Plan for sustainable mortality monitoring in Europe

EuroMOMO deliverable 9 report

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1. **INTRODUCTION**

In order to ensure the sustainability of European mortality monitoring beyond the project phase and to expand the network it is important 1) to disseminate EuroMOMOs’ results and outputs to the relevant stakeholders, in particular to the European Public Health community and ECDC\(^1\), and 2) to assess the projects’ limitations and the future needs regarding mortality monitoring in Europe.

The objectives of the deliverable Nr 9 was to share the project results, to identify organisations in a wider number of European countries, to transfer knowledge and to develop a plan for the continuation of mortality monitoring in Europe beyond the project phase. In order to have as much impact as possible this plan should be drawn up in accordance with ECDC.

2. **METHODS**

In order to reach the objective different strategies were employed:

1) A project website [www.euromomo.eu](http://www.euromomo.eu) to communicate EuroMOMO news and results to the network and the public

2) Frequent EuroMOMO network meetings

3) The distribution of EuroMOMO results to different stakeholder groups by oral and poster presentations at scientific conferences, meetings and seminars, by peer reviewed articles, and by participating at meetings of European networks of related issues, such as EISN\(^2\). Instead of attempting to gather all relevant stakeholders together in one physical meeting, such “virtual workshop” enabled the possibility to tailor the information about the project to the requirements of the respective to target group

4) Negotiations about a sustainability plan with key stakeholders and ECDC, presentation at ECDC Advisory forum

3. **RESULTS**

3.1. **Stakeholder analysis**

Mortality monitoring is pivotal for tackling health threats in Europe and EuroMOMO therefore addressed a wide audience both on the national and European level. Stakeholders of the project were:

- National EURO-MOMO partners and institutions
- Health professionals, health authorities and decision makers at national and EU level, in particular public health officials involved in pandemic preparedness
- DGSANCO, ECDC, EUROSTAT, WHO Regional Office for Europe, public health, surveillance and statistical institutions in European (EU, EFTA/EEA + non-EU) countries
- Other European networks of related issues, eg EISN

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• The scientific community
• The general public.

3.2. Reaching stakeholders within the EuroMOMO network

To share project results with the EuroMOMO network and to detail the future of mortality monitoring in Europe, it was decided to hold a 3rd EuroMOMO plenary meeting: 27-28 April 2010, Berlin, Germany. Meeting minutes see annex I

3.3. Reaching stakeholders at the policy level

- Presentation to health security committee
Mølbak K, on behalf of all EURO-MOMO partners. Monitoring influenza death trends. Presented at the FLU section of the Health Security Committee, 7 April 2011, Luxembourg. See presentation attached as annex 2

- Presentation at ECDC Advisory Forum
Mølbak K, on behalf of all EURO-MOMO partners. The EuroMOMO project. Presented at the ECDC advisory forum meeting, 16-17 February 2011, Stockholm, Sweden

- Advisory board member mentioned EuroMOMO at a meeting of the “European observatory on health system and policy”

3.4. Reaching national and European public health experts

Presentations at scientific conferences, meetings and workshops:


Gergonne B EuroMOMO. Workshop of the Multinational Influenza Seasonal Mortality Study (MISMS), 17-20 September 2008, Vilamoura, Portugal.

Mazick A. Workshop on computer supported outbreak detection and signal management. RKI Berlin, 18 Nov 2008. Title: EuroMOMO project.

Mazick A. Experiences with participation in the Community Health programme: From a project coordinator perspective. National information day about the 2009 Calls for proposal. Helsedirektoratet, Oslo. 20 Jan 2009.


3 http://www.euro.who.int/en/home/projects/observatory


Mølbak K, on behalf of all EURO-MOMO partners: Timely monitoring of excess mortality during the 2009 pandemic: Results from the EURO-MOMO pilot project. European Scientific Conference on Applied Infectious Disease Epidemiology, