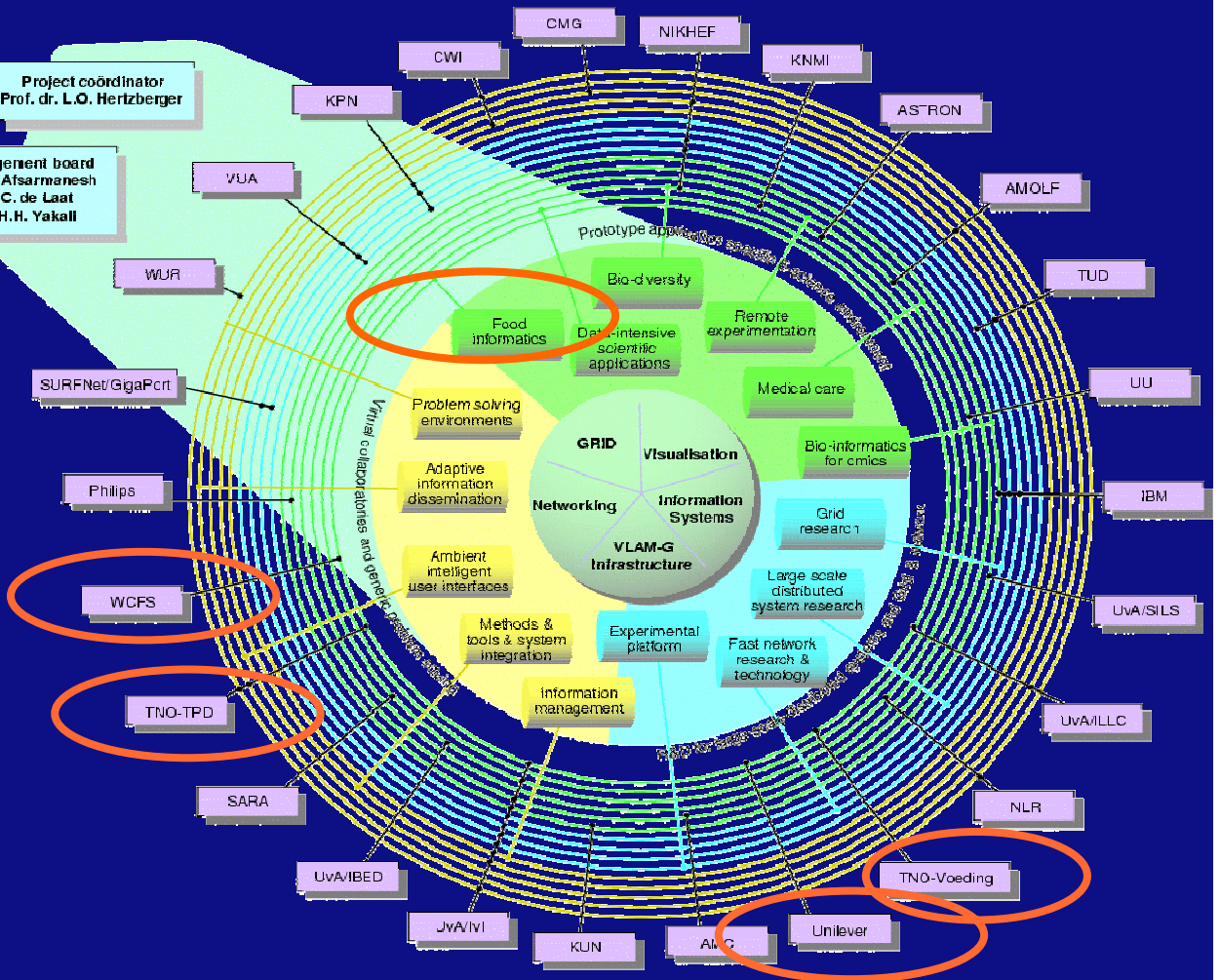
Fred van de Brug

TNO Quality of Life

Topics

1. Bsik Programme & Food Informatics
2. Aim
3. How the information looks like (acrylamide case)
4. How we are going to find it
5. What we will do with it

Bsik programme: “Virtual laboratory for e-science”



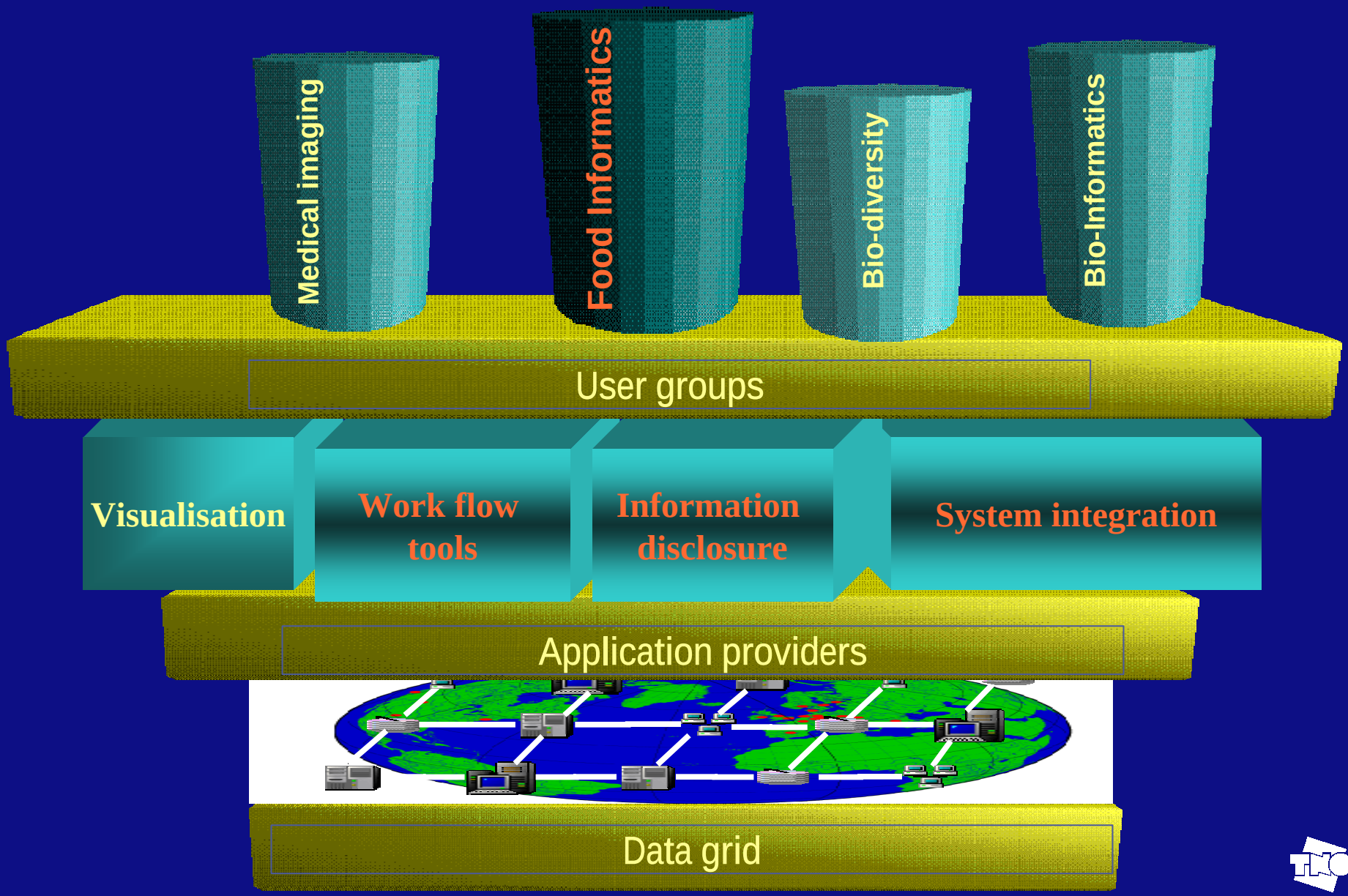
> 20 organisations

> 100 people

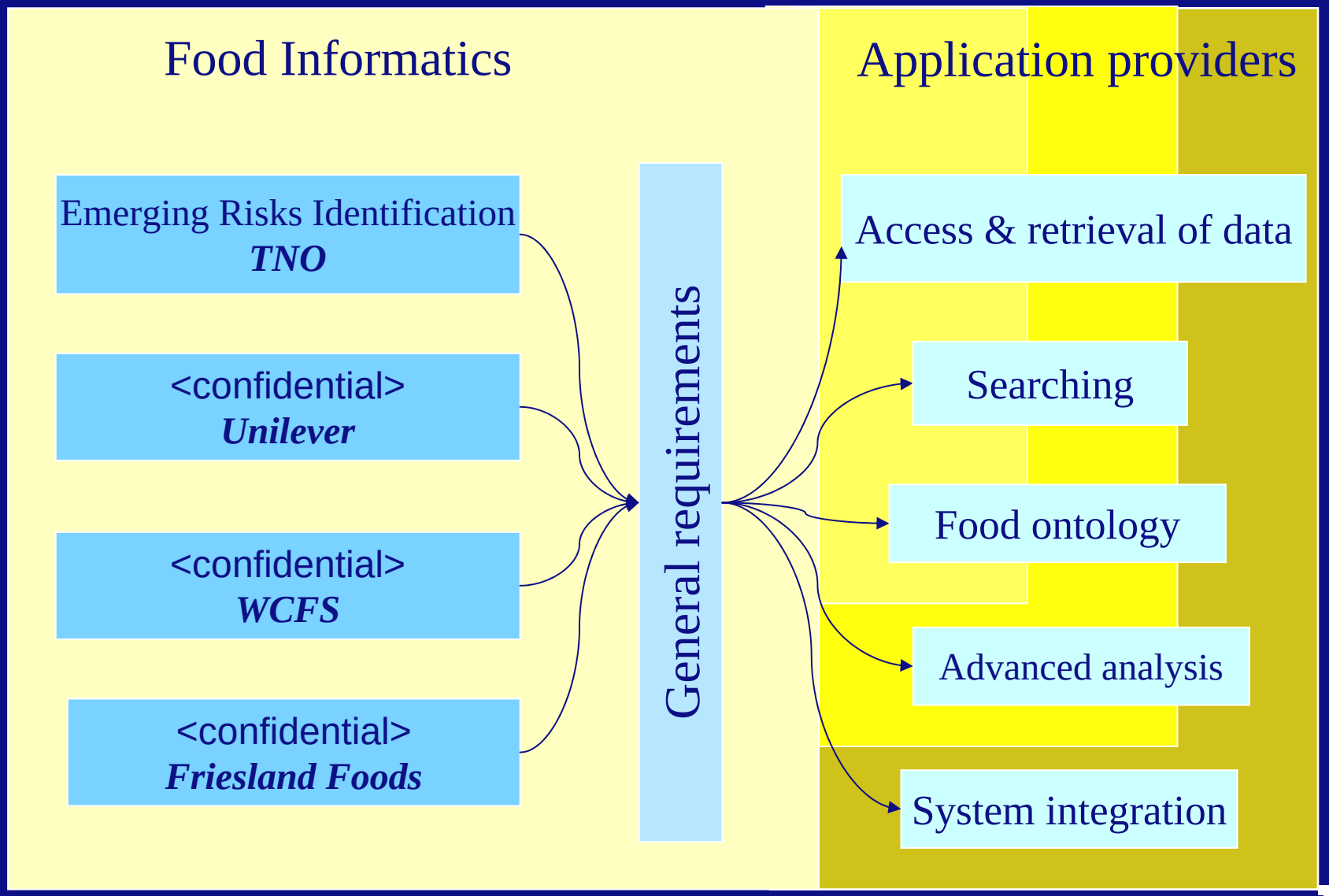
25 mEuro

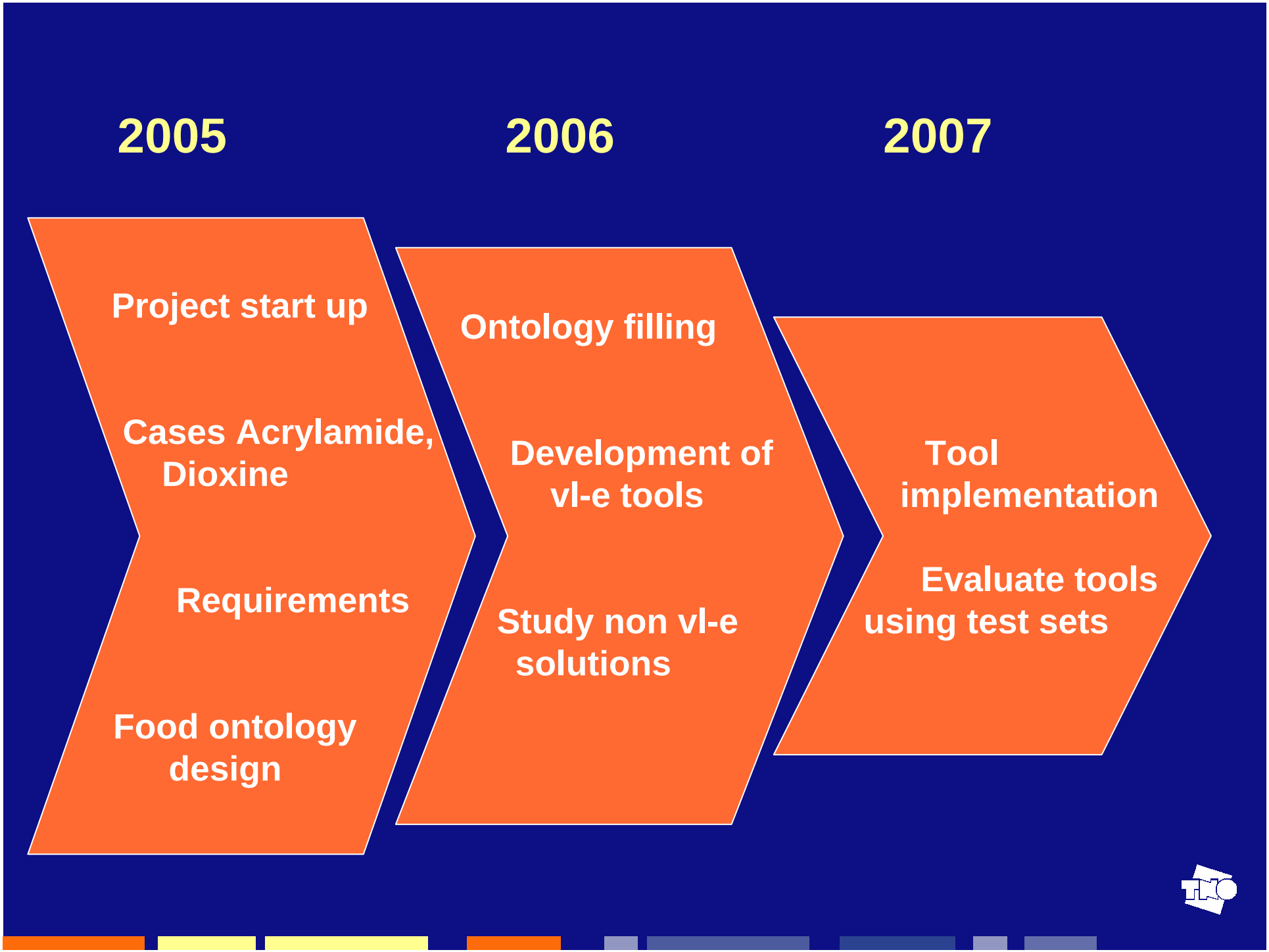
2004 - 2008

Bsik programme: "Virtual laboratory for e-science"

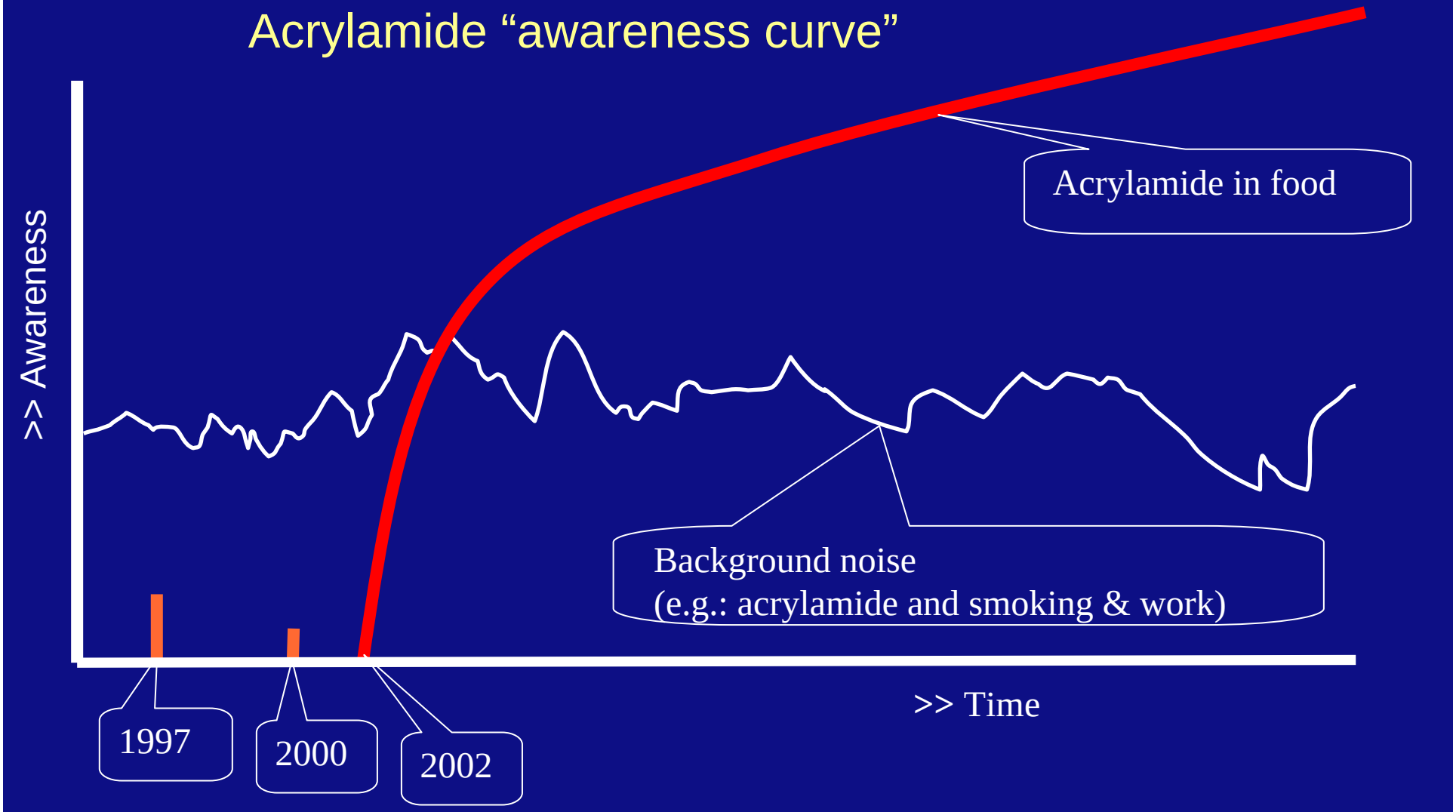


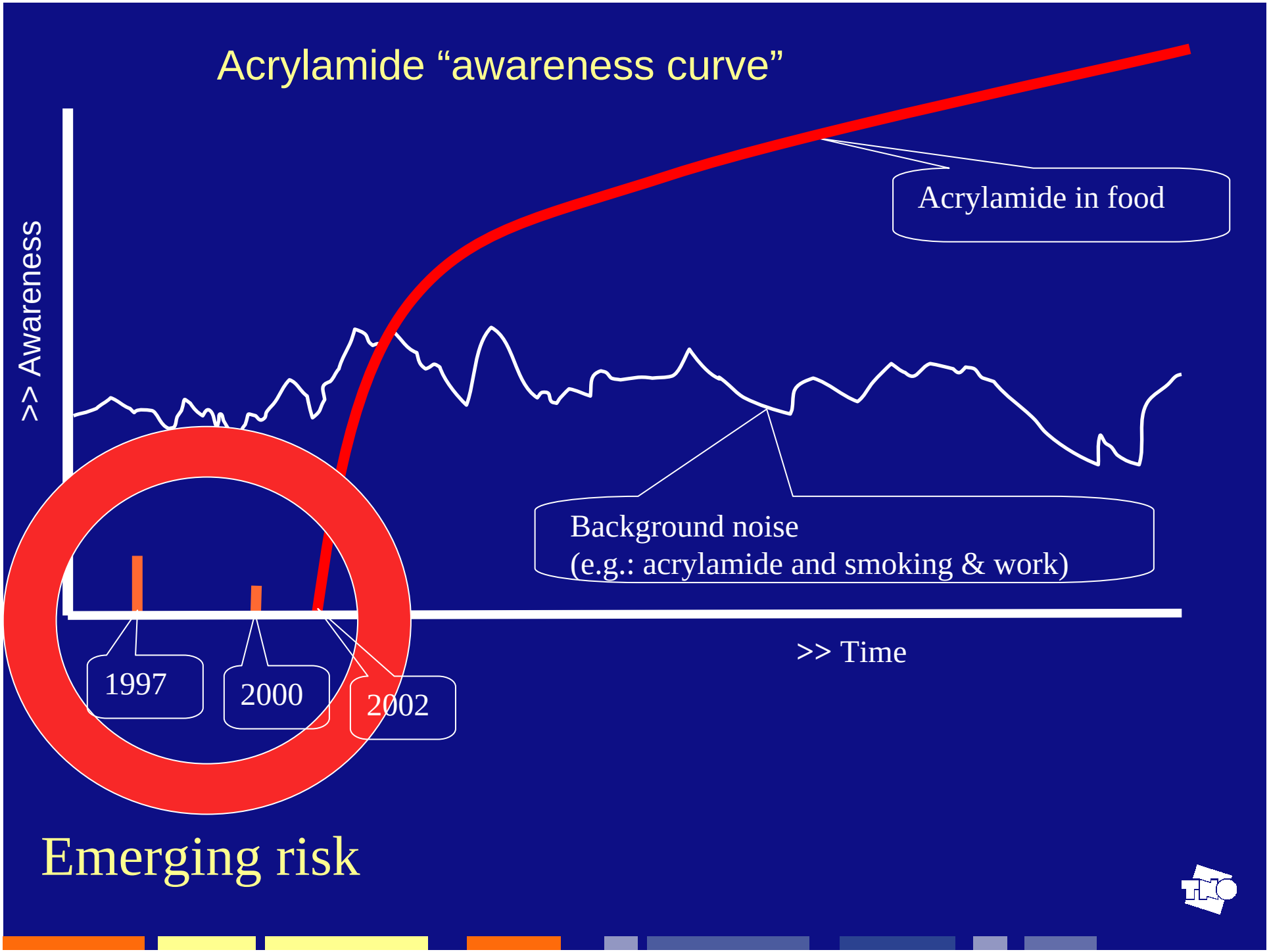
Bsik programme: “Virtual laboratory for e-science”

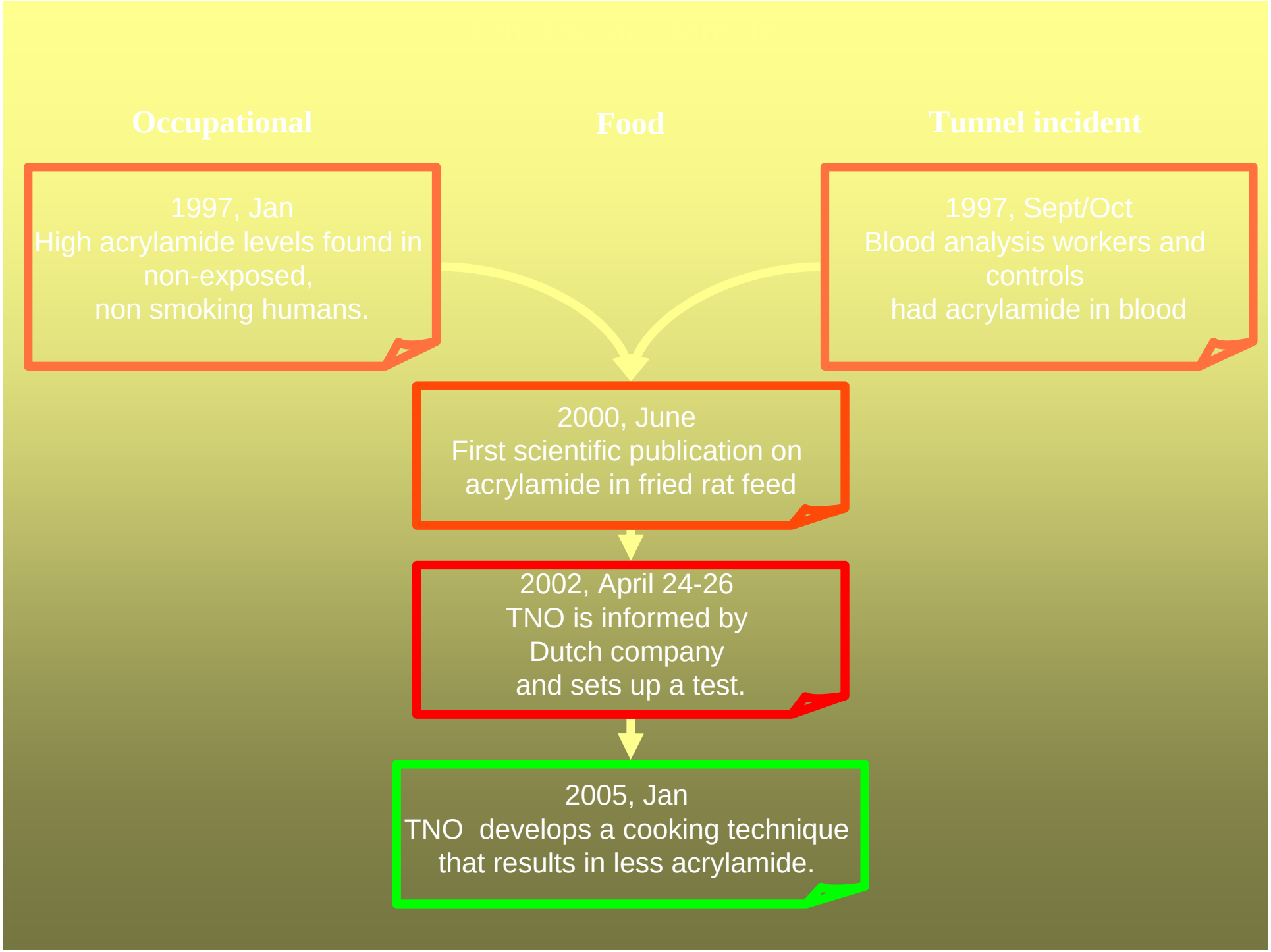



2005
2006
2007
Project start up
Cases Acrylamide, Dioxine
Requirements
Food ontology design
Ontology filling
Development of vl-e tools
Study non vl-e solutions
Tool implementation
Evaluate tools using test sets

Acrylamide “awareness curve”




Acrylamide “awareness curve”
>> Awareness
Acrylamide in food
Background noise
(e.g.: acrylamide and smoking & work)
>> Time
1997
2000
2002
Emerging risk


Occupational
Food
Tunnel incident
1997, Jan
High acrylamide levels found in non-exposed, non smoking humans.
1997, Sept/Oct
Blood analysis workers and controls had acrylamide in blood
2000, June
First scientific publication on acrylamide in fried rat feed
2002, April 24-26
TNO is informed by Dutch company and sets up a test.
2005, Jan
TNO develops a cooking technique that results in less acrylamide.

"EMERGING DANGER"

The high background of acrylamide adducts in nonsmoking controls was unexpected.

Bergmark 1997

"EMERGING DANGER"

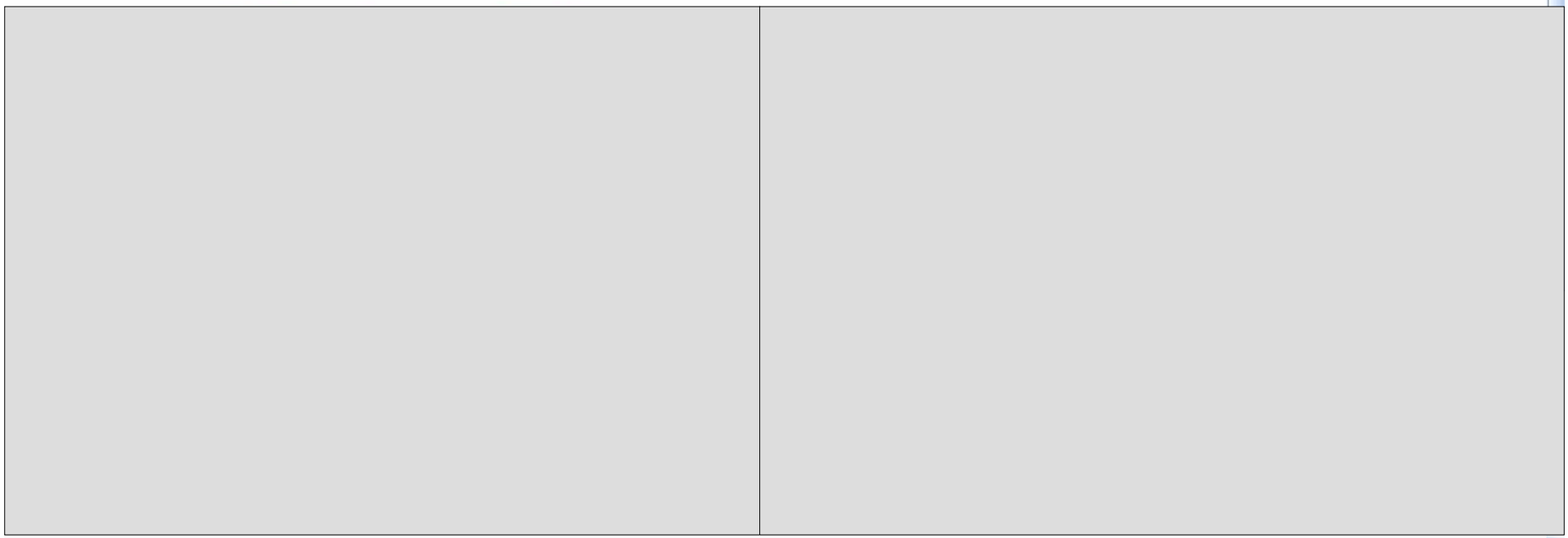
The high background of acrylamide adducts in nonsmoking controls was unexpected.

Bergmark 1997

"FOOD & FEED"

Analysis of acrylamide, a carcinogen formed in heated foodstuffs

Tareke 2000



"EMERGING DANGER"

The high background of acrylamide adducts in nonsmoking controls was unexpected.

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FDA 1997

"FOOD & FEED"

Analysis of acrylamide, a carcinogen formed in heated foodstuffs

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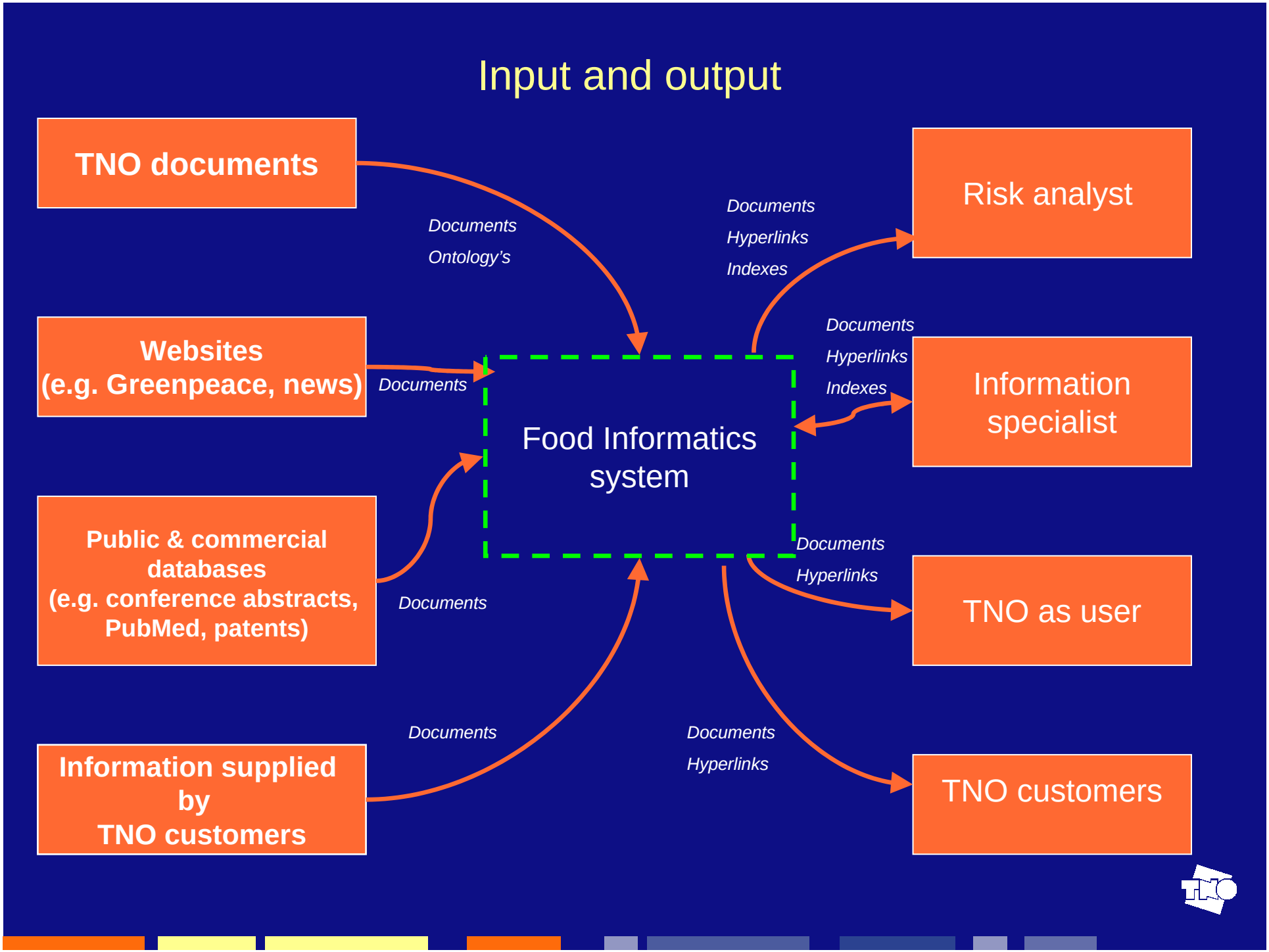
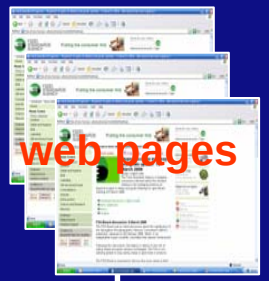
		"EMERGING DANGER"	"FOOD & FEED"		
Bergmark	*1997*	The high background of acrylamide adducts in nonsmoking controls was unexpected.	Analysis of acrylamide, a carcinogen formed in heated foodstuffs	*Tareke*	*2000*
FDA	*1997*	FDA and state officials disclosed that the source of dioxin in the animal feed was "ball clay,"	Since summer 2004 McCain uses clay instead of salt for selection of potatoes	*AID*	*2004*


Emerging Risks
will be found by
combining pieces of
information
to
meaningful
information

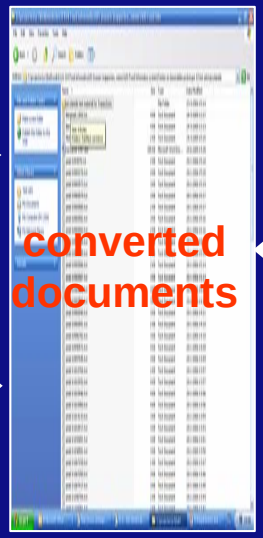
Input and output





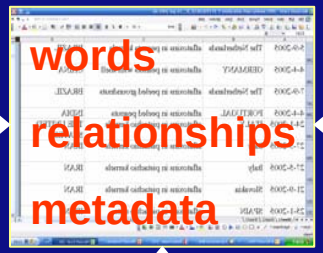
web pages

crawling



converted documents

pre-processing

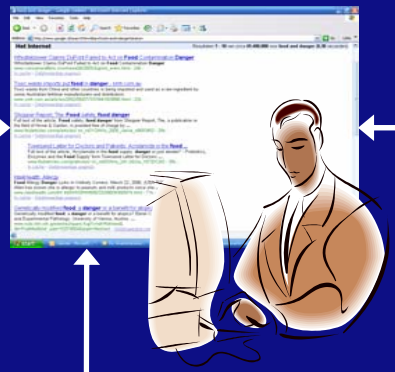


words

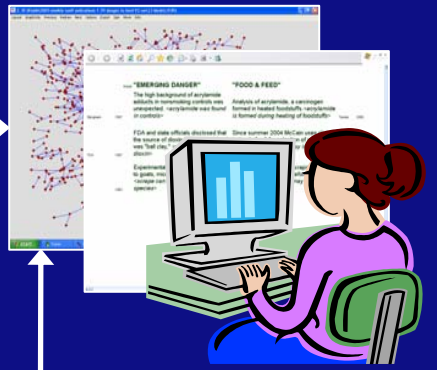
relationships

metadata

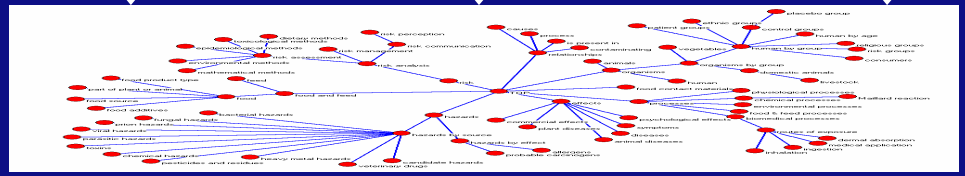
searching



advanced analysis



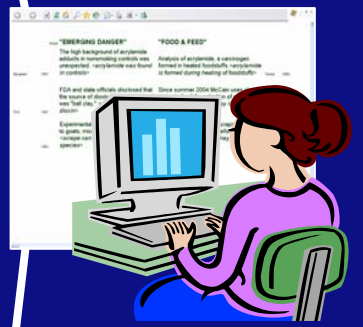
databases

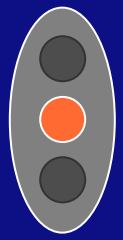


ontology

advanced analysis

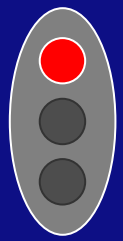
		RANK	"EMERGING DANGER"	"FOOD & FEED"		
Bergmark	1997		The high background of acrylamide adducts in nonsmoking controls was unexpected. <*acrylamide was found in controls*>	Analysis of acrylamide, a carcinogen formed in heated foodstuffs.<*acrylamide is formed during heating of foodstuffs*>	Tareke	2000
FDA	1997		FDA and state officials disclosed that the source of dioxin in the animal feed was "ball clay," <*clay can contain dioxin*>	Since summer 2004 McCain uses clay instead of salt for selection of potatoes <*McCain uses clay*> <*clay is used in food production*>	AID	2004
	1963		Experimental transmissions of scrapie to goats, mice, rats and hamster. <*scrape can be transmitted to other species*>	Hadlow speculated that scrapie and kuru might be related and therefore transmissible. <*scrapie may be related to kuru*>	Hadlow	1959





Identification months to years earlier

- ITX migrates from packaging materials to infant food (2005)
- Dioxine via sorting of potatoes with marl clay, into milk (2004)
- Semicarbazide from sealings into infant food (2003)
- Acrylamide by heating of carbohydrate food (2002)
- Enterobacter Sakazakii in infant formula (2002)

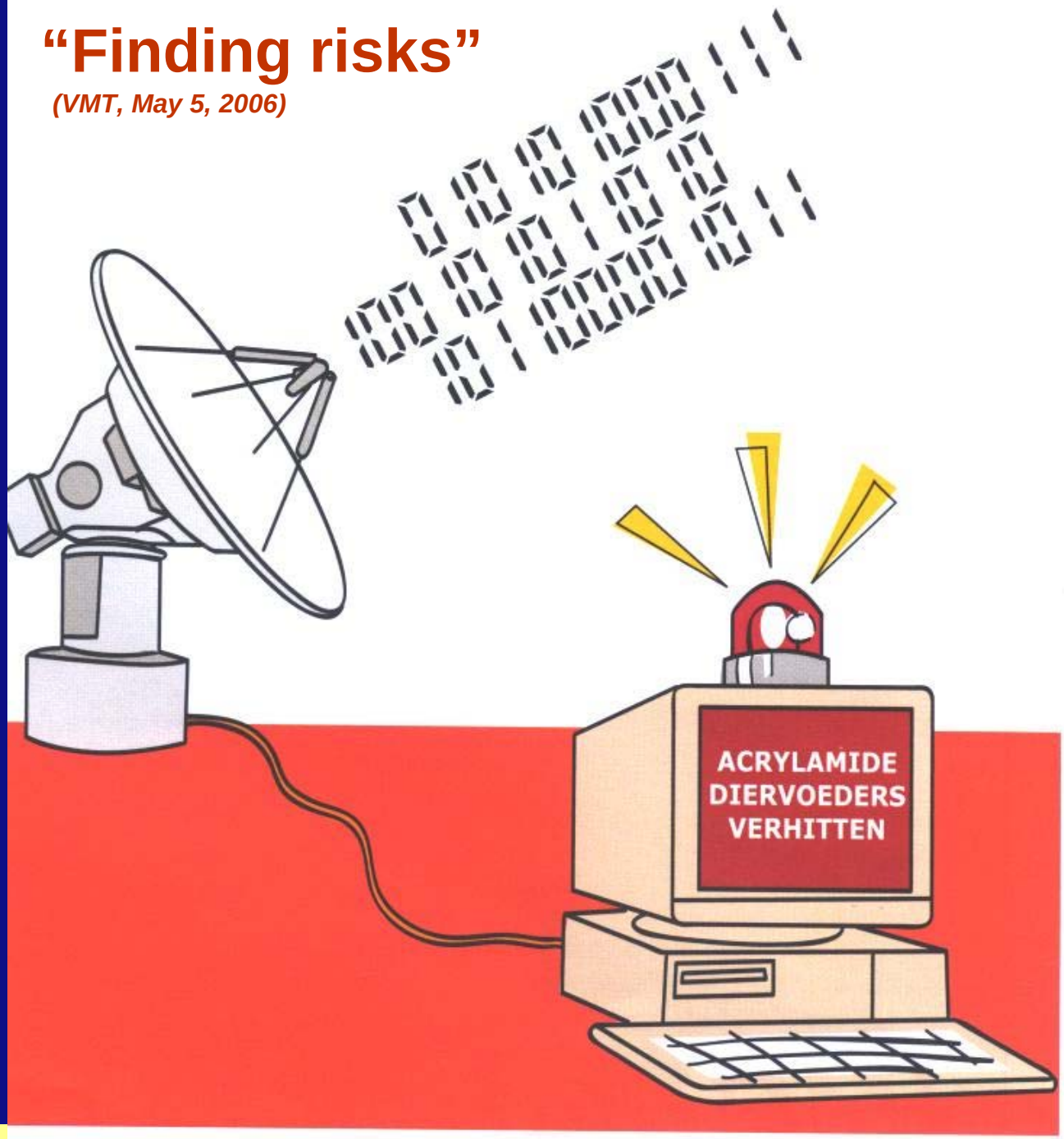


Identification some days earlier

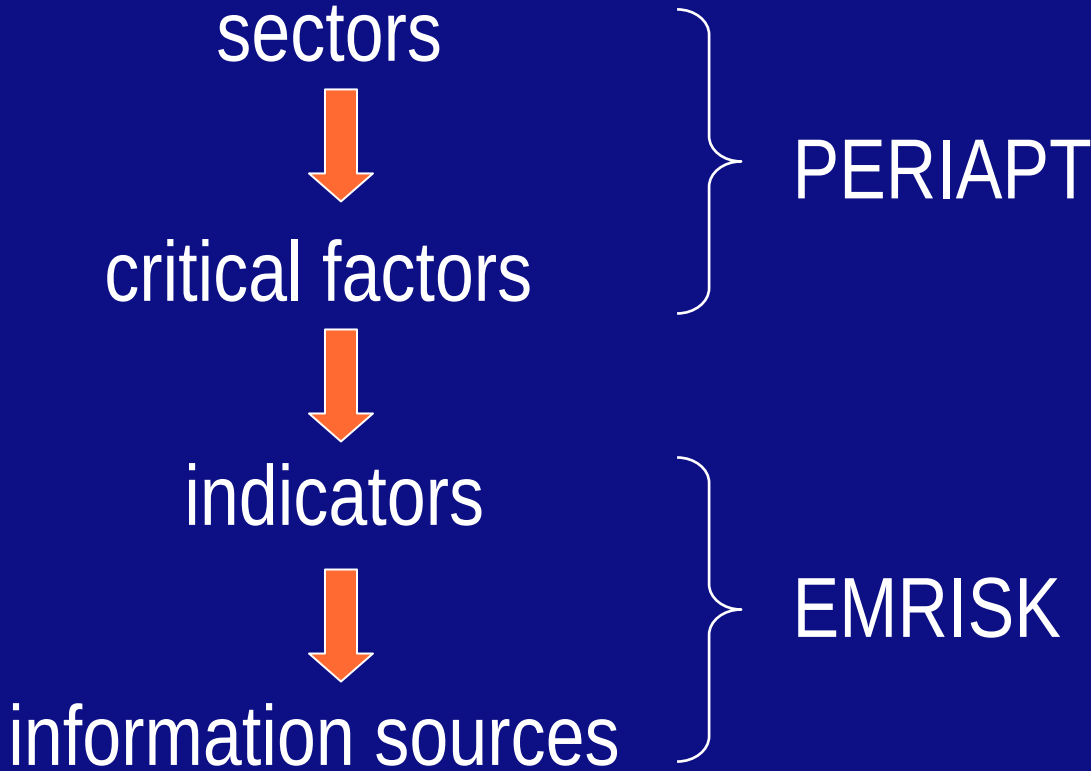
- Aspartaam is carcinogenic in rats (2005)
- Sudan Red in chilli products (2005)

“Finding risks”

(VMT, May 5, 2006)



How to get relevant information ?



AGROTECHNOLOGY & FOOD INNOVATIONS
WAGENINGEN UR

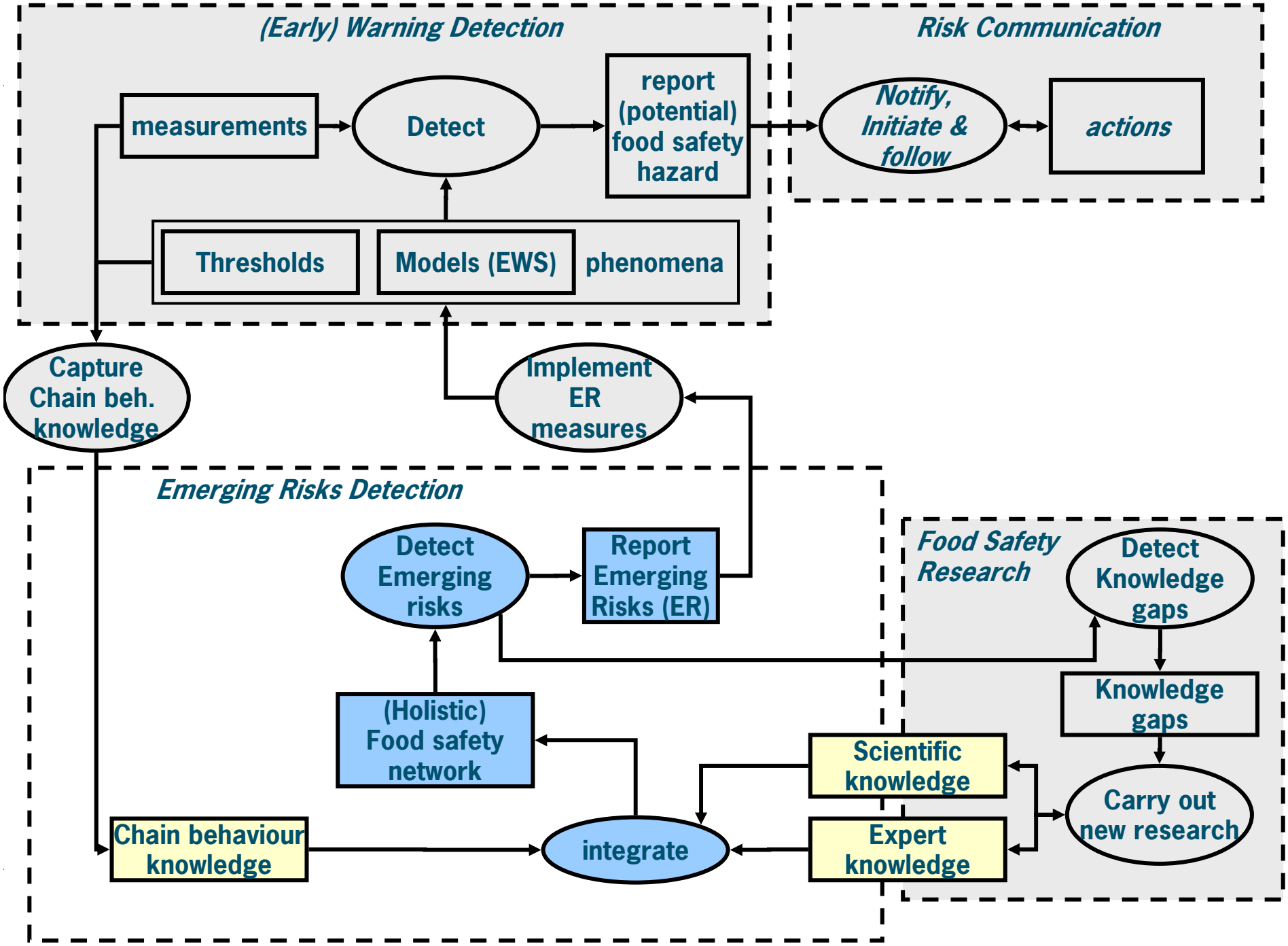
Emerging Risk Detection Support

Willie van den Broek
Lars Hulzebos

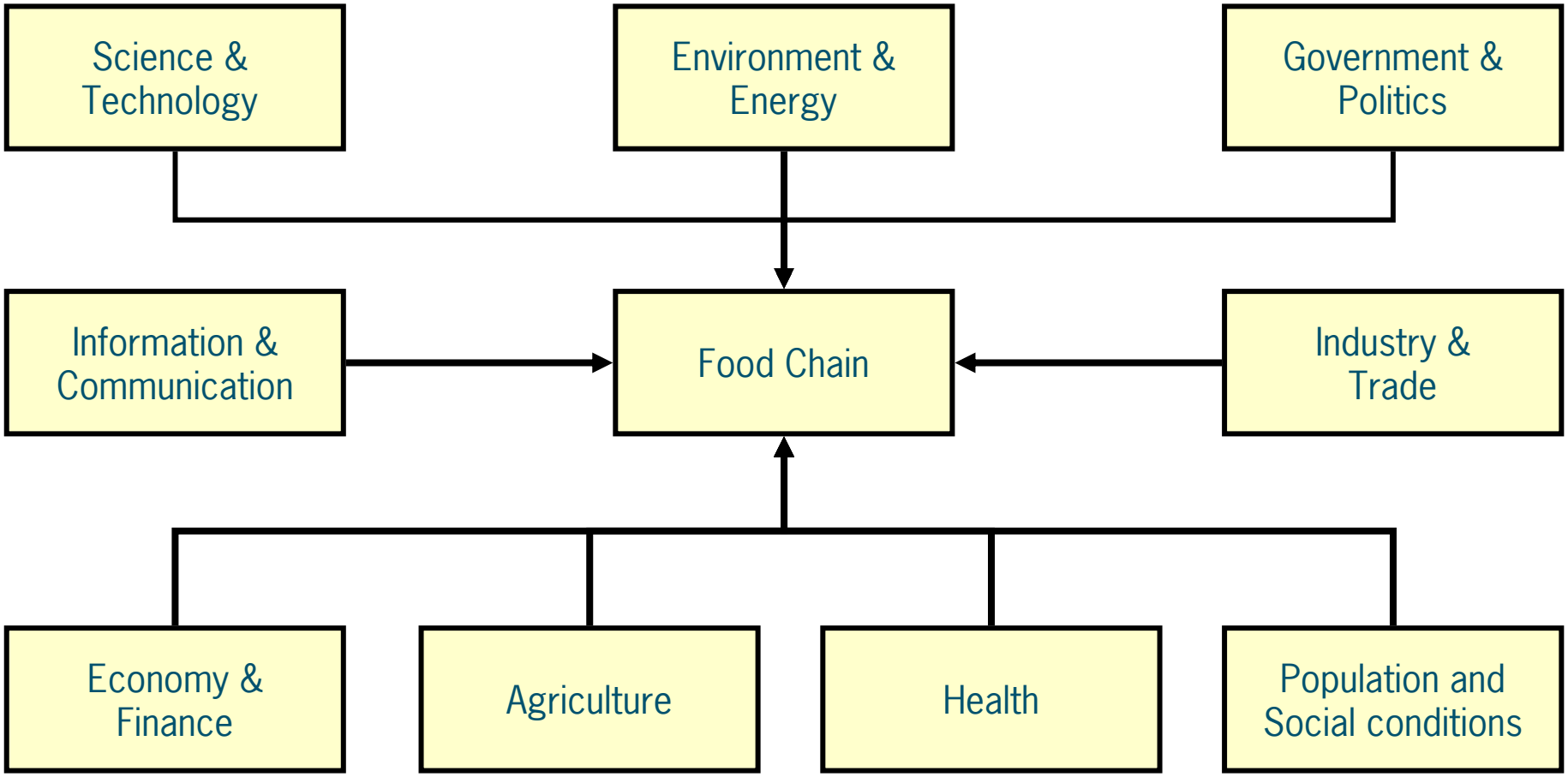
Wageningen, 19-10-2006

Our relation to food safety

- Our expertise
  - Knowledge modeling
- Food safety knowledge
  - Wageningen UR: RIKILT, ASG, PRI, LEI
  - Food safety authority NL: VWA
  - Ministry of agriculture: LNV

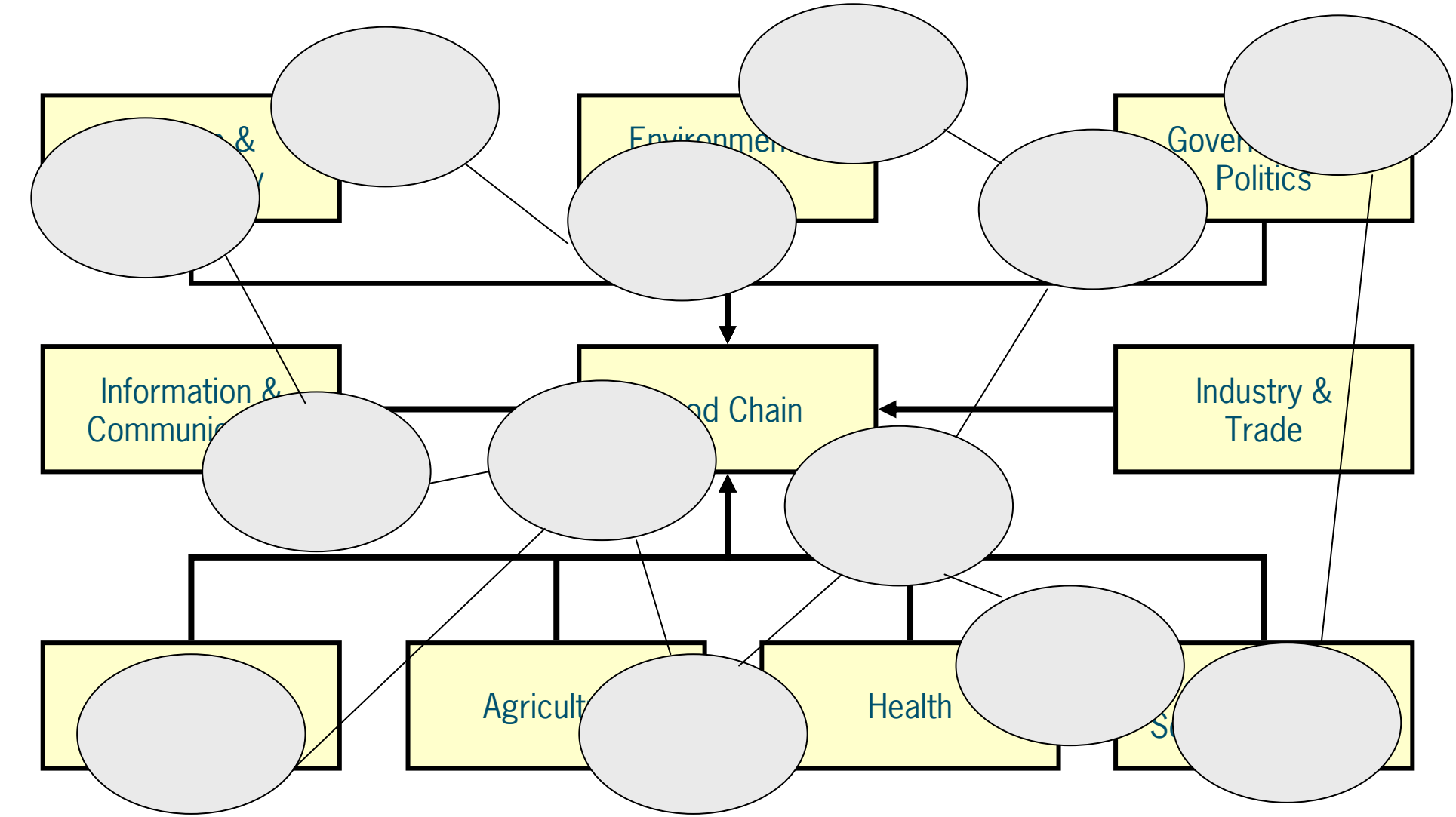

(Early) Warning Detection
measurements
Detect
report (potential) food safety hazard
Thresholds
Models (EWS)
phenomena
Risk Communication
Notify, Initiate & follow
actions
Capture Chain beh. knowledge
Implement ER measures
Emerging Risks Detection
Detect Emerging risks
Report Emerging Risks (ER)
(Holistic) Food safety network
Chain behaviour knowledge
integrate
Food Safety Research
Detect Knowledge gaps
Knowledge gaps
Scientific knowledge
Expert knowledge
Carry out new research

Knowledge Network: Combining holistic knowledge



Source: EMRISK report

Knowledge Network: Combining holistic knowledge

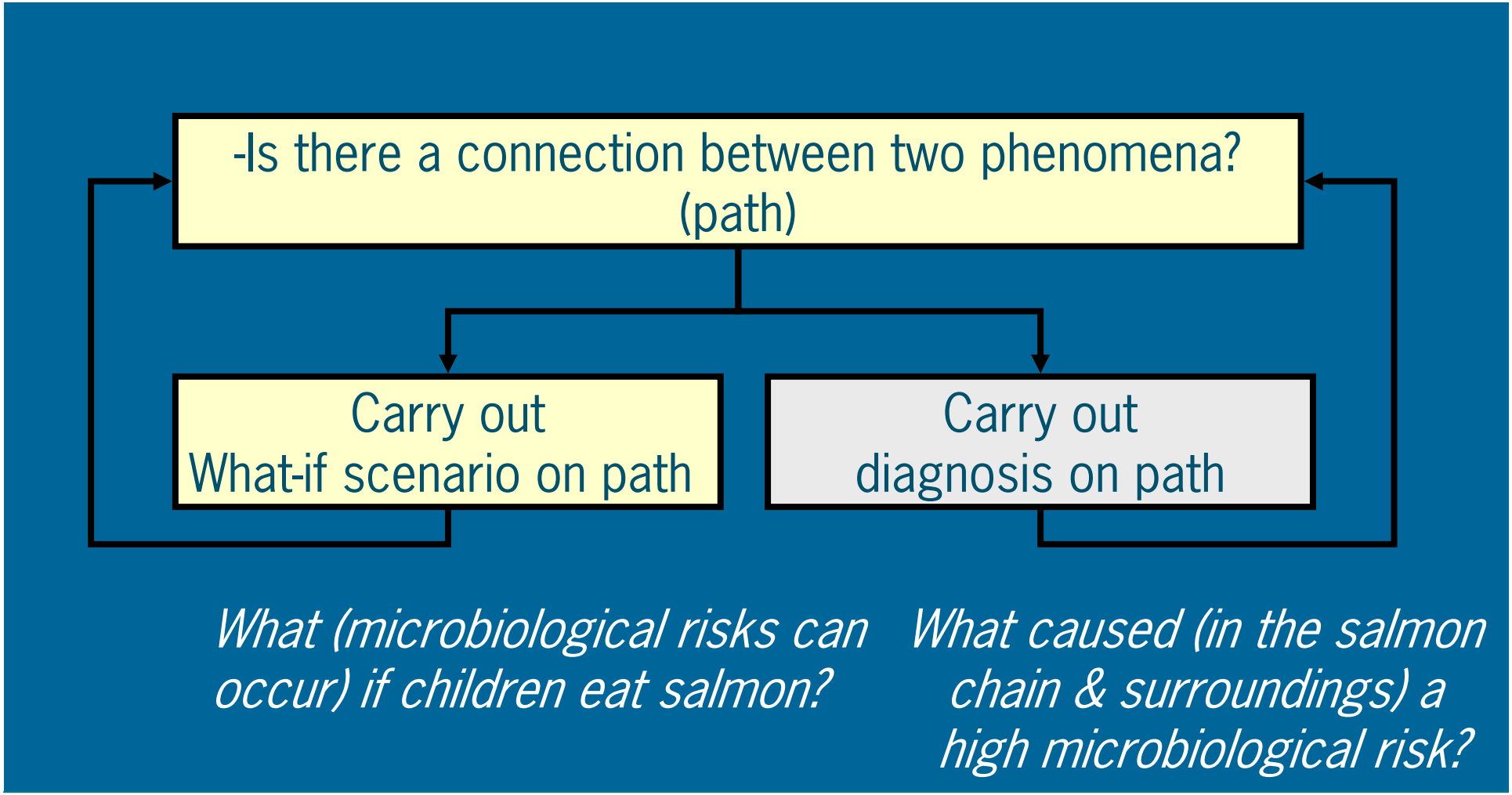


Source: EMRISK report

Emerging Risk Detection Support

- Improve the associative thinking and elimination process of a food safety expert
- Providing food safety expert knowledge outside the daily scope
- Requirement:
  - Keep the information manageable!

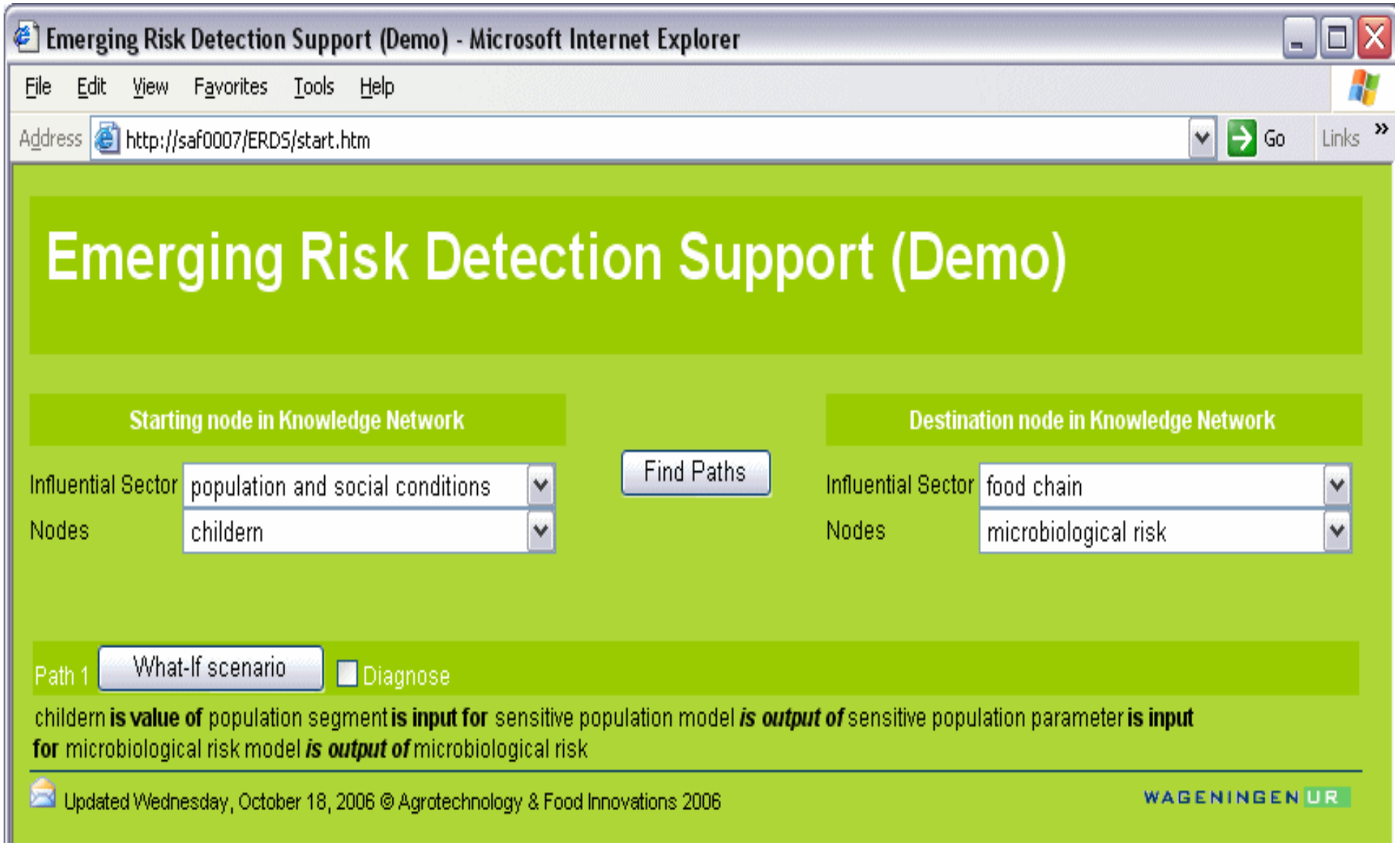
ERDS Process



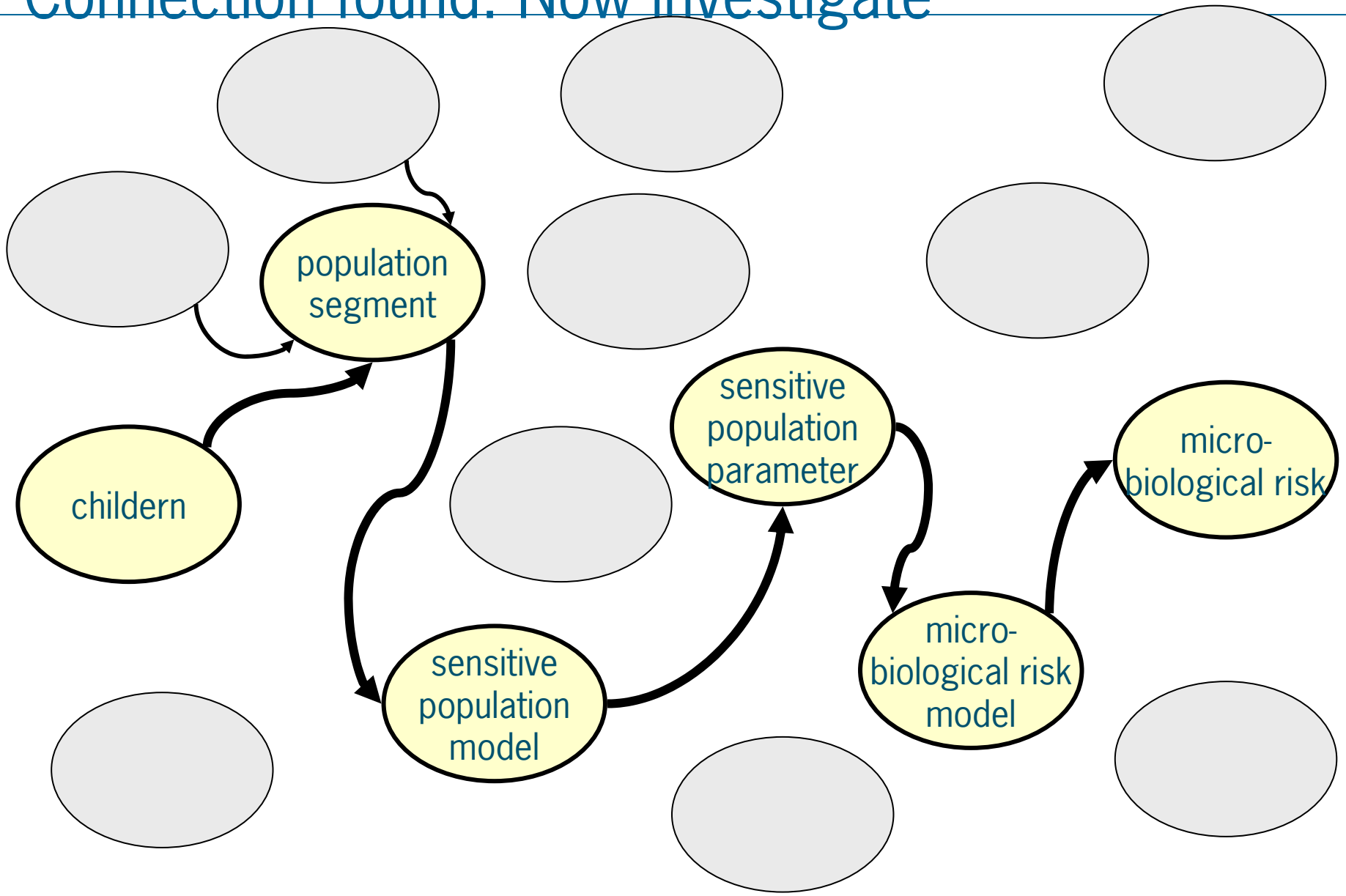
Demo

- From Idea to a Rapid Prototype
  - First development cycle took 1 month
- Client/Server model
  - Web based .asp
  - SQL server database
- Objective
  - Make the ERDS tangible
    - Needed functionality
    - Current draft knowledge from salmon project

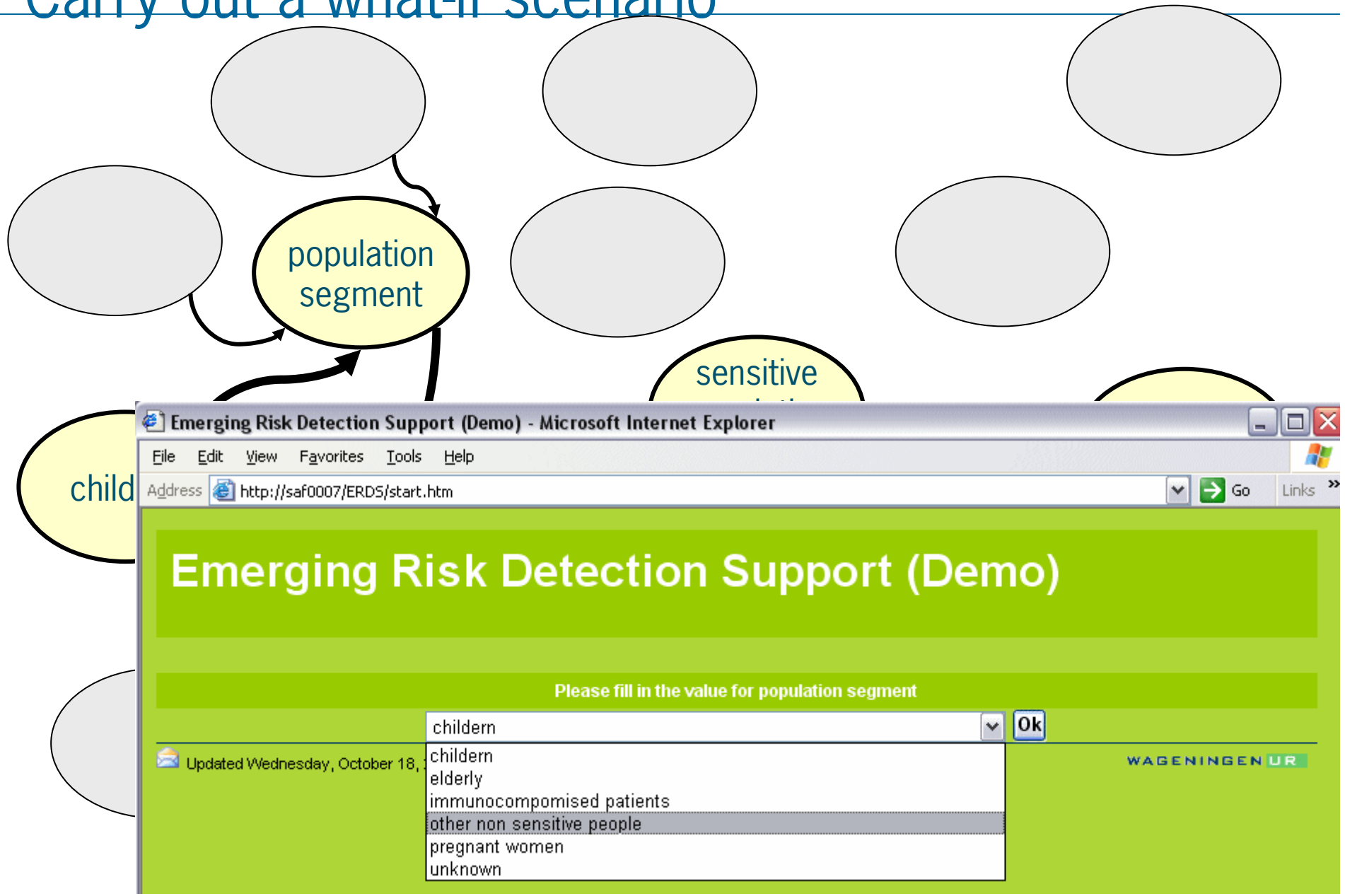
Is there a connection between two phenomena?



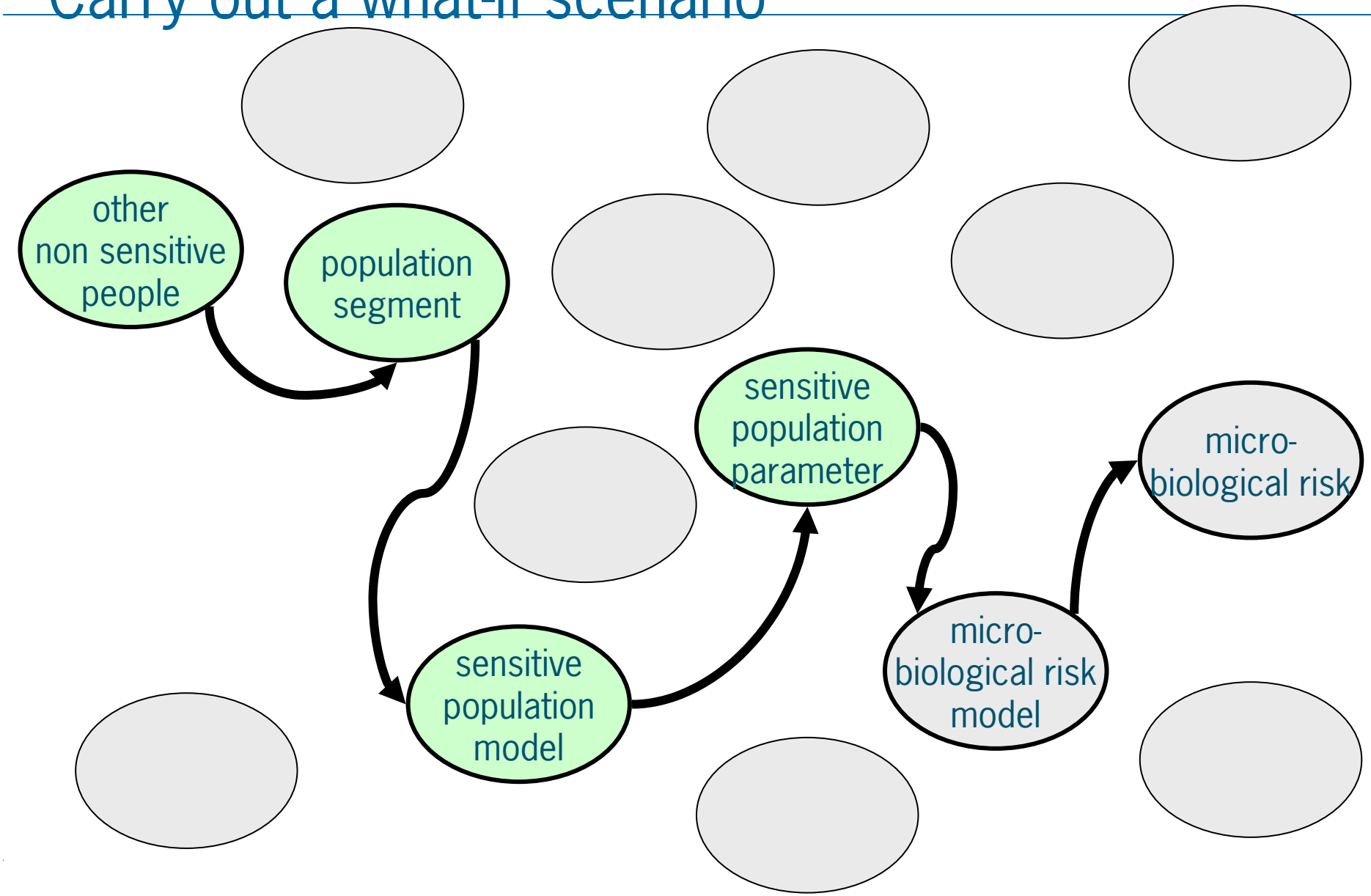
Connection found: Now investigate



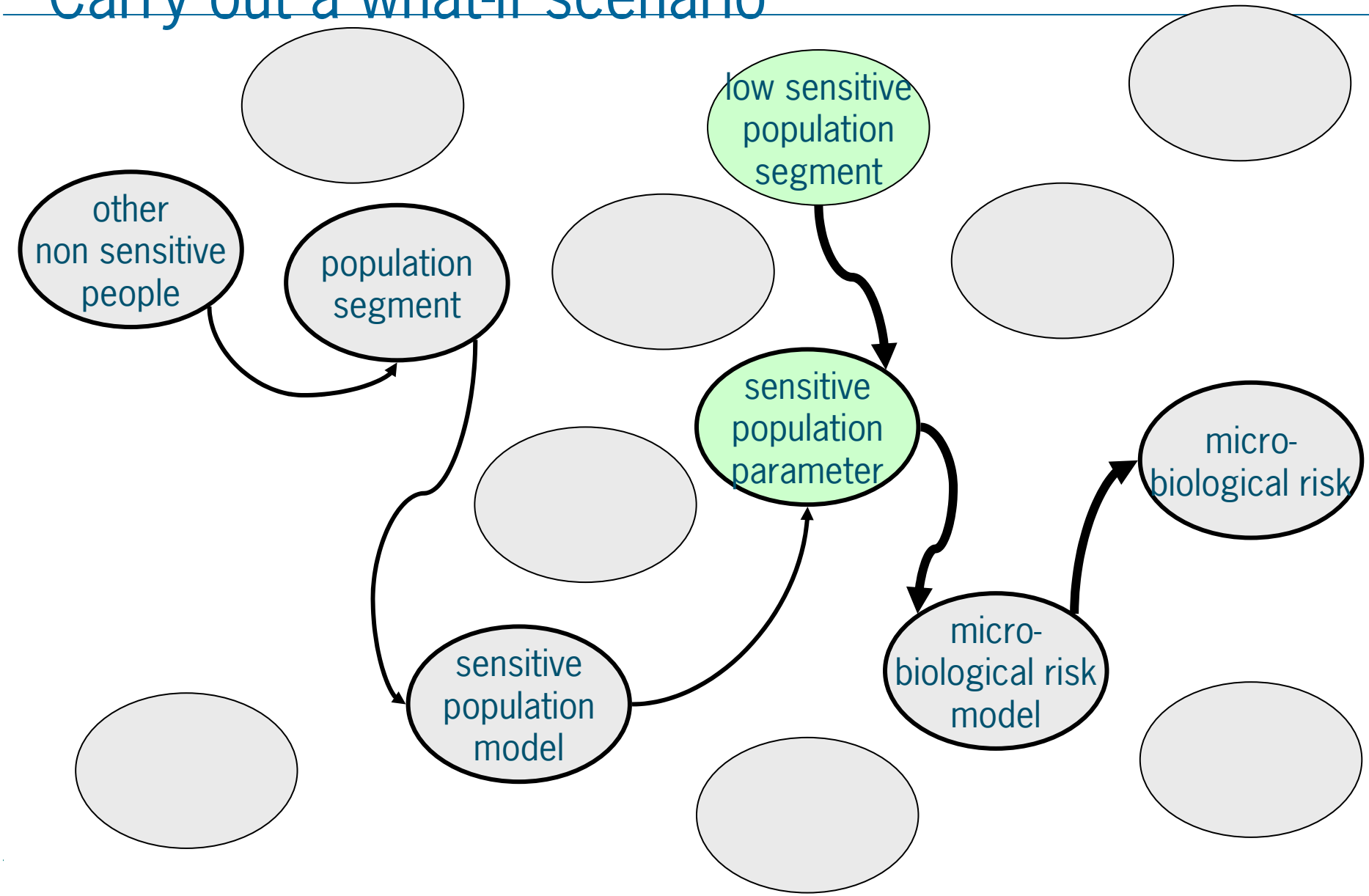
Carry out a what-if scenario



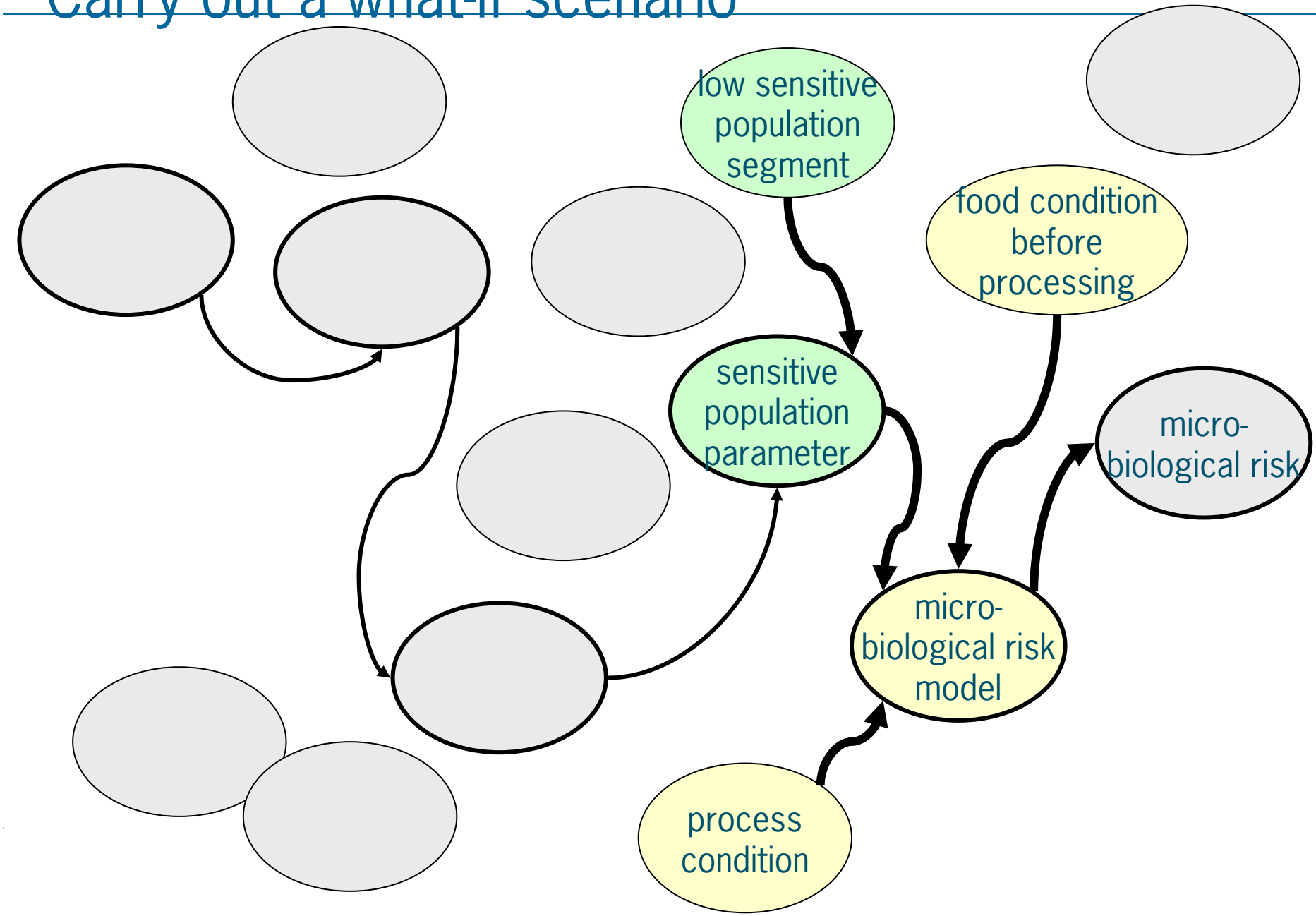
Carry out a what-if scenario



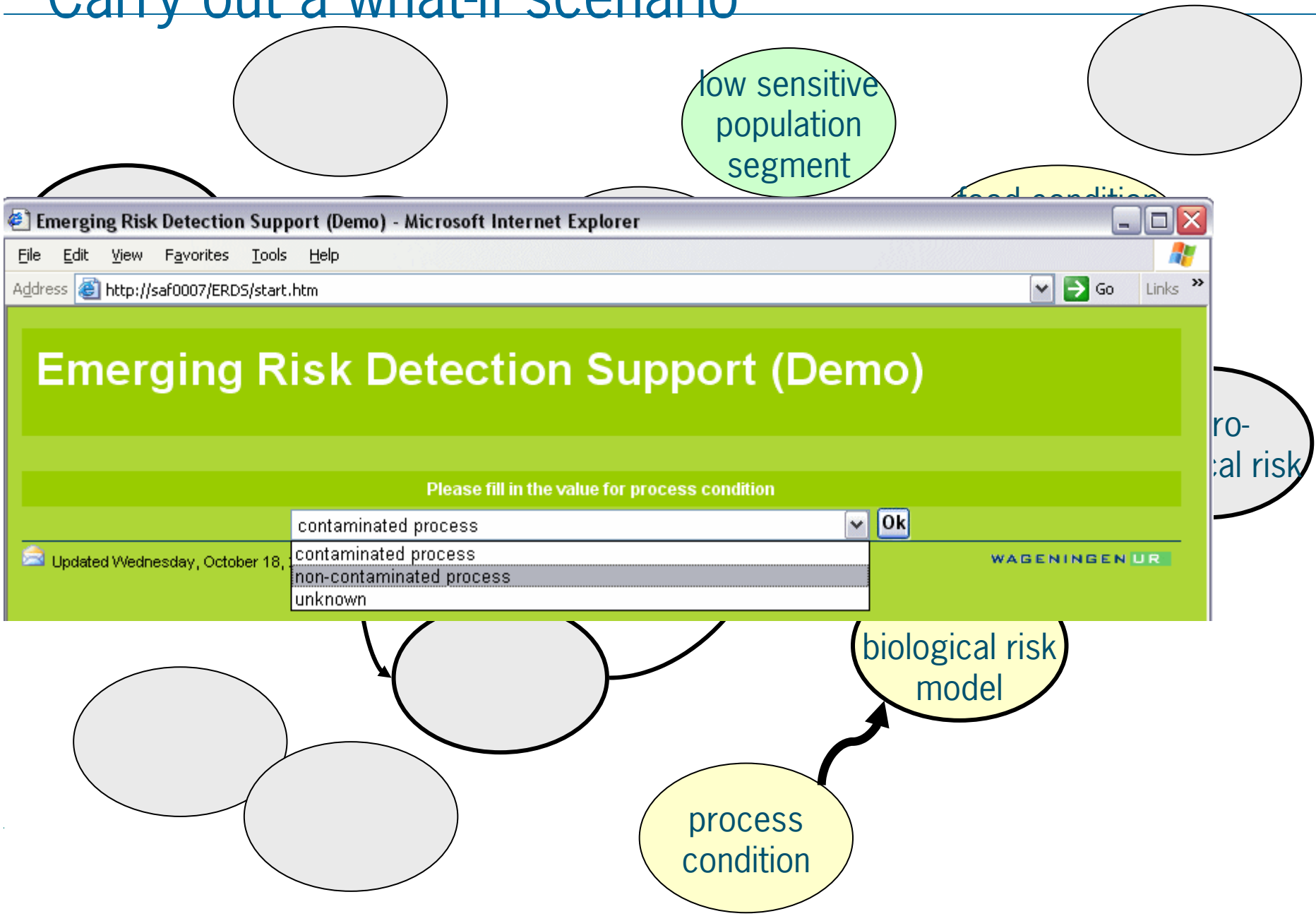
Carry out a what-if scenario



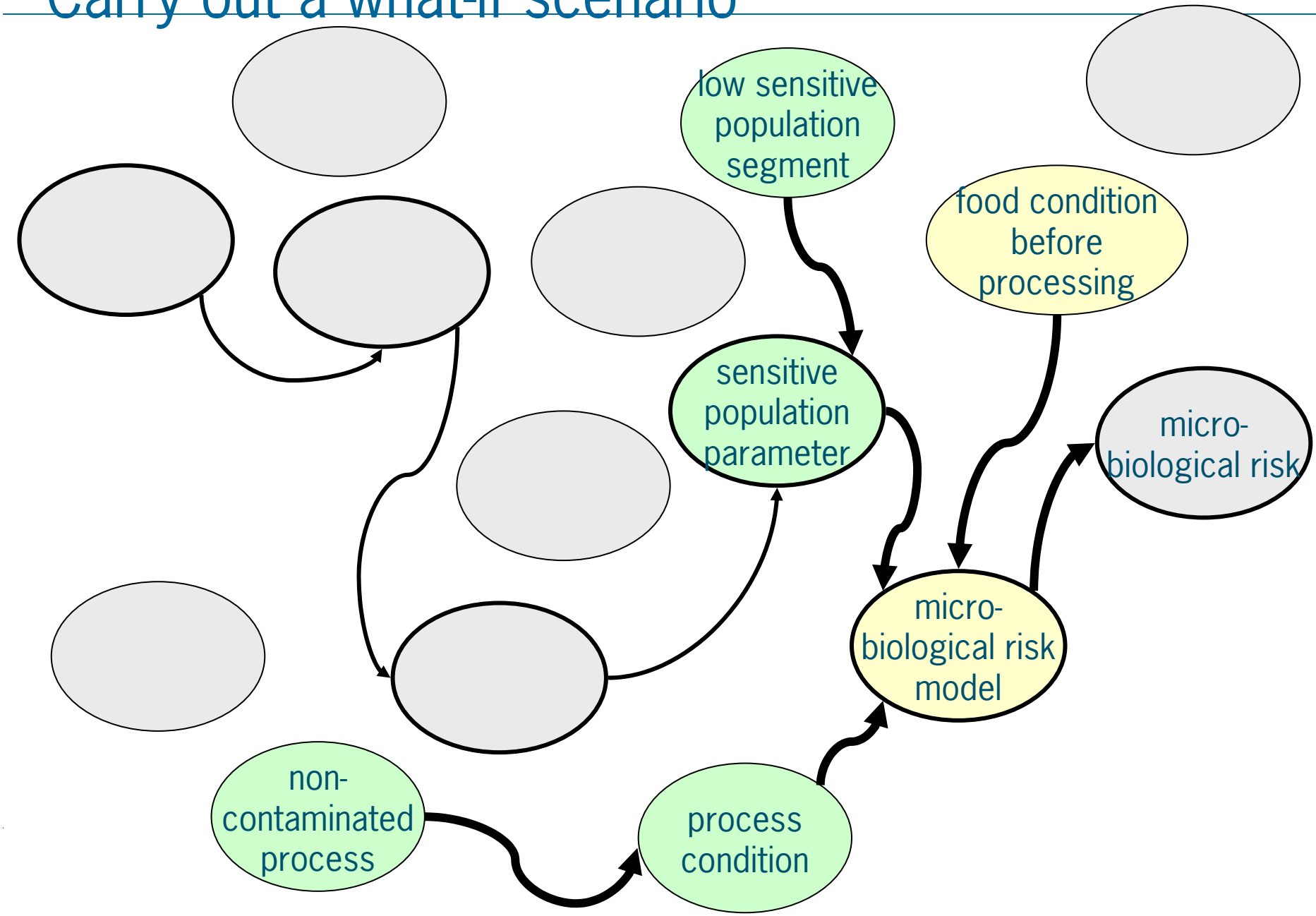
Carry out a what-if scenario



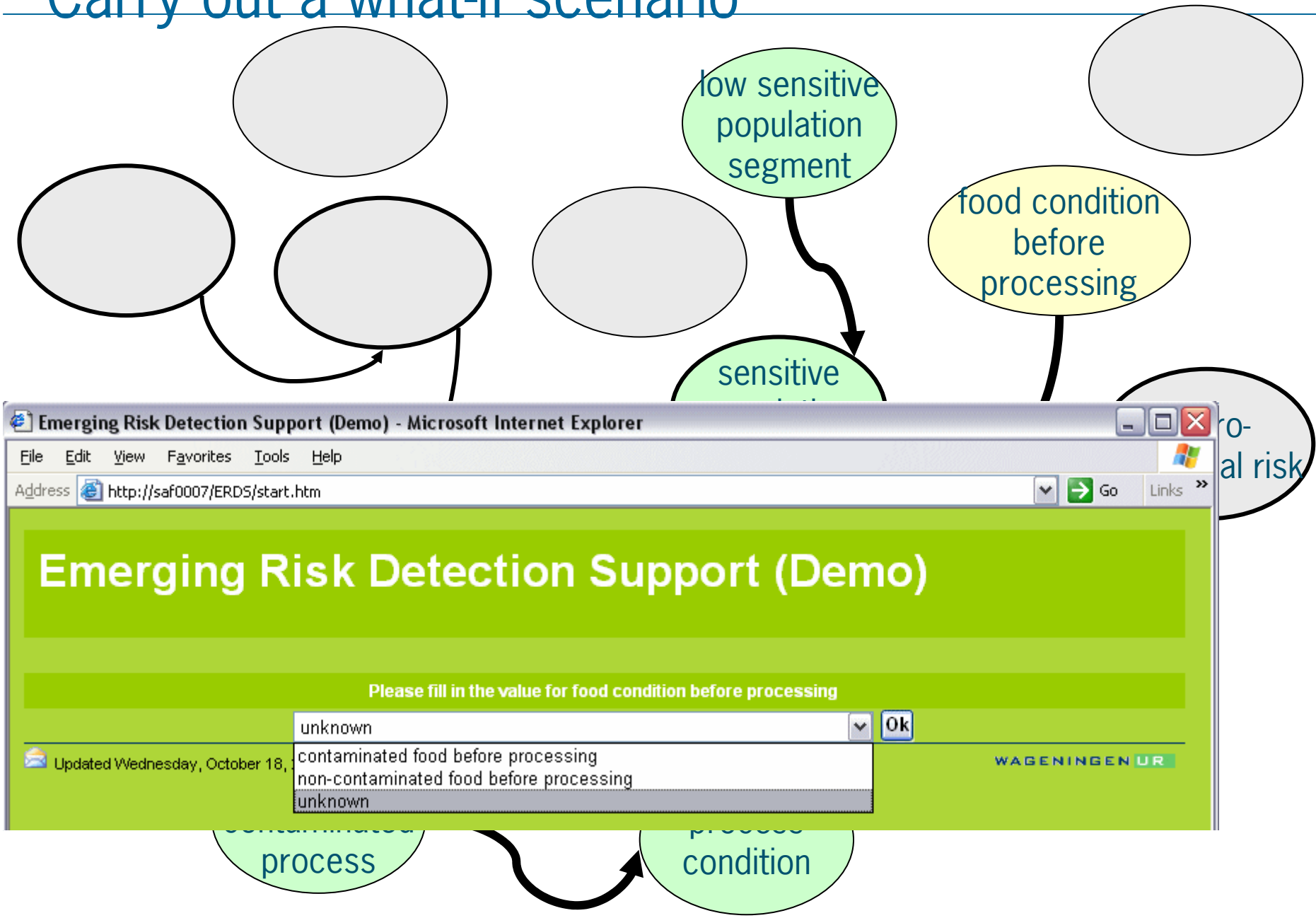
Carry out a what-if scenario



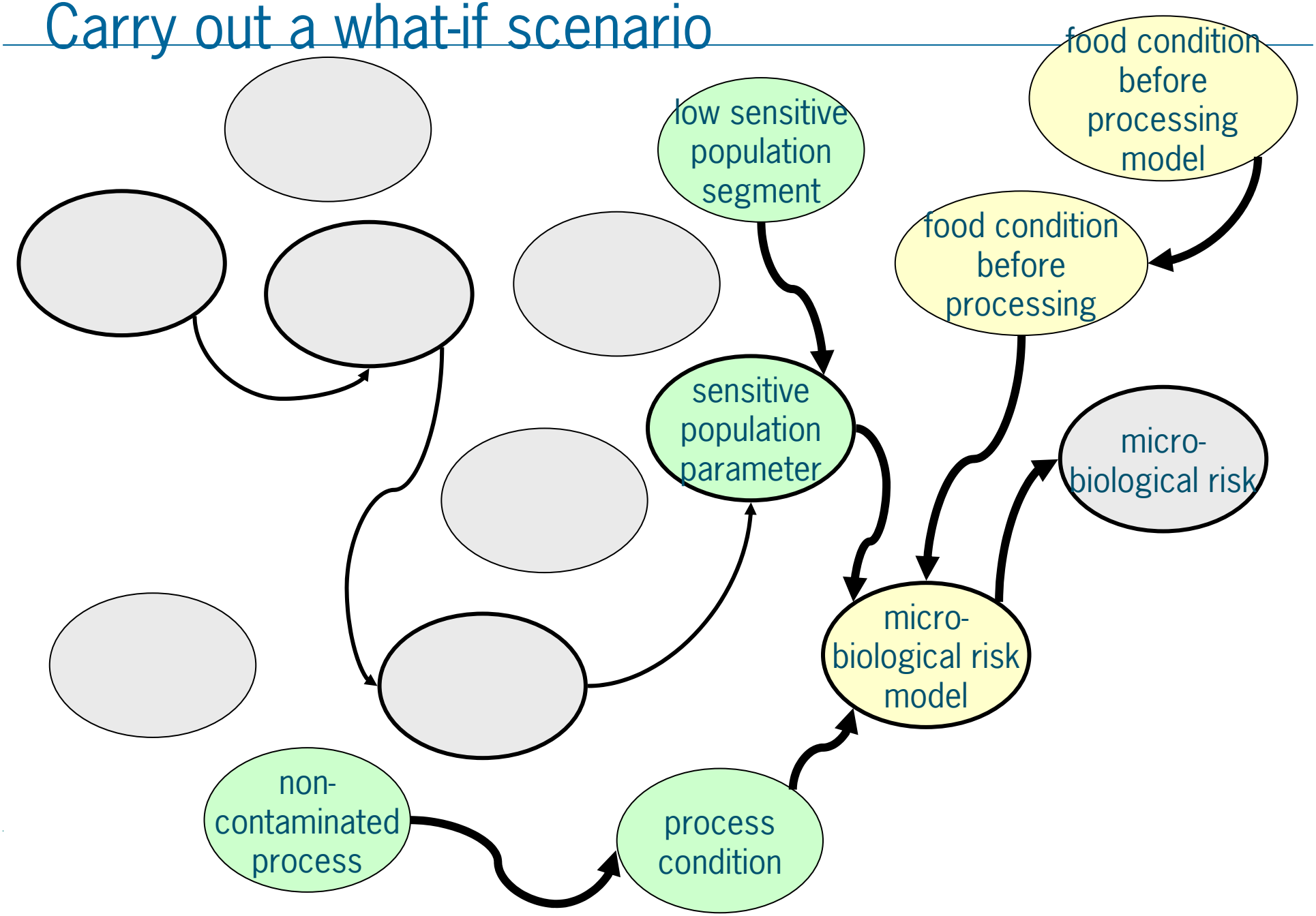
Carry out a what-if scenario



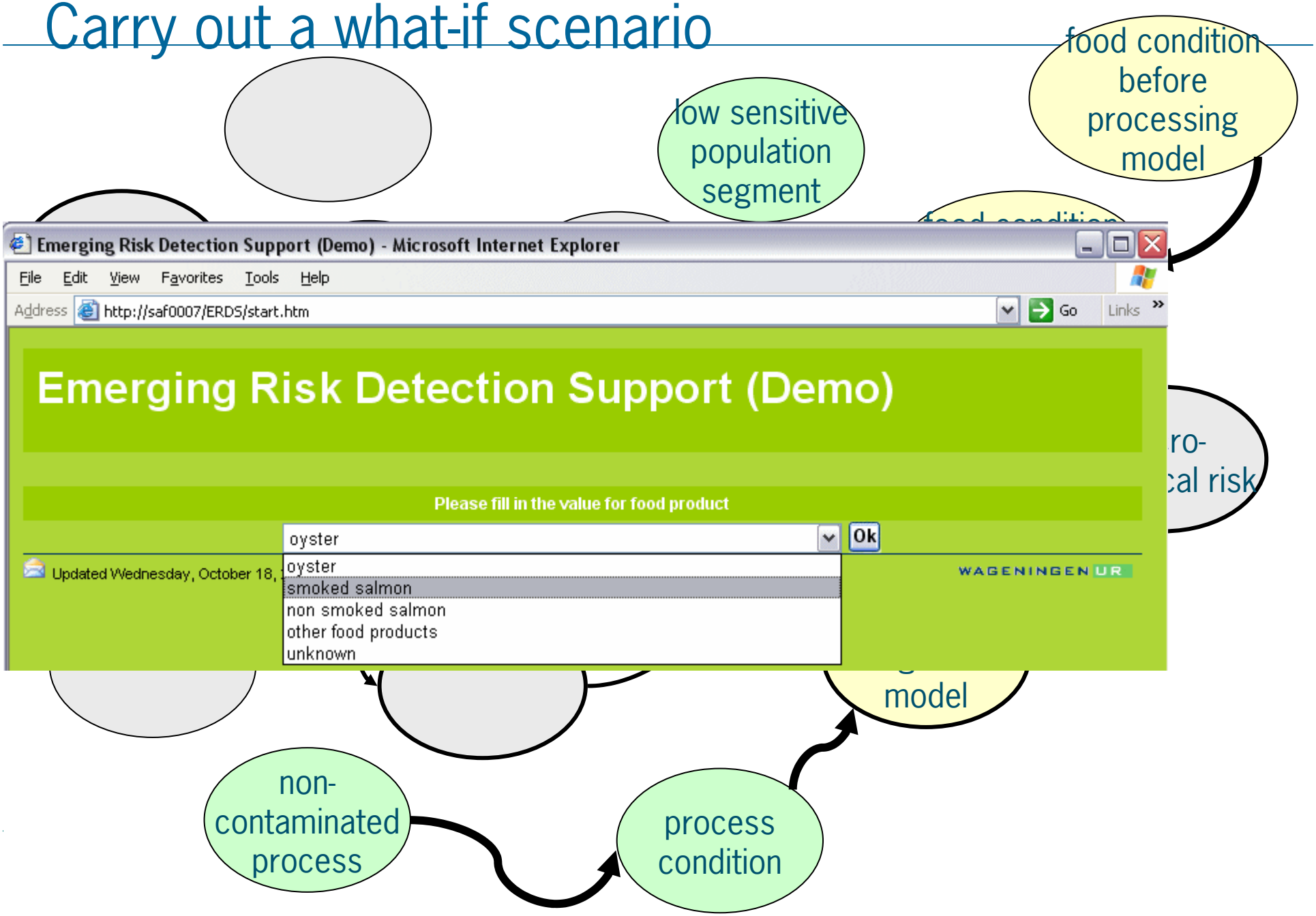
Carry out a what-if scenario



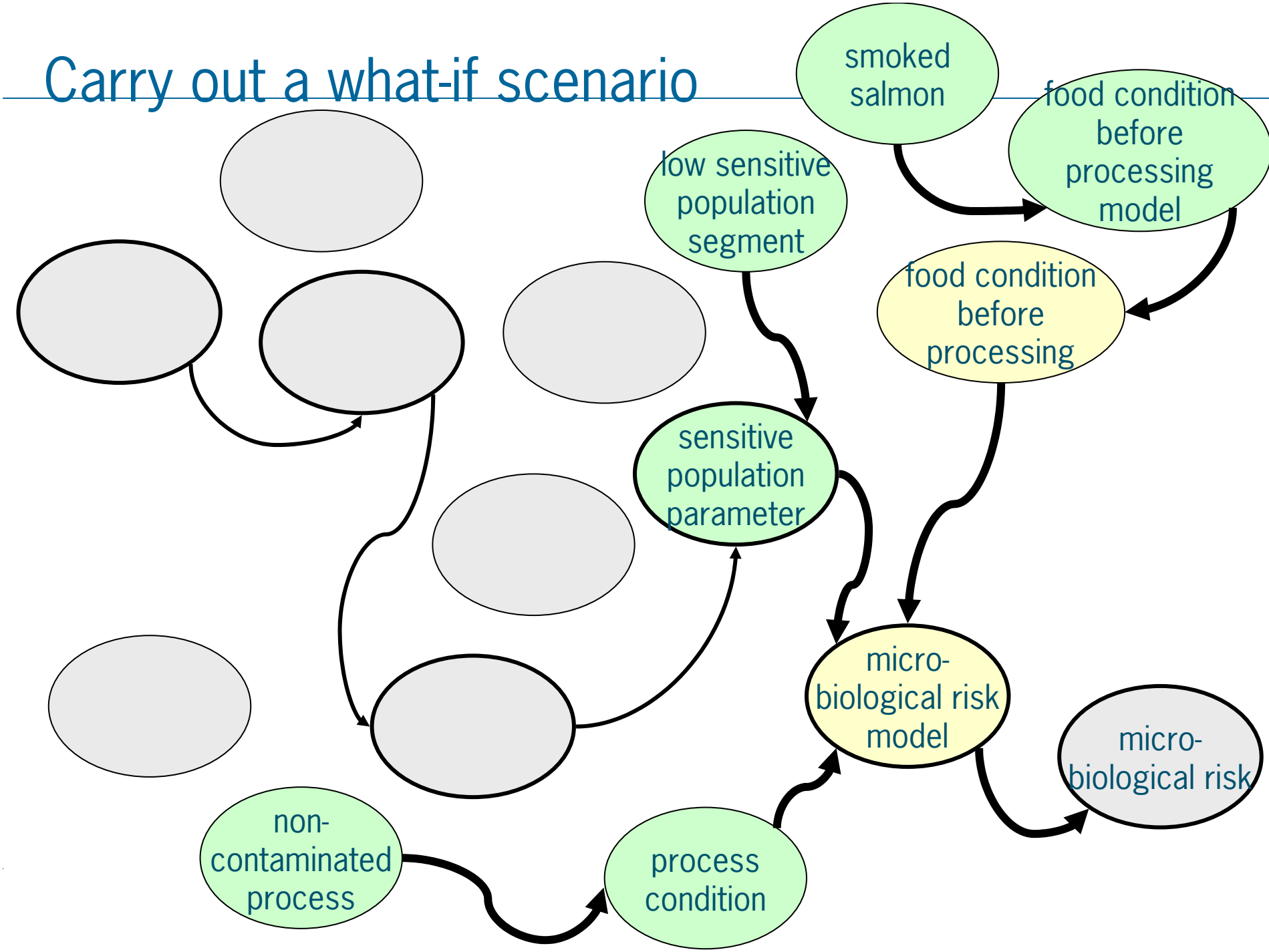
Carry out a what-if scenario



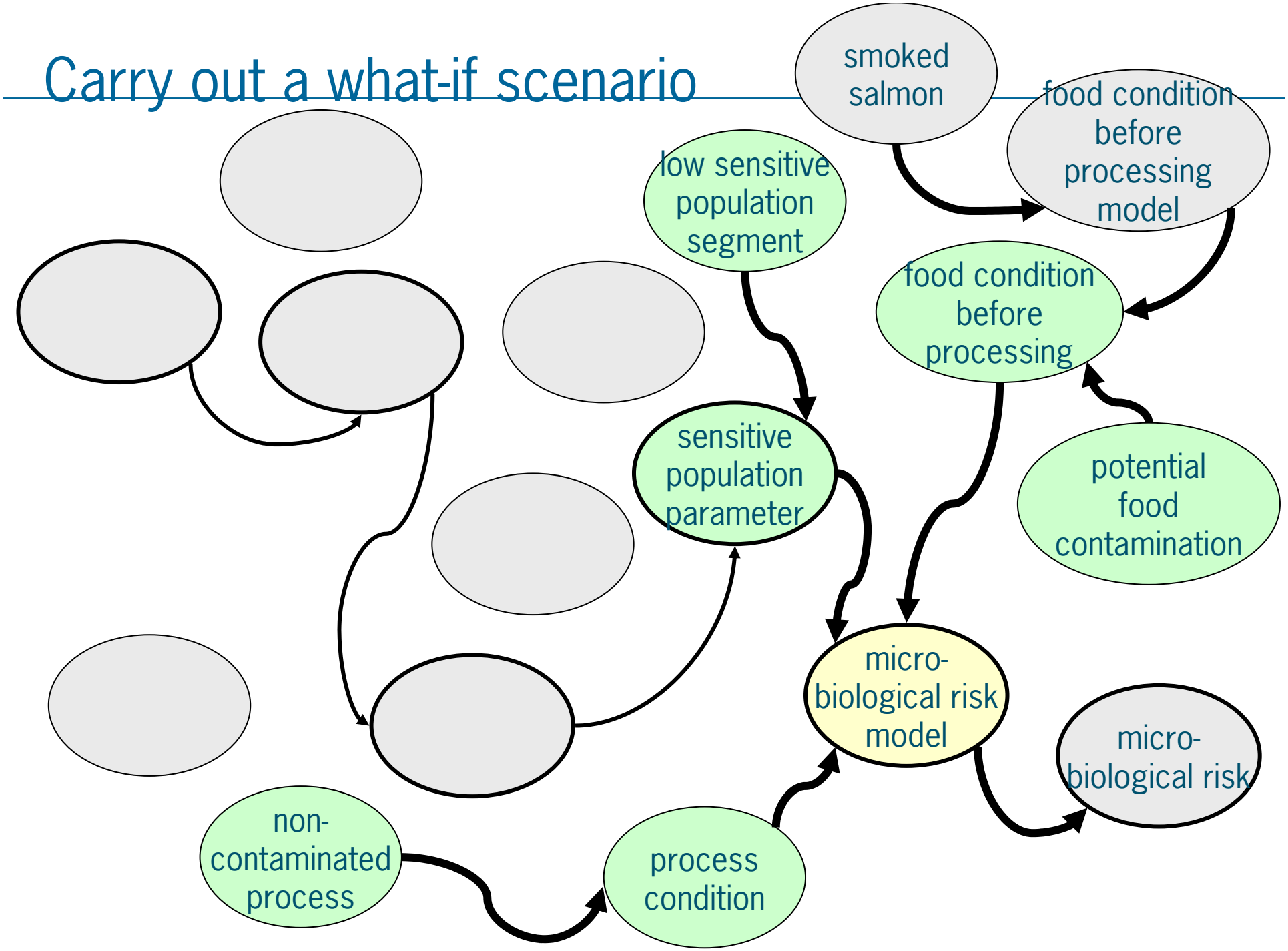
Carry out a what-if scenario



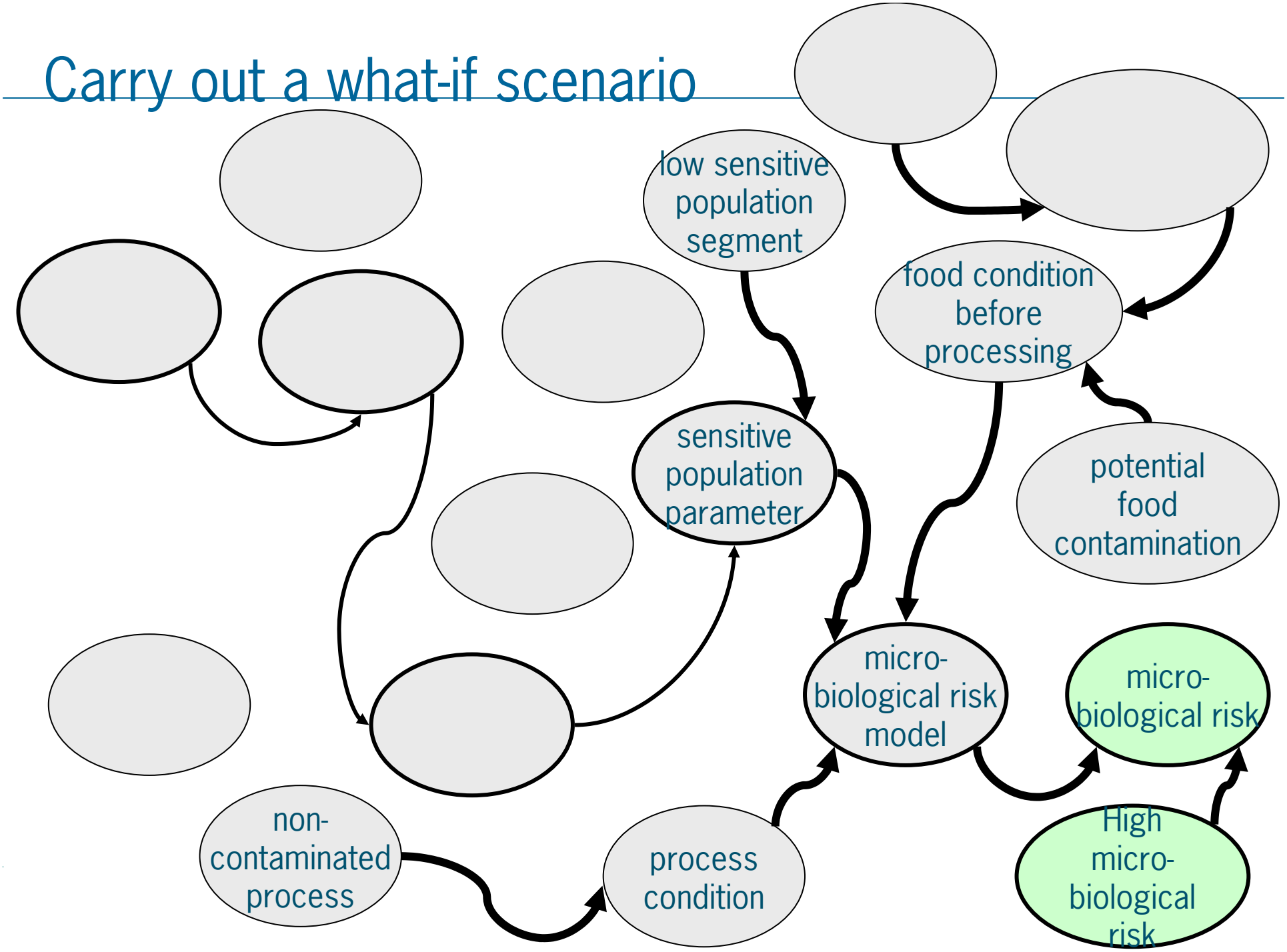
Carry out a what-if scenario



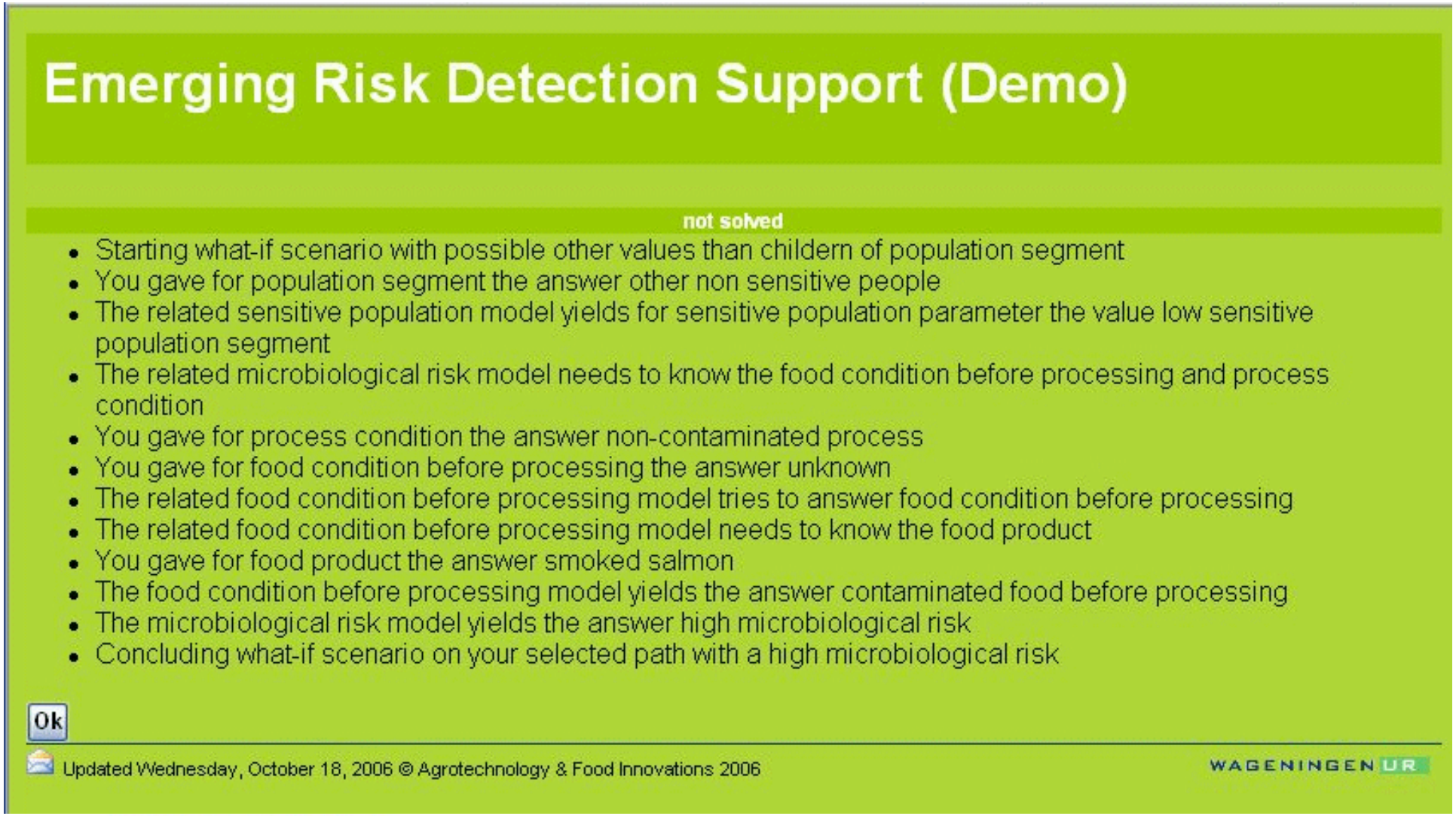
Carry out a what-if scenario



Carry out a what-if scenario



Result of what if scenario



Current status

- Combining holistic food safety knowledge into one network
- Qualitative what-if scenario's and diagnosis on selected holistic paths
- Only part of the salmon case has been modeled

Future work

- How to get optimal support of emerging risk detection
  - Fine-tuning and extending current functionality
    - Risk propagation
    - Benchmarking
    - Detecting knowledge gaps
  - Fine-tuning and extending content
    - Salmon case and beyond

Emerging risks in the Dutch food supply chain: scoping studies

Thom Achterbosch

LEI
WAGENINGEN UR

Rationale

- Redefinition of risk analysis process
  - Shifting responsibilities to firms, consumers
  - Downscaled government intervention
- Dynamic food industries, consumers, policies, …
- Reduce incidents and/or public profile
- Benefits of prevention
  - adverse health effects, economic loss, social commotion

Purpose

Emerging risk identification:

A system or procedure aimed at identifying potential food hazards, allowing proactive interventions that prevent a potential hazard from becoming a risk.

based on VWA (2005, p.12)

Wageningen UR research into building blocs

- 4-year research program for Food and Consumer Product Safety Authority (VWA); Min. Agriculture Nature Food Quality (LNV)
- Year 1: studies of the 'host environment' for food safety risks, 3 areas.
- Perspectives on objectives and systems/indicators of emerging risk identification

1. Perception – what are the different views on emerging risk system

- Diverging perceptions of emerging risks in The Netherlands
- Expectations vary on what is needed to further build confidence in the food safety system.
- Too narrow definition bears risk that stakeholders do not associate positively with regulations.
  - Chemical/microbial food safety, obesity

2. Operations – how does the systems work, what were the signals, what has been missed etc.

- Risk analysis activities intertwined rather than separable.
- Uncertainty is on the menu
  - Anticipate on the assessment, management and the communication of risks to emerge in the future.
- Develop ‘anticipative’ capacity: risk analysis and early warning
  - including collecting information from inside and outside the food supply chain (the 'host environment').

3. Behaviour – what are the working procedures, structured responses, communications etc. with respect to food safety risk.

- Create trust between private sector agents (producers, traders, consumers etc.) and authorities
- Incentives for compliance, cooperation and information disclosure in food industry.
- Balance public efforts to private incentives

Ambitions of emerging risk identification

- Complement standard risk analysis, early warning
  - Address scientific uncertainty, diverging perceptions on risk.
  - Position of risk communication
- ‘System’
  - data input from certain indicators
  - theory/experience to derive useful information
- Indicator coverage
  - 'host environment' (supply chain and business environment)
  - behaviour of agents in the food supply chain.

Ways ahead

- Case study approach:
  - Fish feed
- Risk indicators
  - Statistical relations indicator-potential hazard
  - Producer behaviour, risk perceptions
- Links with risk profiling, risk-benefit assessment (health, economics): SAFE FOOD

End

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Workshop on Emerging Risks and Early Warning Systems

Wageningen, The Netherlands

19 October 2006

The Global Information and Early Warning System (GIEWS)

on Food and Agriculture of

the Food and Agriculture Organization (FAO) of the United Nations

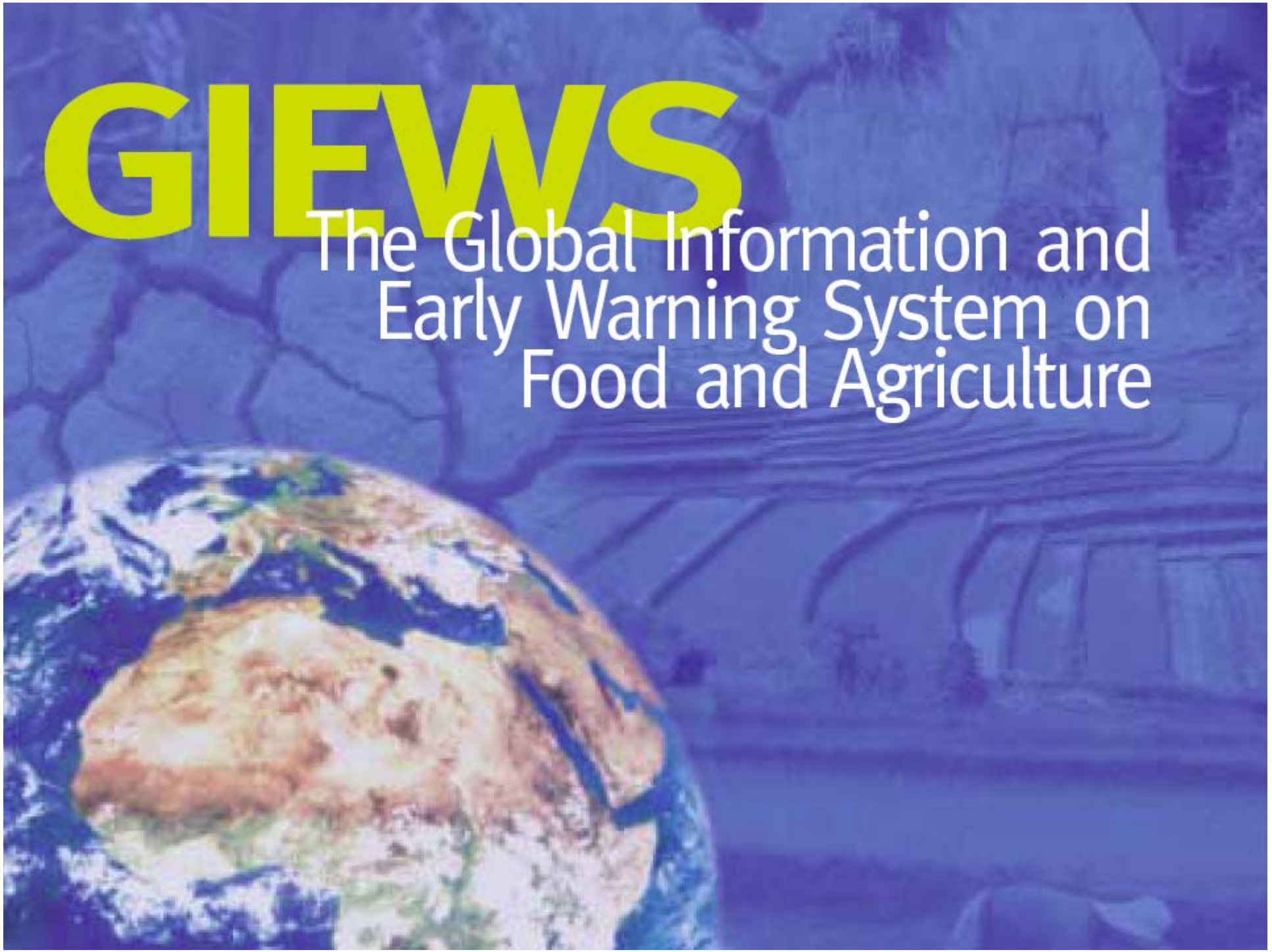
By Dr. Kisan Gunjal, Food Emergency Officer

Commodities and Trade Division

FAO, Rome, Italy

GIEWS

The Global Information and Early Warning System on Food and Agriculture



What is GIEWS?

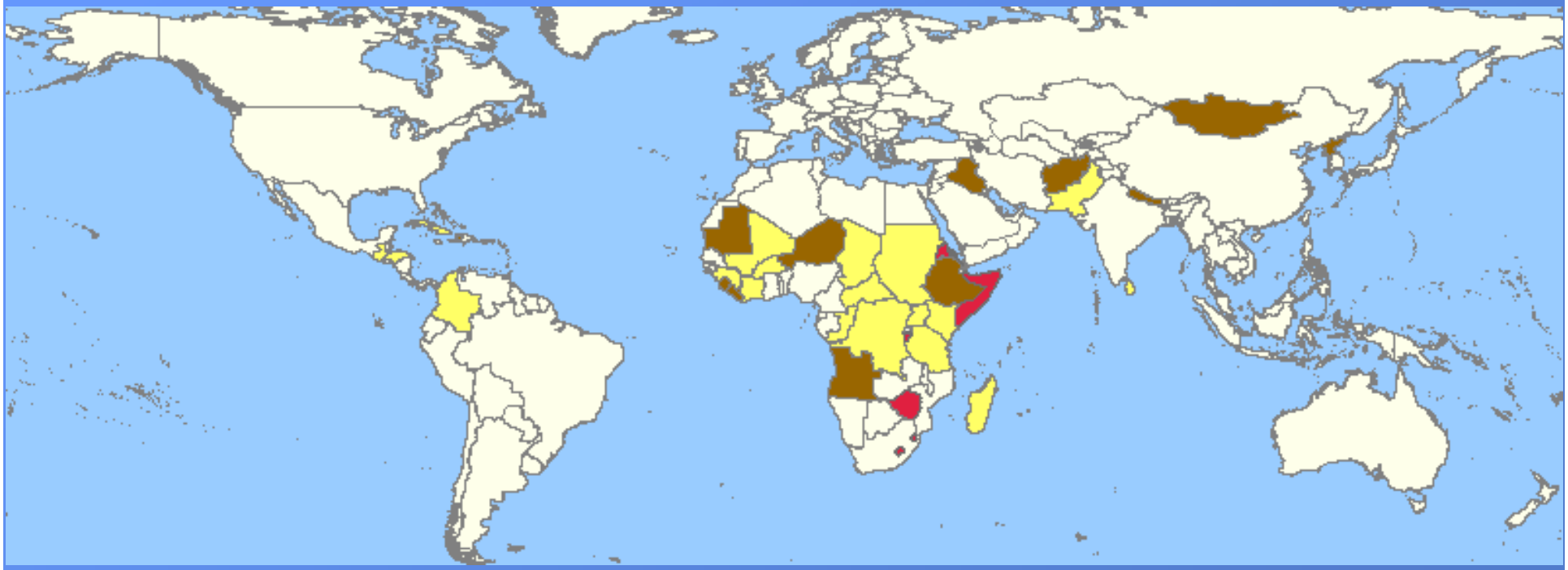
The FAO Global Information and Early Warning System (GIEWS) on food and agriculture was established in 1975 to monitor the food supply and demand situation at global, regional and country levels in order to provide early warnings of impending serious food shortages and food emergencies.

GIEWS Primary Activities

- **Global monitoring and early warning**
  - **Also shows countries facing unfavourable prospects for current crops & reason(s)**
- **Food security (supply and access) assessments**
  - **About 20 countries a year**
- **Information on current food emergencies and trends**
  - **Shortfall in aggregate food supply**
  - **Widespread lack of access**
  - **Severe localized food insecurity**

World - Countries in crisis requiring external assistance (total 40 as of Oct. 2006)

(http://www.fao.org/giews/workstation/page.jspx)



Legend: Red – Shortfall in prod/supply (6); Brown: Lack of access (11); Yellow: Severe localized food insecurity (23); White: Unknown

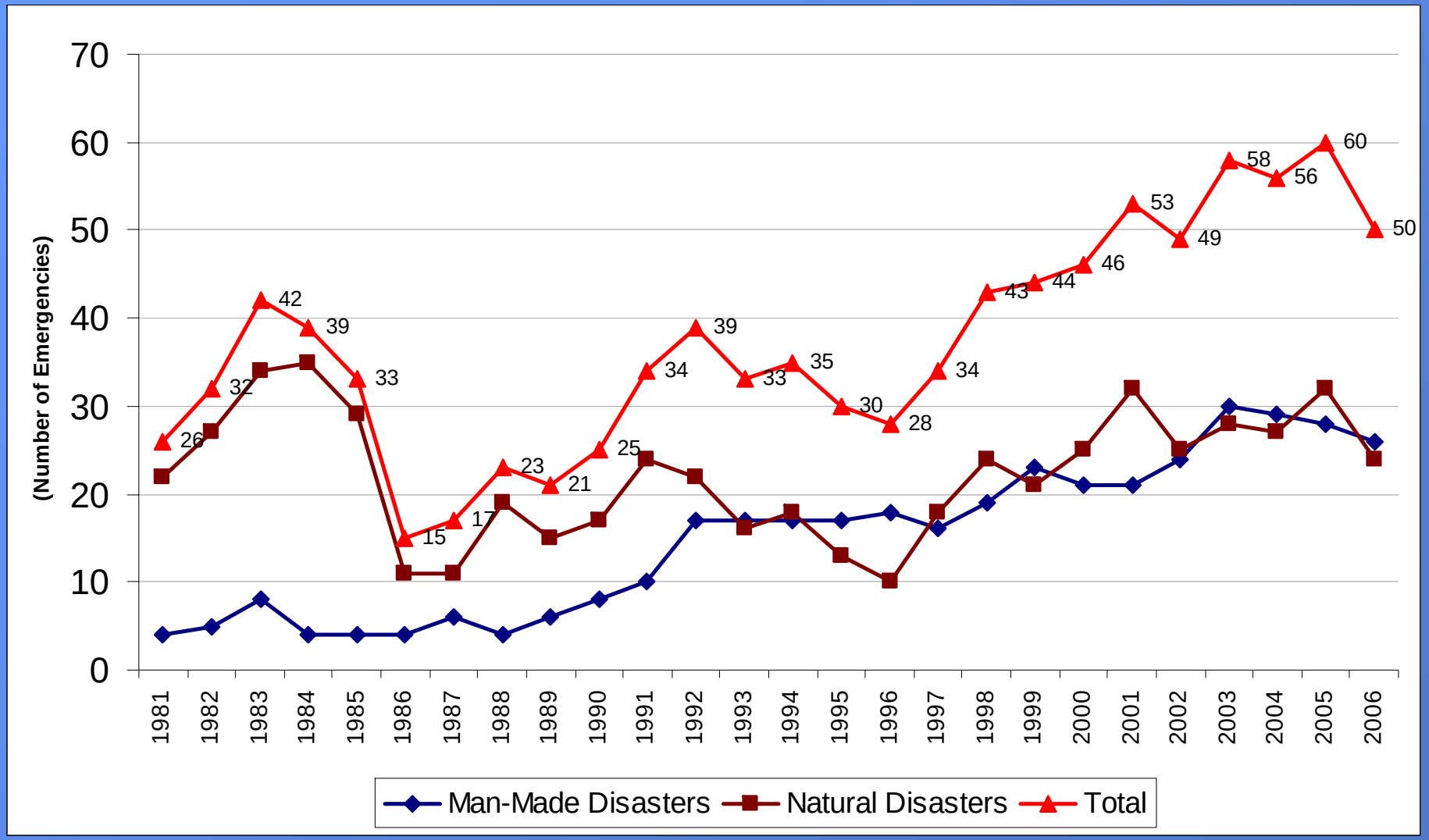
Emerging Risks
FAO/GIEWS Mainly Concerned with the Occurrence of:

- Natural Disasters
  - Slowly developing disasters e.g. drought, adverse weather, trans-boundary diseases, avian influenza, etc.
  - Sudden on-set disasters such as floods, cyclones, hurricanes, earthquakes, volcanoes, etc
- Man-made Disasters
  - War-conflict type disasters, such as war, civil strife, refugees, internally displaced persons, etc.
  - Socio-economic disasters e.g. economic crisis due to commodity price collapse, loss of export markets, currency problems, etc., land tenure problems, HIV/AIDS and health related crises,

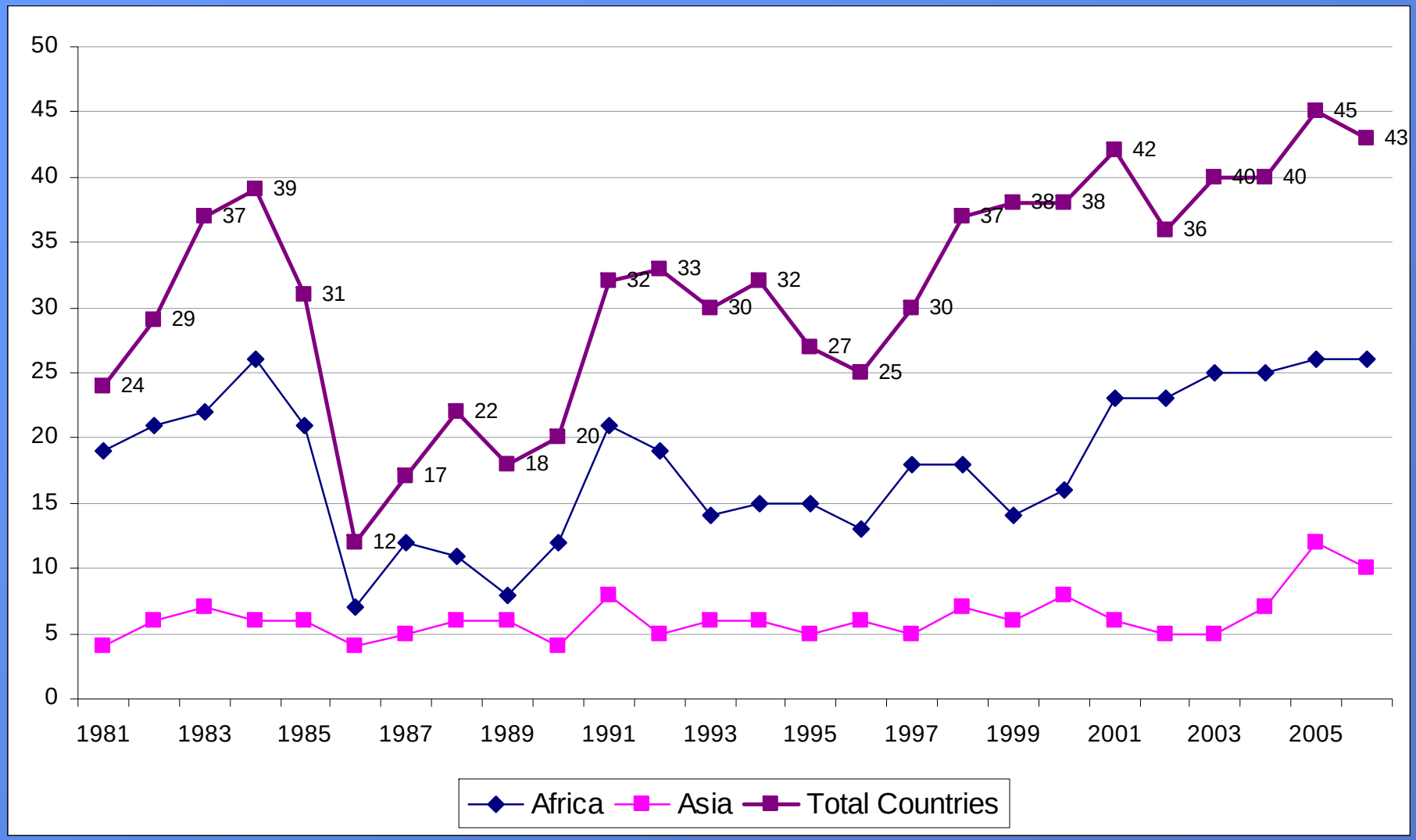
Defining Emerging Risk

Emerging risk is a potential occurrence of large-scale disasters that can cause an extra-ordinary situation where serious and immediate threats to human life and people's livelihood are posed or potential disasters in which people are unable to meet their basic survival needs without external assistance (adapted from UNDP/UNDRO and FAO).

Trends in Causes of Food Emergencies 1981-2006 - as of October 2006 (Source: FAO/GIEWS)



Countries Affected by Severe Food Shortages, by Regions 1981-2006 -as of October 2006 (Source: FAO/GIEWS)



GIEWS Publications

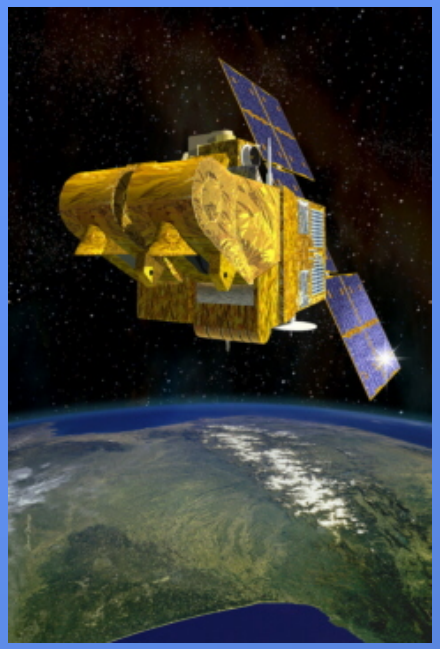
- **Regular Publications:**
- **Crop Prospects and Food Situation**
- **Food Outlook**
- **The Sahel Reports**
- **Latest Country Updates**
- **Special Reports**
- **Special Alerts**

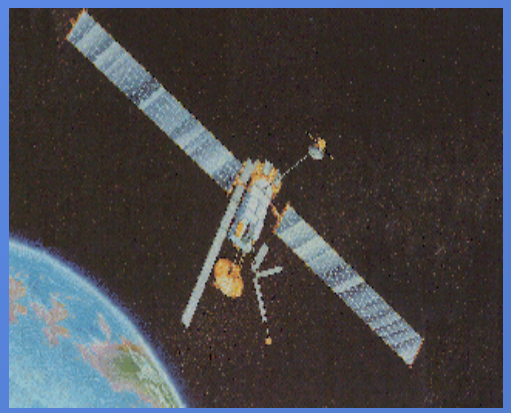
GIEWS Workstation

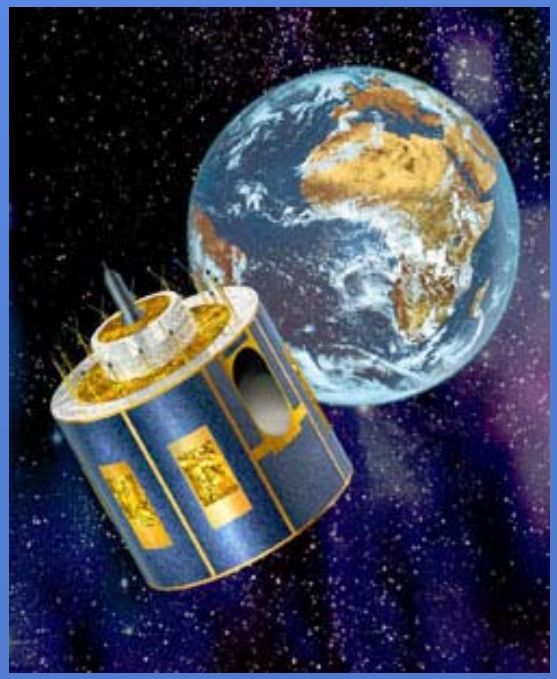
- **Provides analytical tool to country officers/monitors internally and information externally**
- **Sub-national layers being populated for 15 selected countries**
- **National installation of GIEWS Workstation in future in selected countries**

Satellite Data

- METEOSAT images
- NOAA images
- SPOT images







Geographic Layers | Crop Layers | RS Derived Products | Other Thematic Layers

34%

Add/Remove Layer

Mozambique, 2004 September 06
Updated on 03-05-2004

Estimated Impact on Food Security

Environment
Primary Production
Socio-Economic

Indicators

very negative | negative | neutral | positive | very positive | n/a

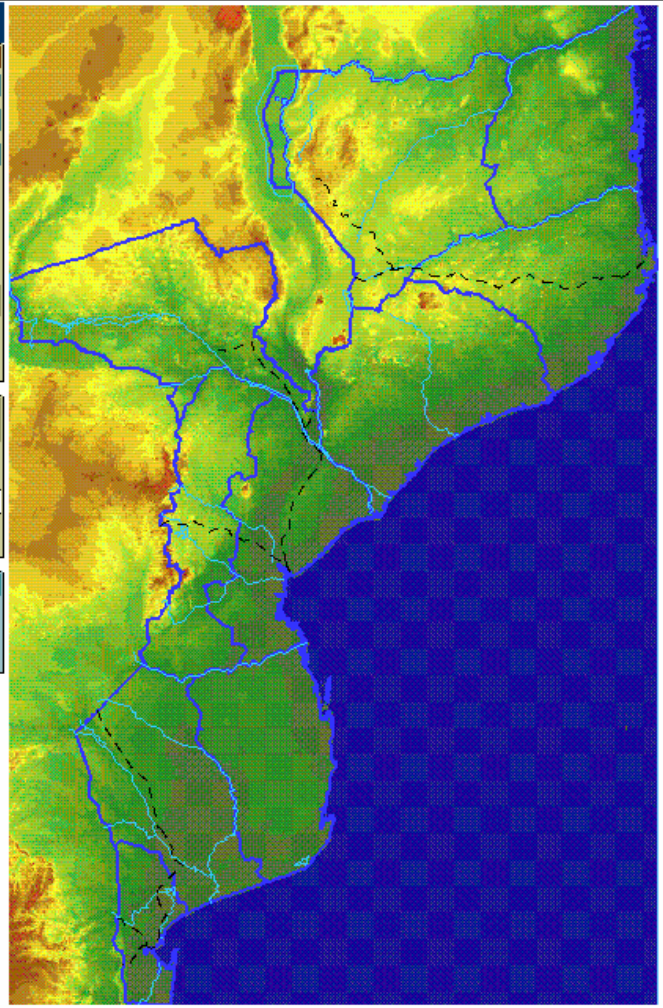
Indicators Report

Reference crop situation for September 06

crop	stage	% of production
Wheat	growing	0

Show crop maps

Sub-National Level Analysis

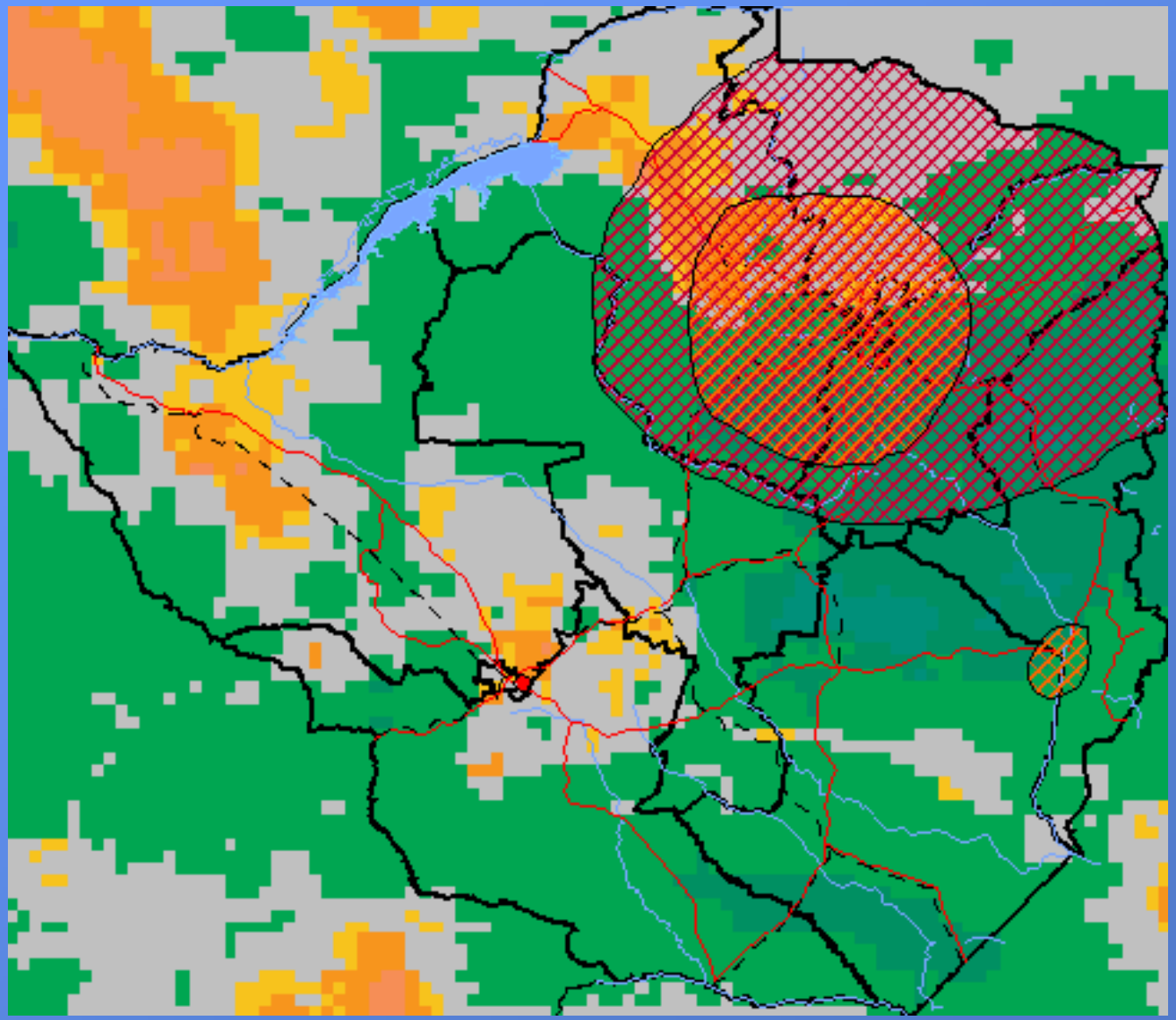


Digital Elevation Model
0m
500m
1000m
2000m
5000m
Water
unknown
unclassified
Level 1
Rivers
Railroads
0 272 km

Report

Harvesting of the 2003/04 main agricultural season crops is currently underway. Assessments by the national Vulnerability Assessment Committee (VAC) and a Crop and Food Supply Assessment Mission by FAO/WFP are being carried out. With substantial recovery in the south, early estimates point to an above-average national level production. Results should be finalized in June. The cropping season started almost a month late and has been characterized by dry spells up to mid-January. As a result, up to three replantings were necessary in the south of the country, while planting was delayed elsewhere. In March overflowing of several rivers in central provinces following heavy rains caused serious flood damage to crops. For example, about 600 hectares of cropland in the Dondo and Nhamatanda districts in Sofala province were reportedly submerged. However, emergency food assistance requirements are expected to be much lower than in the previous years primarily due to improved local food supplies.

Zimbabwe: Estimated rainfall, cropped area maize and wheat, Oct 06



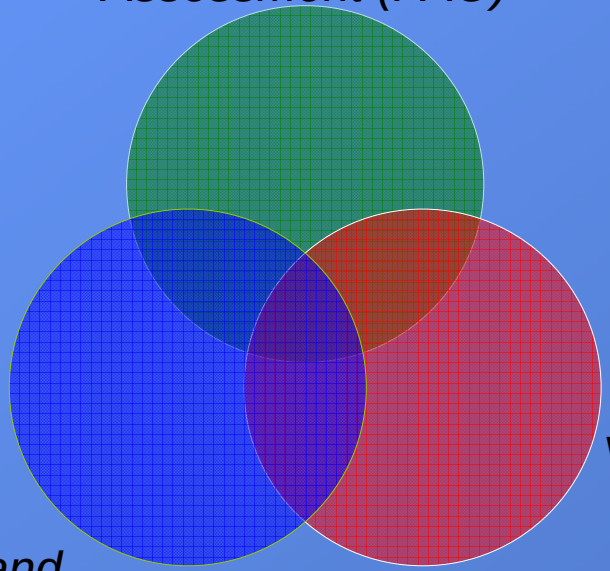
Crop and Food Supply Assessment Missions (CFSAM)

- At the request of national governments FAO/GIEWS, jointly with WFP/OEN, conduct for countries facing widespread and serious food emergencies. Typically 20-25 countries annually are covered by these missions. Most are in Africa, but recent examples also include Niger, Aceh Province, Afghanistan and Iraq, etc.

- FAO Methodology published in 1996
- Updated in 2002
- The joint FAO/WFP methodology currently being revised with funding from the EC.

THREE MAIN COMPONENTS OF FAO/WFP CFSAMs

Crop Production and Food Supply/Demand Assessment (FAO)



Macroeconomic Context Affecting Food Supply, Demand (FAO)

Vulnerability and Food Needs Assessment (WFP)

The Future of Emerging Risk systems for the food chain

Djien Liem

Scientific Committee and Advisory Forum Secretariat

EFSA, Largo Natale Palli 5/A, 43100 Parma

Emerging Risks

EFSA's Responsibility

"The Authority shall establish monitoring procedures for systematically searching for, collecting, collating and analysing information and data with a view to the identification of emerging risks in the fields within its mission"

(Art 34(1) of 178/2002)

Building EFSA's capability to identify and evaluate emerging risks

Work conducted so far

Future plans

Work conducted by the Scientific Panels and Committee

- **Activities SC Working Group on Emerging Risks**
- **Project conducted by the EMRISK Consortium (coordinated by the Dutch VWA)**

Work conducted by the Scientific Committee

- To advise on a system to identify emerging risks
- To advise on a procedure for evaluation and prioritisation of identified issues
- To support the Authority in establishing a network of key sources to systematically collect information on emerging risks
- To advise on an operational system for maintaining appropriate contacts within such a network

(EFSA Mandate, 18 Feb 2004)

SC Opinion on Emerging Risks
(adopted on 31 May 2006)

Sources for collection & exchange of information

- Scientific literature
- Members of SP/SC and their WGs and EFSA staff
- Advisory Forum
- Stakeholder Consultative Platform
- Food Agencies outside EU (e.g. US FDA, US EPA, Health Canada, Japan Food Safety Committee, FSANZ…)
- DG-Research projects
- EU (e.g. non-food SCs, EMEA, ECDC, EEA, …)
- International organisations (WHO, OIE, FAO, ILSI, …)

SC Opinion on Emerging Risks
(adopted on 31 May 2006)

Monitoring of *indicators* to predict an emerging risk at a very early stage

- **Monitoring of parameters/indicators that are remotely and often indirectly connected to the food and feed chain**
- ***Early warning* or *horizon scanning* systems**

Resource demanding, collaboration with organisations with a similar interest needed

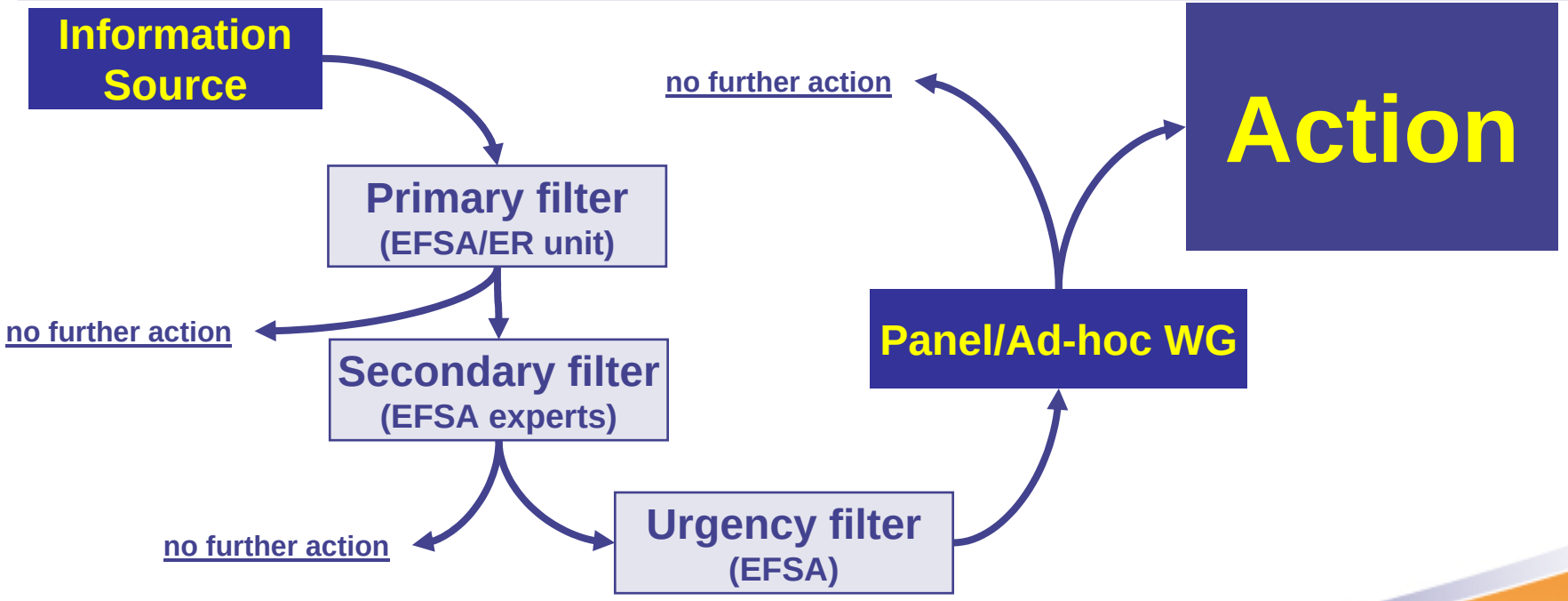
Some examples of programmes and tools for identification of Emerging Risks

- ***GPHIN*** ***Public Health Agency of Canada***
- ***INFOSAN*** ***International Food Safety Authorities Network (WHO)***
- ***Pathfinder*** ***Centers for Epidemiology and Animal Health Centers for Emerging Issues***
- ***GOARN*** ***Global Outbreak and Alert and Response Network (WHO)***
- ***GLEWS*** ***Global Early Warning and Response System***

Conclusions on Emerging Risks

(SC Opinion, 31 May 2006, Cont'd)

Proposed procedure for the handling of a signal indicating an emerging risk



State-of-Play 2006

- EFSA is getting grip on the situation (identification phase) but needs to continue with building its ER capability (implementation phase)
- There will be no single network in emerging risks
- A global perspective and a holistic approach is needed
- Information and data sources shall represent many disciplines and approaches

Future Plans

- **Consideration of advice from the Scientific Committee and definition of action plans to further build EFSA's ER capability**
- **Developing a strategy for collaboration with the Member States and international organisations (EU, world-wide)**
- **Creation of (ad-hoc) networks in area of collection of occurrence and fod consumption data**
- **Participation in selected research platforms relevant for EFSA**

Thank You

Appendix II – Background information on speakers and (early) warning systems

1. The First Session

Below, you find a short introduction of the speakers and their presentations in the first block at the mini-conference.

1.1 Marco Baldari – ECDC

Dr. Marco Baldari, ECDC : Born on Aug 9th, 1957 in Rome. Graduated in Medicine in 1984. Specialized in Infectious Diseases. Diploma in Tropical Medicine and Hygiene. Worked in Italy for over 12 years in Public Health and for about 5 years in a Hospital Infectious Diseases Unit. Worked for 1 year with the United Nations (UNDP) at designing and implementing anti-HIV activities in Africa. With ECDC since its foundation, in the Preparedness and Response Unit (PRU), where designed the TTT and took part in developing the Standard Operating Procedures for event-based Epidemiological Surveillance at ECDC. Is the PRU member in the "HIV" and "TB" ECDC transversal projects

Short description of the system

ECDC started operating on May 27th 2005, to implement regulation (EC) n. 851/2004 of the European parliament and of the Council of 21 April 2004: "*establishing a European centre for disease prevention and control*". The mission and tasks of the Centre in the field of Epidemiological intelligence can be summarized as follows:

- *Establish, in cooperation with MS, procedures for the identification of emerging health threats*
- *Identify, assess and communicate current and emerging communicable disease threats*
- *Inform EC and MS about emerging health threats requiring their immediate attention*
- *Communicate on emerging health threats, including to the public*

To implement all the above, sources to be screened have been established, as well as a protocol that goes from information scanning, through filtering, verifying, assessing and finally to ECDC response. To facilitate the follow-up of identified threats, a specific database has been designed and operated now for more than one year. It also produces reports which are distributed to European epidemiologists. All the above mentioned steps and procedures will be briefly summarized in the presentation.

The rationale behind the design

The rationale is to fulfil ECDC's mandate in the field of Epidemiological Intelligence. Note that this is work in progress.

The target users

The system is operated by ECDC senior experts. Target users are primarily ECDC and EC epidemiologists. But bulletins are provided to state-level epidemiologists EU-wide (and beyond).

The positive points of the system

- It facilitates the daily communal discussion (Round Table) of ongoing threats within ECDC, in order to plan appropriate responses.
- It enormously facilitate the production of a range Reports to be distributed within and without ECDC
- It facilitates statistical analyses of identified threats characteristics and of ECDC monitoring and responding activity

Future work: what could be improved?

Number of people operating the screening, range of screened sources, in-depth reports on specific themes, manageability of the database, quality of reports

Support and collaboration

The system would benefit from a close link and data exchange with all existing EU alert networks (RASFF, animal health, MIC, RELEX, ADNS). Moreover, an improved and regular flow from "traditional" (indicator-based) E.I. would be helpful.

Responsibility and financial support

The PRU Unit at ECDC is both responsible for and paying for the system.

Definition of emerging risks

Potential communicable disease threats include diseases with a high potential for spread; severe diseases or diseases with limited treatment; diseases that require infection control measures; emerging or resurging diseases; diseases/pathogens that change spread or resistance patterns; or diseases that are of unknown origin (independent from where in the world they are detected); and at least one of the following:

- Cases/unusual numbers occur or are expected in more than one MS.
- Exposure to a source to which citizens from more than one MS may have been in contact (including environmental, food, medical)
- Considerable or unclear risk of importation into Europe through trade and travel.
- Adequate verification and investigation of a threat might require assistance from ECDC and/or partner organizations
- Affecting a single MS but requiring information of national health authorities of other European MS
- High media or political attention

Applicability in food domain

The system is probably applicable in the food domain.

Successes in spotting emerging risks

The system has been successfull in spotting:

- Chikungunia in La Reunion.
- Norovirus on cruise-ships.

1.2 Wilfrid van Pelt – RIVM

Wilfrid van Pelt studied biology, bioinformatics and -statistics in the seventies of the last century and studied and teached lungphysics in the eighties at the University of Leiden as part of his PhD program. Since 1993 he works at the Netherlands Institute of Public Health (RIVM), Centre of Infectious Diseases Control (CIb). From 1993 to 1996, he set-up the national electronic surveillance for infectious diseases mainly focused on microbiological laboratories, called ISIS and in 1995 the national project on the surveillance of nosocomial infections involving most Dutch hospitals, called PREZIES. From 1996 onwards his interests changed towards zoonotic diseases, mainly Salmonella and Campylobacter, acting as an intermediate between veterinarians, microbiologists, epidemiologists and risk modellers that focus on the veterinary and food part of the problem and those studying gastro-enteric diseases in humans. Currently he is involved in a feasibility study for the implementation of syndromic surveillance. He developed several statistical tools to detect and study sudden and long-term emerging problems of infections and antimicrobial resistance in humans, in parallel to findings in animals, food, feed and the environment.

Short description of the system

Threats to public health caused by infectious diseases appear usually unexpected, but can in a very short period of time have major consequences. Timely recognition of these threats is essential. In the Netherlands, the "early warning committee" (EWC) has been established in 1999 under the authority of the Health Inspectorate. Its main task is to assess information from various sources, foreign as well as domestic, in order to timely recognize threats to public health caused by infectious diseases. If necessary, further outbreak investigation can be done, or measurements to control the outbreak can be taken. The weekly meeting of the early warning committee takes place at the National Institute of Public Health and the Environment (RIVM). Participants are microbiologists and epidemiologists from various departments of the RIVM, including the National Coordination Centre for Outbreak Management (LCI), as well as representatives from the Food Safety Authority (VWA). Prior to the meeting, each participant selects from various sources of information items which in his opinion are important to discuss at the meeting (so called "signals"). There can be several reasons for selecting a signal. These are outlined in a protocol, and are based on experience. A sudden change in the incidence or prevalence of an infectious disease (e.g. international: the upsurge of West Nile virus infections; national: *Salmonella Typhimurium DT104* infections from contaminated imported beef or STEC infections from raw meat products; *Aedes albopictus*) , the appearance of an infectious disease among certain groups of people or in certain places (e.g. *Lymphogranuloma venereum* outbreak among men having sex with men), or the emergence of a totally new or unknown disease (e.g. SARS) are some of the reasons mentioned. During the meeting, the various signals are discussed and interpreted by the participants in order to estimate the threat for public health in the

Netherlands. On the same day, the RIVM sends a report of the meeting to about 500 people engaged in the control of infectious diseases in the Netherlands: physicians and nurses of the municipal health services, microbiologists, specialists in infectious diseases, infection control practitioners, the Ministry of Health and the Inspectorate of Health. The report is formulated in a way that signals are not reducible to persons, institutions or locations. Evaluation in 2004 showed that the early warning committee recognized nearly all threats due to infectious diseases and outbreaks of infectious diseases which were of national importance, published in various sources of literature. Improvements apply to timeliness and recognition of long term trends. The food safety domain is part of the EWC. Routine excerpts of regular meetings discussing recent problems within the veterinary domain (Healthy Animal Service) and Animal Feed Sector Inspection Services could complement the system.

2. The Second Session

2.1 Marion Wooldridge –VLA

Present Organisation and Position:
Head of the Centre for Epidemiology and Risk Analysis (CERA),
Veterinary Laboratories Agency (VLA), UK

Scientific Expertise:
Marion is a veterinary surgeon and epidemiologist who has specialised in veterinary and veterinary public health risk analysis (including risk assessments) over the last 12 years. Since 1994 she has been responsible for developing and running a risk analysis facility at the Veterinary Laboratories Agency, UK (a Defra Agency), from 1997 as head of the (then newly formed) Department of Risk Research, and since 2003 as Head of the then new VLA Centre for Epidemiology and Risk Analysis (CERA). CERA comprises approximately 90 staff engaged in epidemiological research, surveillance, and risk analysis. She has undertaken or supervised many risk assessments in diverse fields (import risk assessments, food safety risk assessments, animal health and animal movement risk assessments etc.), as well as providing personal risk analysis consultancy to WHO, FAO, WTO, OIE, EC, etc. She has taught risk analysis nationally and internationally, and supervised MSc and PhD students in risk analysis.

Education:
Postgraduate Diploma of the London School of Hygiene and Tropical Medicine, University of London
Doctor of Philosophy, London School of Hygiene and Tropical Medicine, University of London
Master of Science in Epidemiology, London School of Hygiene and Tropical Medicine, University of London
Member of the Royal College of Veterinary Surgeons, United Kingdom
Bachelor of Veterinary Medicine, Royal Veterinary College, University of London

Short description of the system
At the VLA we have a number of interrelated systems and initiatives which are intended to enhance detection of Emerging Risks and provide Early Warnings. Underpinning this, we have a network of

Regional Laboratories with Veterinary Investigation Officers. These officers undertake both scanning surveillance and targeted surveillance, and all the information obtained from their farm visits, case work, and sampling is entered in one of a number of databases, as appropriate.

These databases (examples include Farmfile/VIDA and the Salmonella database), are used to provide regular reports (annual, quarterly etc), and can be interrogated for specific purposes. Farmfile/VIDA, in particular, has a code for undiagnosed cases, and this is an area for current and future 'Emerging Risks' research. A statistical method of identifying changes in the prevalence levels of particular pathogens (e.g. Salmonella in cattle) has been developed, and its application is being assessed for other pathogens and species combinations. This is now part of a project entitled Delivering Intelligent Surveillance which is looking into maximising the wealth of data in the databases that we have.

Looking specifically at potentially new diseases, we are looking at ways of maximising the use of on-farm outbreak investigations via our system of 'species groups', whereby when an 'unusual' finding is observed, there is a specific system already in place which rolls out to investigate it as fully as necessary. A risk assessment is an integral part of this activity, and we also have an associated project looking at how best to undertake rapid but meaningful on farm risk assessments, assessing the risk both to animal health and agriculture, and to human health.

The target users

The various aspects of the system are used by VLA to give advice to Defra, FSA, HAIRS, and other stakeholders as appropriate.

The positive points of the system

One very positive development at present is the VLA's development of the specialist species groups; another is the development of statistical methods to maximise use of the data already present.

Future work: what could be improved?

Improvements are an ongoing feature, and the project Delivering intelligent Surveillance was designed with the intention of integrating all our surveillance information sources to maximise their value.

Responsibility and financial support

In general the database systems are maintained at the VLA, and VLA staff provides the inputs. Funding is mainly from Defra.

Successes in spotting emerging risks

Our systems are used now to identify public health issues, and the species groups will make that more routine.

2.2 Wim Ooms – VWA

Wim Ooms received his degree in veterinary medicine in 1986 (Utrecht University) and is a scientific officer Veterinary Public Health for the Office for Risk Assessment of the Dutch Food and Consumer Product Safety Authority (VWA). Before this he was a specialist in meat hygiene for the Inspection Service for Livestock and Meat, a governemental body. After this, he acquired nearly three years of experience in governemental research coordination in food safety on behalf of the Ministry of Agriculture, Nature Management and Fisheries before joining the VWA.

He was one of the representatives of the Office for Risk Assessment which coordinated two European projects - PERIAPT (DGResearch, ERA-NET, 2005) and EMRISK (EFSA, 2006) - in the field of Emerging Risks identification regarding food safety. More recently, his focus is on emerging zoonotic diseases.

Introduction

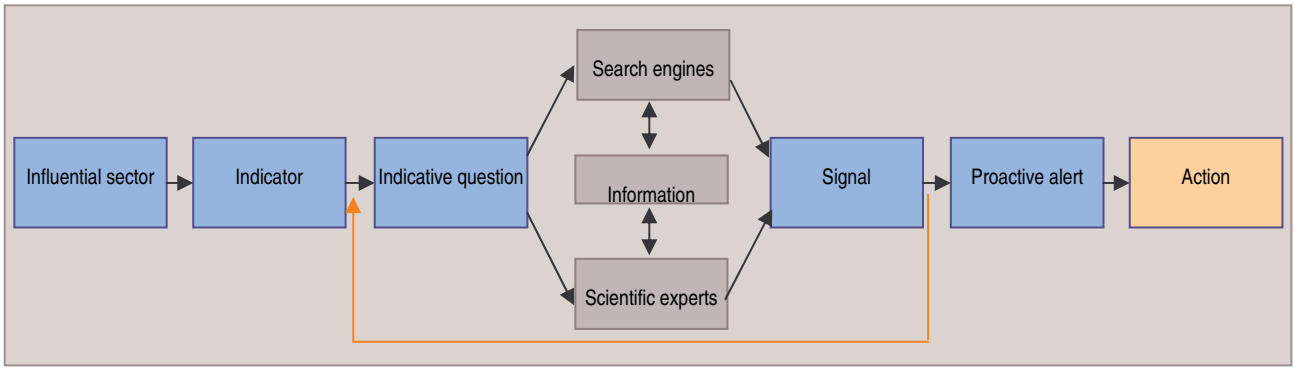
Nowadays, it is well recognised that food safety requires an integrated approach to ensure a high level of protection of human health. All aspects related to the feed and food supply chain, from primary feed and food production to the final distribution to the consumer should be addressed (the farm to fork approach, and vice versa). The increasing complexity of food and feed production systems, increased globalisation, market introduction of novel foods, application of new food processing technologies, climate changes, political and social developments, consumer behaviour and perception may lead to new, unforeseen or re-emerging risks (henceforth called emerging risks) with a negative impact on human and animal health, environment and economy. These issues are of great general concern. In order to manage these issues proactively there is a growing need to identify and evaluate emerging risks and to do so systematically in a European and global setting.

Requirements

Traditionally, the identification and assessment of food and feed related risks are achieved through expertise from within the food supply chain. However, due to aforementioned issues it becomes necessary to look at information available outside the food supply chain. Exploring only the food chain for the identification of emerging risks is probably a too narrow approach and may in specific cases only identify a problem when food safety is already threatened. The necessary information is likely to be drawn from a combination of knowledge both from inside as well as from outside the food supply chain. Elements related to the food production environment, the host environment, should be taken into account.

Within this holistic vision various influential sectors (areas of disciplines), which are more or less related to the food and feed production chain, can be identified and are fundamental in the blueprint developed for an early warning system which enables the identification and assessment of emerging risks. In order to identify an emerging risk as early as possible it is necessary to use indicators that are able to provide signals that indicate (directly or indirectly) the (possibility of) occurrence of this emerging risk. According to the

holistic vision these indicators should be sought in various influential sectors. To obtain the necessary information, related to these indicators, from various sources like databases or scientific experts it is important to ask the right questions in order to obtain the (most appropriate) answers, i.e. the predictive signals. Subsequently, evaluation of these signals may lead to a proactive alert that in turn will lead to assessment of the emerging hazard or risk. Summarised, the proposed blueprint of the early warning system consists of the following key elements: influential sectors, indicators, questions, information sources, scientific experts, electronic search systems and signals.



Flow diagram of the basic processes within the early warning system.

Requirements

The requirements to create an effective and efficient early warning system could be summarised as follows: a set of key indicators and key information sources should be available and networks of (issue and sectoral) experts as well as electronic scanning systems should be at the disposal of the authorities, concerned in food and feed safety, for their risk assessment policy. A set of key indicators can be obtained by: criteria and expert based selection, weighting the indicators, establishing a possible relationship between indicators and analysing an overall time dependency. Key information sources should be identified, selected and employed by using experts as well as innovative search engines. The utilisation of search engines requires indicators and it is suggested that these will be transformed into indicative questions to enable key word extraction.

Important parties

It is well recognised that for acceptance and implementation of the proposed system at an European and global level co-ordinated efforts are needed of organisations like EFSA, ECDC, DG SANCO, WHO, FAO and OIE. But first of all, the proof of the pudding is in the eating.

3. The Third Session

3.1. Fred van de Brug - TNO

	Fred van de Brug holds a Ph.D. on gastro-intestinal physiology (Leiden University Medical Center). This had a follow up as working on a post doc position in the field

of gastro-intestinal motility in prematurely born neonates (Wilhelmina Children's Hospital, Utrecht). Next, he has been working at Elsevier Science as an information specialist on the customised bibliographic services for pharmaceutical companies. Subsequently, he has been working at Prismant, a Dutch consultancy firm in health care, as a product developer on business intelligence for the Dutch hospitals. Since 2005 he is working at TNO Quality for Life as an information analyst on the Food Informatics project.

Short description of the system

TNO Quality of Life is developing methods to identify potential threats that emerge in the human food chain. The reason for doing this is that, in the past, we have had food safety incidents in which we could only responding in a reactive manner. For example, in 2002 the potential carcinogen acrylamide suddenly hit the headlines after the discovery that acrylamide is formed while heating carbohydrate rich foods, like chips. More recently, dioxin from prehistoric origin present in kaolinitic clay, which was used in the sorting process of potatoes and, ultimately, this dioxin was found in milk produced by some Dutch farms. Incidents like these may constitute a serious threat for human health and can cause significant economical damage. Unfortunately, we have to admit that often we are alarmed too late! We are entirely dependent on the alertness of every one involved in the production of food, because no system exists that supports us in the identification of emerging risks. Therefore, TNO Quality of Life is developing methods to identify threats that emerge in the food chain. In order to achieve this we are setting up an early risk identification system that will support us in finding hidden relations within a world of rapidly growing volumes of information.

Using state-of-the-art techniques, developed within the fields of information extraction, artificial intelligence and natural language processing, we are building an information system that supports us in identifying emerging risks. TNO co-operates with Unilever, Friesland Foods, Wageningen UR and WCFS in a nationwide Bsik project called the *Virtual Laboratory for e-Science* (www.vl.e.nl). where more than 20 organisations and more than 100 scientists of different disciplines are working together.

This project will result in a problem solving environment that supports TNO in extracting patterns of information obtained from multiple data resources. The processing of high volumes of information can be executed on a Grid infrastructure.

In order to find relevant signals among huge volumes of noise, TNO is designing an automated system to identify emerging risks. The system starts automatically by retrieving information using a long list of web sites and various databases. The information will be converted to standard formats that permit subsequent pre-processing. The results of the pre-processing phase are words, relationships between words and also metadata. Words, relationships and metadata will be stored in a database which will then be explored for sensible combinations of words and their relationships. The searching process and additional advanced analysis will yield known and previously unknown food safety risks. Both searching and advanced analysis

will be facilitated by using prior knowledge about historical food safety risks. Information on these historical food safety risks is stored in a so called knowledge base (ontology). Moreover, this ontology will continuously be enriched with knowledge from TNO'sbroad expertise like we have on risk analysis, toxicology, microbiology, and food production. During the project, TNOwill develop and evaluate the system with the purpose of finding potential emerging risks in food safety. TNOexperts and customers may then be notified at an early stage and will be able to take appropriate measures like doing thorough risk analyses, setting up of new methods for detection of hazards in food or designing new and safe food production processes. The first results are expected at the end of 2006 or early 2007.

The rationale behind the design

The rationales behind the design of the information system:

- The system must support the identification of emerging risks in food safety with high accuracy, so that expensive experts are only needed for evaluating a reasonable number of potential relevant results.
- The system must support the entire work flow till a list of potential emerging risks.
- The system must be implemented in the current and future TNO business processes.

The target users

TNO will be using the system.

The positive points of the system

We will be combining TNO knowledge with high accuracy searching in a validated system to find potential emerging risks.

Future work: what could be improved?

This we will know after we have tested and evaluated the system during a pilot period which we aim to do in 2007.

Support and collaboration

We would welcome any suggestion for sources, like websites and databases, that the system should use as input.

Responsibility and financial support

TNO will be responsible for filling and maintaining the system. Currently we are developing the business model. We think that 1) projects following generated leads and 2) subscriptions to the system's output would generate money.

Definition of emerging risks

An emerging risk is a food or feed related hazard that may become a risk causing an adverse effect in the (near) future. In this definition, "hazard" means: a biological, chemical or physical agent in, or condition

of food or feed with the potential to cause an adverse effect. Also, "risk" means : a function of the probability of an adverse effect and the severity of that effect consequential to a hazard.

A potential emerging risk is represented by the combination of pieces of information that have been found in various documents.

Applicability in food domain

Yes, the system is dedicated to the food safety domain because of the ontology that will be used.

Successes in spotting emerging risks

We will first evaluate the system by using historical cases like "acrylamide in fried food" and "dioxine in kaolinitic clay". Next, we will try to find previously unknown risks in a "live" situation.

3.2 Willie van den Broek and Lars Hulzebos – A&F

Willie van den Broek studied chemistry at the Radboud University of Nijmegen. After finishing his PhD in analytical chemistry (applied chemometrics), he has been working for Agrotechnology & Food Innovations since March 1997. He started as a scientific researcher and in January 2002 he became a senior research coordinator in the the working field of production and control systems. His intertests are: data exploration and processing, statistical analysis, food safety and modeling.

Lars Hulzebos studied knowledge engineering at the University of Maastricht. After working for four years as a knowledge consultant as Bolesian (CapGemini) he works since September 2002 at Agrotechnology & Food Innovations. His expertise lies on qualitative knowledge modeling.

Short description of the system

In the last few years we looked into new ways of supporting food safety activities in general. We placed all these activities in to four groups: *(early) warning detection, Food risk communication, detecting emerging risks and food safety research*, as shown in Figure 1. Early warning detection has already been realised in several information systems and therefore we focused our thoughts on supporting the other three areas. Today we focus on supporting the detection of emerging risks.

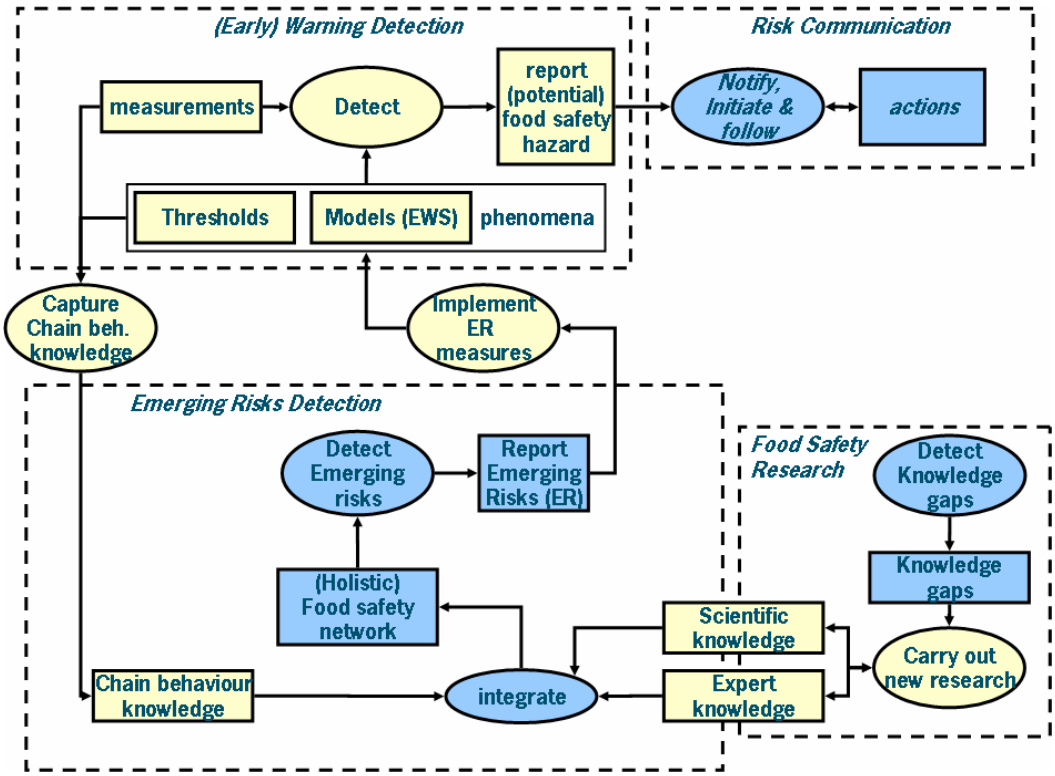


FIGURE 1: FOOD SAFETY SUPPORT

We think that by creating and accessing a holistic food safety network the detection of emerging risks can be supported. The network consists of related topics and qualitative models. This holistic food safety network is the result of gathering knowledge from several food safety sources. Possible relevant sources are originated from *food research* (providing scientific knowledge and food safety expert knowledge) or from food chains (chain behaviour knowledge). It is a challenge to integrate the various types of knowledge. This integration is not a one-shot activity but is an ongoing process of updating and extending the food safety knowledge.

In the prototype (that will be presented at the workshop) we created a network of holistic topics on fish. We tried to make this network as realistic as possible. The prototype consists of a database containing the holistic food safety network and a web-based user-interface.

The rationale behind the design

The increased globalization will make food chains even more complex and therefore more difficult to control. It is our opinion that a focus on ONLY control will not lead to a risk free food chain. For the near future, we focus on 1) an improved preparation for food safety hazards and 2) to fasten response time in case of a food safety hazard.

The rationale of the holistic knowledge network approach is to improve (existing) early warning systems that monitor certain phenomenon in food chains. This improvement is done by detecting a new phenomenon that can lead to a future food safety risk (emerging risk). The process of detecting these

emerging risks is done by gathering not only state of the art knowledge from several areas food safety research but also incorporate relevant actual chain data (gathered by existing early warning systems) in a so-called knowledge network.

The target users

- Government national (VWA, KvW, IAD, LNV, VWS), provincial, municipality
- Control and certification organisations (SKAL, BRC, EurepGap, HACCP, ISO, GMP etc.)
- Sector representatives

The positive points of the system

The system allows:

- Getting insight in underlying (causal) relations in food risk assessment within the specific food chain
- To explore the causal relations in order to detect so called 'blind spots', knowledge gaps that might explain food risks.
- Pro-active preparation to emerging risk or early warning
- To preserve and enrich food safety knowledge
- To initiate and follow actions on possible detected food risks
- Integrating of different types of scientific models to broaden knowledge about risk interactions
- Carrying out "what-if" scenario's and diagnosis -to getting insight in potential food safety hazards and blind spots
- Initiating and following actions (scripts/workflow) -> adequate action/crisis management
- Modifying the causal network caused by new experiences and knowledge -> enrichment and preserving food safety knowledge

Future work: what could be improved?

The causal network approach is still in its developing stage. It needs further practical applicability: the system needs coupling to existing information sources and testcases to optimize the approach.

- The provided functionality to the user could be further tuned to the user's demands.
- The content of the holistic knowledge network could be extended and be in more detail such as the incorporation of more qualitative models.
- The business model could be worked out in more detail. Especially on topics as 'Who pays', 'who uses', 'who provides'

Support and collaboration

The system could benefit from operational usage and experience.

Responsibility and financial support

The owners of the existing (early) warning systems and food safety research provide knowledge for the food safety network. The target users of the system are likely to pay for the system.

Definition of emerging risks

In practice *(early) warning detection* continuously takes place to ensure food safety. Food safety checks in food chains are carried out and have the function to detect an (emerging) threat to food safety. Once a food safety risk is reported, the food chain takes measures to a) reduce the food risk and b) to prevent the

incident in the future. (Early) warning detection focuses on real-life (*in practice*) situations and *reacts* on phenomena in the food chain. (see also Figure 2).

Another kind of food safety activities is *detecting emerging risks*. Emerging Risks are risks that are not previously been identified as food risks. *Food safety knowledge* from several food safety disciplines are needed to detect emerging risks. The washing of potatoes with contaminated clay is an example of an emerging risk from the past. (Early) warning systems did not know that the potato-chain had changed its washing procedure from washing with water into washing with clay. It took a long time before one was able to determine the origin of the contaminated potatoes. Detecting emerging risks is *research (desk-study)* related and proactive in nature (see Figure 2).
Research and *practice* are proactively and reactively involved in food safety, making it a multi-disciplinary co-operation of government, watchdog, food chain and research institutes.

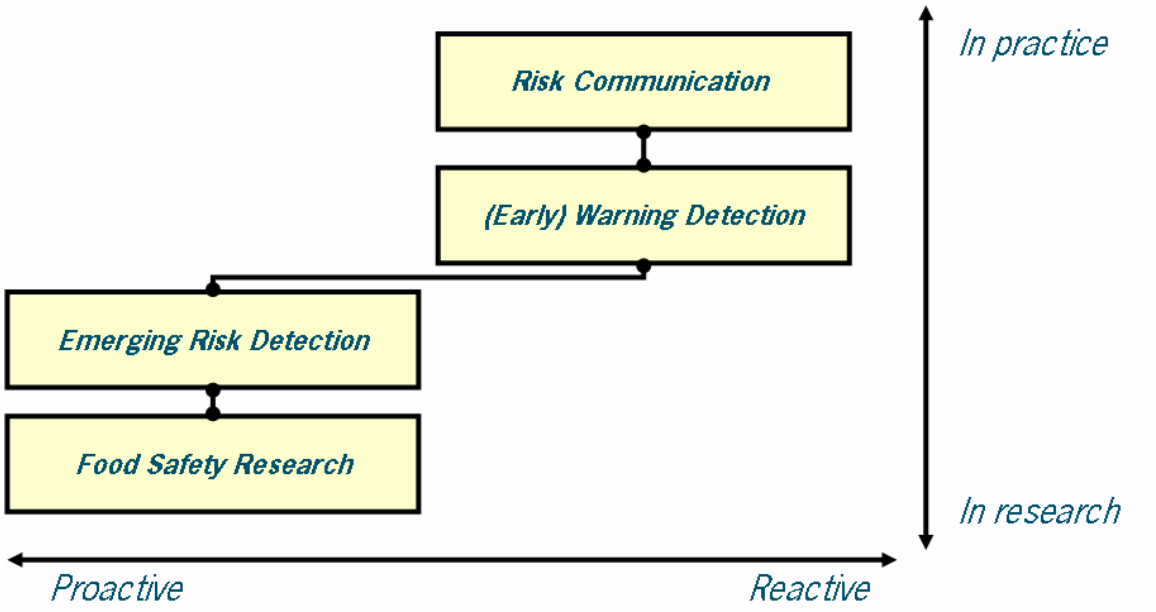


FIGURE 2 PRO/ACTIVE AND REACTIVE RESEARCH AND MANAGEMENT

Applicability in food domain

The holistic knowledge network approach is especially developed for the food safety domain. However, it can be applied to other domains as well.

Successes in spotting emerging risks

Since we developed a prototype we did not detect an unknown emerging risk yet. However, we try to give an idea of the potential of the concept during the demo.

4. The Fourth Session

4.1 Thom Achterbosch – LEI/Rikilt

Thom Achterbosch holds a position as trade economist at the Agricultural Economics Research Institute in The Netherlands, which is part of the Wageningen University and Research Centre. His main research interests are technical barriers to trade, WTO issues involving SPS and TBT agreement, and the impact of consumer concerns on the structure and performance of the food industry. He holds an MA in development economics from Erasmus University Rotterdam.

Short description of the system

The current structures for hazard identification in the Netherlands and EU, e.g. rapid alert systems, have proven useful but have not been specifically designed to flag food safety hazards as they emerge. Complementary activities are deemed necessary, therefore, for emerging risk identification, or, a "…system or procedure aimed at identifying developing food hazards in an early stage allowing proactive interventions and thereby preventing a potential hazard from becoming a risk." (VWA, 2005:12). Emerging risk identification is applied in relation to food safety risk.

It is assumed that any successful emerging risk system will depend on warning signals from inside and outside the food production chain that are indicative for the development of food safety risk. We refer to this approach as a "holistic" system.

The building blocks for such holistic food safety risk signalling are delivered to the Food and Consumer Product Safety Authority (VWA) and Ministry of Agriculture, Nature and Food Quality (LNV) by a four-year research program 'Emerging risk in the food chain' that is carried out by a multidisciplinary team from Wageningen University and Research Centre. The following definitions summarise the state of thought on the system.

An emerging risk is a potential food or feed borne or diet-related hazard that may become a societal risk in the (near) future.

If food safety policy-making does not account for perceptions of emerging risks among stakeholders in market and society, it will risk that these stakeholders do not associate themselves positively with its regulations. In order to ensure that stakeholder perceptions with respect to emerging risks are recognised, the working definition of emerging risks should be broadened to cover not merely human risk but all societal risk.

Emerging risk identification involves complementing all elements of standard risk analysis (assessment, communication and management of risk) by means of procedures for anticipating unforeseen consumer

hazards that may occur at any stage of the food supply chain with the purpose of reducing human and societal impact of the hazard.

Previous definitions, e.g. in VWA (2005), place ERI largely unattached from standard risk analysis, with a strong orientation towards risk assessment. The present definition is explicit on ERI's purposes, which can be defined both on the level of life sciences and effects in society.

An indicator of emerging risk is any observable fact or pattern or behavioural incentive that may point to the possible undesirable human or societal impact of an unforeseen food safety risk.

It is clear from this definition that, for emerging risk indicators to have any substantive meaning, one must make operational the 'undesirable effects from food safety risk'. Hence, there are two sets of useful information: (1) expectations on societal impact of food safety risk, and perspectives on acceptable risk; and (2) data on risk factors from within and outside the food chain, and an understanding of the human factor in the emergence of risk.

The rationale behind the design

There is a wind of change in governance of the risks created by the production, marketing, distribution and consumption of our food. Nowadays, the pendulum in the Netherlands is swinging towards bigger responsibilities for firms and consumers, and downscaled intervention of government where possible. This calls for a redefinition of existing procedures in risk analysis, and of the responsibilities of all actors involved including the competent authorities, industry, consumers, etc.

The VWA aims to operate more pro-active with respect to foodborne risk. Their assumption is that if one can pick up signals of possible hazards in an early stage (before hazards have risen to their full weight in terms of public health or media attention), targeted prevention can ‘fix’ a situation or steer towards reducing the profile of the incident .

Recent years have shown several food related incidents that were unforeseen at the time. The increasing complexity of food supply, technological innovations and ongoing globalisation appears to drive new hazards into existence, or to reduce our capacity to manage the hazards that are known. Such, unforeseen problems have been dubbed emerging risks. (Below we discuss a new definition of emerging risks.) Government intervention in relation to food risks has often been reactive, whereas food safety incidents tend to build up rapidly.

A low-cost tool that steers preventive action on food safety risk is likely to have a positive economic return, especially when incorporating the social cost of food safety risk. Timely identification of food safety risks in food supply provides consumers, firms and governments with opportunities to take preventive measures that reduce the risk or the impact of the hazard. The benefits of prevention are measured in terms of possible adverse health effects, economic loss and social commotion that may occur

if preventing actions had been omitted. Stringent assumptions are required, however, when assessing whether the prevention action and the associated costs outweigh the possible adverse effects of omitting preventive action.

The target users

Targeted users are authorities in The Netherlands, in cooperation with EFSA. Targeted beneficiaries: all stakeholders to the food supply chains.

- What are the positive points of the system?
- What could be improved on the system?
- What is missing from the system (future work)?

Future work: what could be improved?

In response to these three questions, a discussion on how the findings of our work this far allows a further specification of the aims and ambitions of anticipative action on unforeseen food safety risks. These are the following:

- An important contribution of emerging risk identification to standard risk analysis is that it addresses scientific uncertainty and diverging perceptions on risk.
- The anticipation on unforeseen risk requires data input from certain indicators, and a procedure or model or structure to derive useful information from the raw data.
- Indicators relate information on the 'host environment' (supply chain and business environment) as well as behaviour of producers in the food supply chain to emerging food safety risk.

The performed studies demonstrated a complicated inter relation of many factors outside and inside the food production chain that have direct or indirect effect on the occurrence of a hazard and the development into a risk. These factors are potential elements in emerging risk identification. From the host environment studies performed in the first year it became apparent that the human factor in operation, handling and interpretation of existing systems and signals is crucial for the success of correctly identifying a hazard. It is clear that more research in this field is needed to find the crucial elements in emerging risk identification, and also to make sure that signals are recognized and used.
Apart from this finding it is also clear that food safety systems would benefit from an holistic, anticipative approach, which is to combine indicators of emerging risk with existing operational early warning systems, and which integrates emerging risk identification into standard risk analysis procedures. It is furthermore clear that this is a complicated challenge and that time is needed for it development and demonstration of proof of principle.

Support and collaboration

Scientific and practical advice from colleagues on strategies for efficient identification of indicators and their use for emerging hazard detection.

Responsibility and financial support

See above: the project currently receives support from the Ministry of Agriculture, Nature, and Food Quality, as well as from the Dutch Food and Consumer Product Authority

Definition of emerging risks

See under question 1. Note that there is a tension between smaller and wider definitions used, which reflect on the ambitions of the emerging risk identification.

Applicability in food domain

Yes, food safety is the prime focus

Successes in spotting emerging risks

At the moment of writing, retrospective case studies have been performed, while a prospective system has yet got to be developed

4.2 Kisan Gunjal – FAO

Education

Ph. D. Agricultural Economics, Iowa State University, 1977-81.

M.Sc. Agricultural Economics, Indian Agricultural Research Institute, New Delhi, India, 1975-77

Professional positions held:

Food Emergency Officer, Food and Agriculture Organization (FAO) of the United Nations, Commodities and Trade Division, Global Information and Early Warning Service, from 1/09/2002 to present.

Associate Professor of Agricultural Economics: 1988 to 2002, department of Agricultural Economics, McGill University, Canada.

Department Chairman (Acting): 1987

Director of Graduate Program 1997-1998

Visiting Scientist/Professor at: 1. FAO/ESAF 1998-99, 2. Gokhale Institute of Politics and Economics, Pune, India, December 1998 and January 1999, 3. Cornell University, October to December 1990, 4. Visiting Professor at IARI, India as Senior Research Fellow of Shastri Indo-Canadian Institute, 1990-1991.

Assistant Professor: McGill University, Canada, 1982 - 1988

Consultancies:

- At FAO before joining as a staff member, on four separate occasions.
- World Bank, re. Ethiopia, Oct - Nov, 1989, and Jul - Aug 1989.
- Canadian International Development Agency (CIDA) under the McGill program on international irrigation, drainage and flood control.
- International Livestock Research Institute (ILRI) project, Ethiopia
- Heritage Bovigene, Inc., Montreal Financial analysis of irrigation project in

	Egypt, 1986. • Centre d'Insemination Artificielle du Quebec Inc., Canada, 1985. • SNC, Montreal on Dominican Republic. July-August, 1984. ***Publications*** • Contributions to several FAO Publications and Country Reports. • Planned and managed about 23 research projects involving multidisciplinary teams and Ph D and Masters level students. • Published over 50 publications of which 25 are refereed, published in reputed international journals of agricultural/development economics.

Short description of the system

The FAO/GIEWS was established in 1975, in the wake of the world food crisis of the early 1970s, to continuously **monitor** the food supply and demand situation at global, regional and country levels in order to provide **early warnings** of impending serious food shortages so as to assist Governments in taking timely and appropriate measures in light of quickly changing situations. GIEWS conducts focused sub-national, mid-term food security reviews/assessments in disaster affected countries in order to provide early warning of the impending crisis. It provides regular updates through its flagship publication "Crop Prospects and Food Situation" (every two months), occasional Special Alerts and other Country Updates.

In addition to monitoring and providing early warnings, for countries facing a widespread and serious food emergency, GIEWS carries out **assessments** to provide accurate picture of the **damages** as well as the **food and agricultural needs** to help improve the country's short-term food security. GIEWS conducts the Crop and Food Supply Assessment Missions (CFSAMs), jointly with WFP in many cases, at the request of national governments. The primary purpose of these Missions is to provide accurate, timely and credible information on imminent food security problems in a country or a region so that appropriate actions, including food aid where necessary, can be taken by the governments and the international community to minimize the impact of the food emergency on the affected populations. Emergency Operations (EMOPs) of WFP are jointly approved by WFP and FAO to ensure that agricultural markets are not distorted by excessive food aid.

GIEWS has development an integrated information management and analysis tool known as the "**GIEWS Workstation**" which incorporates the remote sensing, GIS, and mapping capabilities at global, regional, national and sub-national levels. Currently it is also being installed in selected countries to help improve their capacity to network, manage and analyze food security and early warning-related information.

The rationale behind the design

GIEWS was established in 1975 on the recommendation of the member countries at the World Food Conference of 1974, following the 1972/73 food crisis particularly in Africa. Many of the countries recurrently affected by natural and/or socio-economic crises, primarily in the category of low-income

food-deficit countries (LIFDCs), lacked sufficient local capacity to alert international community with accurate, detailed and timely information about the impact of the potential problems related to food security. Hence this international, independent and unbiased, system of information was created. The UN assessments (CFSAMs) of food supply and demand are also used to identify the food aid needs of a country facing food security crisis.

The target users

The system provides valuable information on food security and potential impending problems in a country to the respective national Governments, public and private policy makers, international relief agencies (including other UN agencies and non-governmental organizations), donor countries and national and international media. For technical and analytical purposes the system is useful for commodity analysts, private businesses and national food security and early warning units.

The positive points of the system

That it is the only system of its nature that is global covering some 180 FAO member countries. It is UN based and not sponsored by any one country. It is capable of incorporating latest remote sensing and mapping information.

Future work: what could be improved?

- Networking with national and international food security and early warning systems could be improved.
- Collaboration with other UN systems of complementary nature.
- More and higher quality satellite imagery could be acquired for food security analysis of critical countries.

The following are the areas where improvements are anticipated/planned.

- More systematic ground level meteorological information collection
- More advanced satellite based information and its linkage to crop yield estimation
- Identification of area under specific crops from satellite information.
- Improved methodology for food import estimation, inclusion of roots and tubers and other important crops in the national food balance sheets.
- Development and use of food insecurity and vulnerability indicators and phase classification.

Support and collaboration

- Regular assured financial support.
- Acquisition of high quality and timely satellite imagery
- More on the ground staff to collect real-time information.

Responsibility and financial support

The system is maintained by FAO. Some of the assessment missions are funded through additional donor funding. The EC has provided financial support for the development of the GIEWS Workstation and its implementation in several selected countries as well as the critical work on improvements in CFSAM methodology.

Definition of emerging risks

Emerging risk is a potential occurrence of large-scale disasters that can cause an extra-ordinary situation where serious and immediate threats to human life and people's livelihood are posed or potential disasters in which people are unable to meet their basic survival needs without external assistance (adapted from UNDP/UNDRO and FAO). These can be (a) natural disasters with either sudden occurrence (such as floods, cyclones, hurricanes, earthquakes, volcanoes, etc.) or slow on-set (e.g. drought, adverse weather, trans-boundary diseases, avian influenza, etc.) or (b) man-made disasters induced by conflict (such as war, civil strife, refugees, internally displaced persons, etc) or due to severe socio-economic-health constraints (e.g. economic crisis due to commodity price collapse, loss of export markets, currency related problems, etc., land tenure problems, HIV/AIDS and health related crises, and others).

An ideal early warning system is one that provides credible, timely, accurate and unbiased information about the nature of the emerging risk and its potential impact on the population, especially those that are most vulnerable, in order for the national and international communities to take timely actions to mitigate the adverse effects of this impending crisis.

Applicability in food domain

Yes, the system can be used to monitor emergencies related to food safety such as radiation contamination of crops and foods, damaging effects on food quality, etc.

Successes in spotting emerging risks

In the case of GIEWS, several early warnings over the years have been effective in informing donor community and mobilizing international support. A few examples of this would be: the 2002 food crisis in southern Africa due to extensive drought, 2001 Alert for Afghanistan, 1998 floods in Bangladesh, and 1998 economic crisis in Indonesia, periodic food shortages in Ethiopia, Sudan and the Democratic People's Republic of Korea among others.

Success of an early warning system depends on the issuance of adequate, timely and effective information about the impending crisis. This is a necessary but not sufficient condition. The international donor community response and the resulting relief provided to the affected people should measure the ultimate success of an early warning. Unfortunately, a donor response in many cases materializes only after intense and high profile media coverage.

4.3 Djien Liem - EFSA

	Djien Liem is Scientific Co-ordinator of the Scientific Committee of the European Food Safety Authority (EFSA) in Parma. Dr. Liem earned a M.Sc. degree in environmental chemistry and toxicology from the University of Amsterdam in 1984 and a Ph.D. in biology from the Utrecht University in 1997. Following his university

study in Amsterdam, Dr. Liem began his career at the Department of Industrial Contaminants of the Dutch National Institute of Public Health and the Environment (RIVM) in Bilthoven. Dr. Liem was leader of various multidisciplinary dioxin projects. He was appointed as chairman of the Dutch Working Group Dioxins in Food and the Dutch Working Group on Dietary Intakes, and acted as temporary adviser and national delegate in the framework of studies of the World Health Organization related to dioxins and related compounds. Essentially this work formed the basis of his Ph.D. thesis that was succesfully defended in 1997. In 1998-2000 Dr. Liem acted as the leader of the Dutch delegation co-ordinating a European Scientific Co-operation (SCOOP) Task on the assessment of dietary intake of dioxins and related PCBs by the population of EU Member States. In September 2000 Dr. Liem was seconded to the Secretariat of the Scientific Committee on Food of DG SANCO as a national expert and in January 2003 he joined the EFSA as scientific coordinator of the Scientific Committee.

Short description of the system

The European Food Safety Authority does not yet have a system operational. It has however requested its Scientific Committee (SC) to advice on how EFSA could build its capability to identify and evaluate possible emerging risks in the area of food and feed safety. The SC has released its opinion in July (see http://www.efsa.europa.eu/en/science/sc_commitee/sc_opinions/sc_op_ej375_emrisk.html). This opinion is based on a report from the outsourced project "Forming a global system for identifying food-related emerging risks – EMRISK" which has been coordinated by the Dutch Food and Consumer Product Safety Authority (VWA), The main conclusions of the Scientific Committee and the way EFSA intends to proceed will be explained at the workshop.

Definition of emerging risks

The Scientific Committee gave the following definition of emerhing risks: "An emerging risk (ER) is an issue that in the future may pose a risk to the health of the consumer, animals or the environment. The indication of an ER may relate (1) to a significant exposure to a hazard not recognized earlier or (2) to a new/increased exposure to a known hazard (it is then called re-emerging risk). "

5 The Organising Committee

Fatima Kreft

Fátima Kreft has an academic degree on Food Technology from Universidade Católica do Porto, Portugal. She has joined Agrotechnology and Food Innovations bv. in Wageningen as researcher/scientist in 1994. She has worked in three main research areas:

- Processing of potatoes and vegetables;
- Edible coatings;
- Packaging, transport and logistics.

At the moment, she holds the position of scientist and project manager, combining scientific activities with the coordination and management of applied research projects. She is involved in a wide range of projects and themes varying from packaging technology, product quality (mainly fresh products) and food safety, both on national and international level.

Floor Verdenius

Dr. Floor Verdenius (1962) was educated in software engineering and AI. He worked as a software engineer, consultant and researcher in IT and artificial Intelligence before joining AFSG in 1993. Here he worked on software approaches for controlling and monitoring product quality in food production and distribution chains. Floor was one of the contributors to FoodPrint, a framework for designing traceability systems. FoodPrint-designed traceability systems attend the commercial potential for companies, on top of food safety and legal considerations. Over time, Floor has also worked in projects on planning, scheduling, knowledge management and chain information systems in various sectors, including fruit & vegetables, poultry, feed, fish, potato production, and processing industries. Apart from his interest in ICT he has been active as a project manager, trainer/coach project management and as a facilitator for group sessions. His PhD was on designing systems for intelligent data analysis. Floor has (co-)authored about 50 papers for conferences, journals and books.

Nicole Koenderink

Nicole Koenderink (1975) has studied mathematics at Utrecht University and Mathematics for Industry at Technical University of Eindhoven. She has specified in knowledge and information management. Nicole has been a researcher at the Information Management group since 2001. Her research focus lies in capturing existing knowledge in knowledge models (e.g. ontologies) and making this knowledge in an automated way available to support specific tasks. The applications of this technique vary from using expert knowledge to design an automated seedling sorting system, from using 'highly-structured documents' on

	the internet to create food ontologies for a (food) research management system, to analysing risk management information to design a risk ontology for early warning systems. The reuse and restructuring of knowledge can offer a significant additional value to the agrofood industry.

Appendix III –Towards an Emerging Risk Detection Support System

Summary

Within a "Kennis Basis" project in 2006 a prototype of a data management system has been developed. In 2006 we have evaluated in the BO "Emerging Risks in the Dutch Food Chain" the potential of this systems for further development into an Emerging Risk Detection Support System This summary briefly describes the results of this evaluation and the first results of its development.

Used Vocabulary and point-of-view

Emerging (food safety) risks are potential food or feed borne or diet-related hazards that may become a risk for human health in the (near) future[1]. *Emerging risk detection* are all those activities involved in defining those emerging risks. Newly detected emerging risks can be used to enhance the existing *early warning systems* by adding the new indicators to the existing monitored indicators. Governmental organisations and well-organised food supply chains are in our opinion the most obvious stakeholders in dealing with the detection of emerging risks (like EFSA, VWA, LNV, Nutreco).

A vision on Emerging Risk Detection Support

The detection of emerging risks benefits from a proper visualization of emerging risks in realistic chains. In order to achieve this, we see a four layer approach as depicted in Figure 2. The first layer is about translating identified indicators to signals. Indicators are supplied by various types of data sources (databases, websites and humans). The challenge is to gather all the information from relevant data sources to determine the value and trends (i.e. the behavior of these indicators in time) of the indicators, and to translate the value and trends towards a signal. For example in the influential sector *Agriculture* can the value and trend of the indicator *'toxic chemicals used by sector'* be obtained from IPPC, FAO, GIEWS, EMPRES, Foreign embassies network, GPHIN, Expert networks and EUROSTAT. The analysis of these sources could lead to the signal *'the use of DDT is increased dramatically in south-east Asia agricultural areas'*.

This signal can imply food risks in several ways. For example the usage of DDT in south easy Asia could increase the food safety risk of consuming citrus fruits imported from south east Asia. These *risk pathways* are still too general to get insight in which chains are involved and where the risks take place geographically. Therefore the risk pathways need to be projected on chain knowledge: *'What products are sprayed with DDT and are coming from Asia, and how do these chains look like?'*. Once this projection is made a proper visualization (like the use of easy to understand

[1] *Definition according to the PERIAPT project.*

symbols as traffic-lights, graphs and geographic plots) can be made towards the food safety expert.
Supported by an implementation of this vision, the food safety expert is eased in making decisions on what measures should take place and where to prevent the emerging of food safety risks.

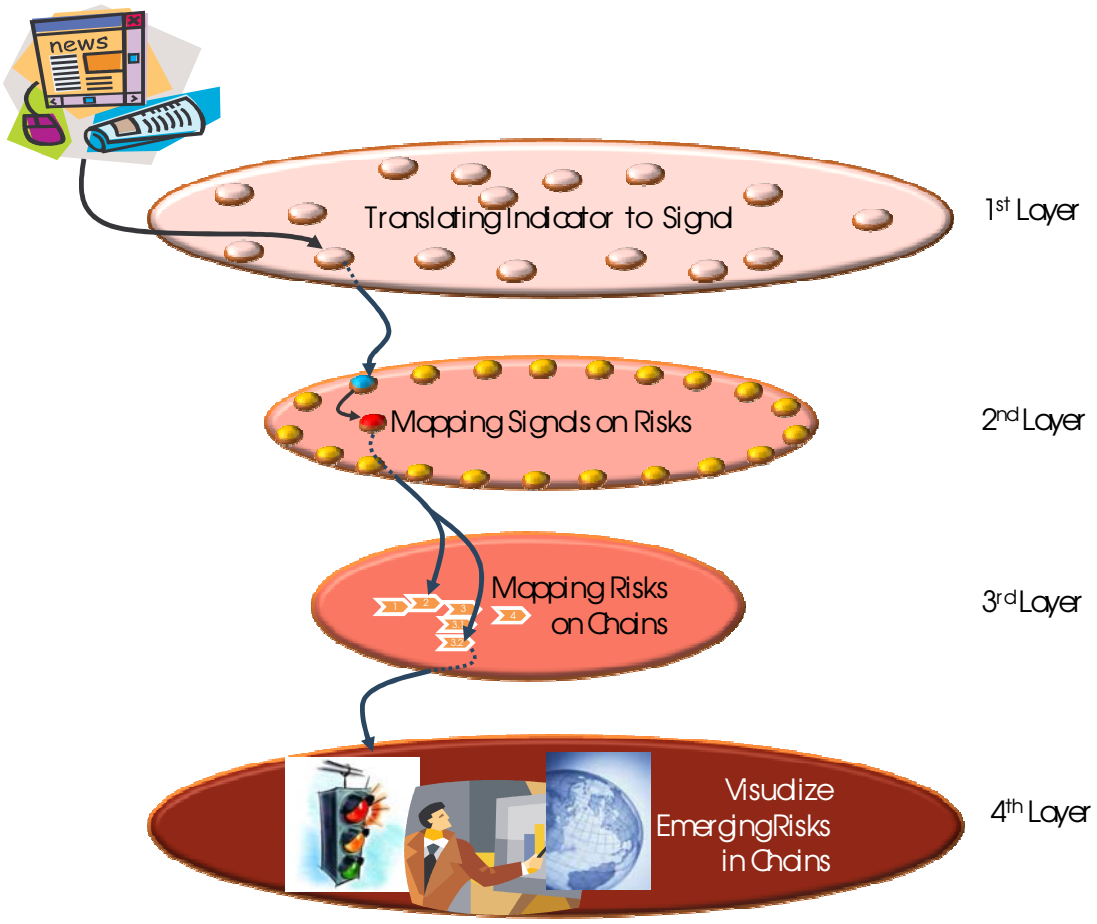


Figure 2: Our 4-layer vision on Emerging Risk Detection Support.

The prototype: Discovering the risk pathways between signals and food safety risks

In 2006 we developed a prototype dealing with the relation between a signal and food risks (comparable to the 'Mapping signals on risks 2nd layer' in Figure 2. As depicted in Figure 3, the prototype discovers the links between a signal (like *'the use of DDT is increased dramatically in south-*

east Asia agricultural areas') and i) all implicated food related risks (like *'health risk' via 'imported products', 'low level of residue checks', 'popular consumption product' and 'consumption'*), ii) all risk pathways between a specific signal and a specific selected risk or iii) all signals leading towards a specific selected risk (*'There is a Health Risk detected. What signals may have caused this health risk?'*).

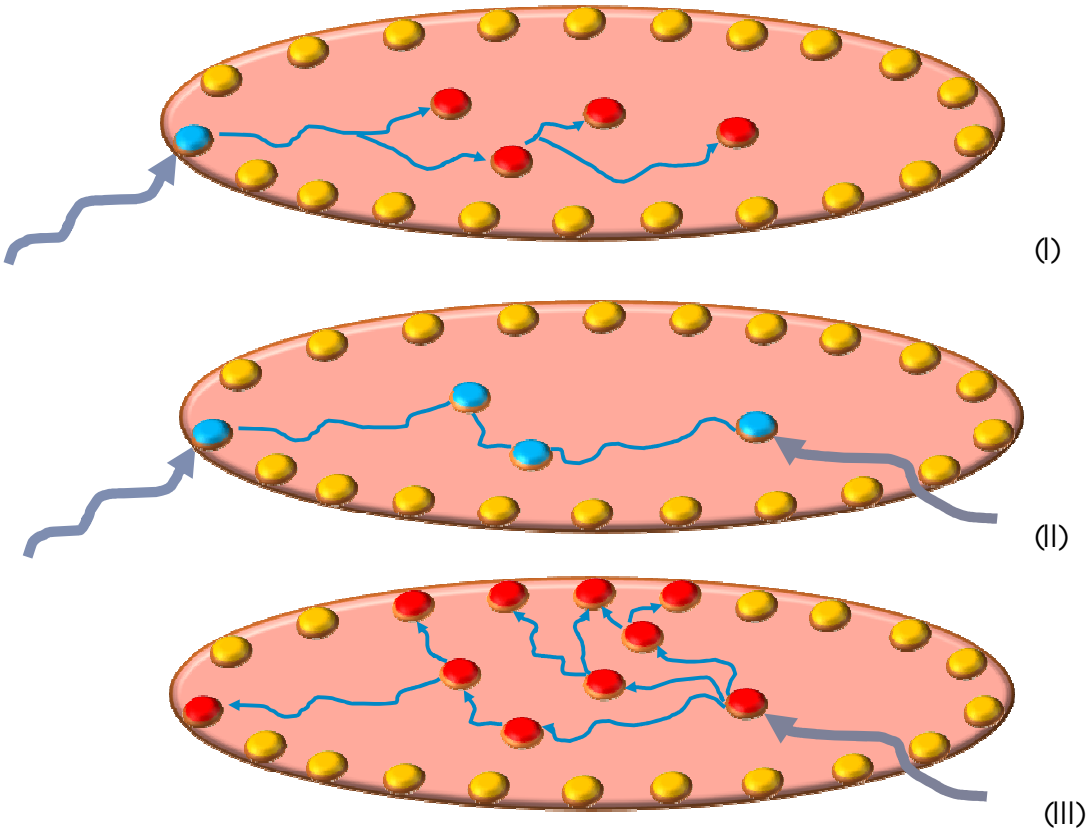


Figure 3: Three ways of discovering links between signals and food safety related risks in the current version of the prototype.

In order to test the prototype, we filled during 2006 the prototype with a realistic case on fish feed. RIKILT, LEI and IMARES provided the necessary content on a few examples of risk paths and chains. In 2007 we will extend the fish feed case by adding realistic indicators, signals, risk paths and more chain data. We will also try to fit the prototype in into the *'mapping signals on risks'* layer of the Emerging Risk Detection Support vision as described in the previous section. In the further development we include the valuable feedback that we received during the mini-conference in October 2006. In Q1 of 2007 we have planned a meeting with VWA to further enhance the vision and the requirements of Emerging Risk Detection Support System.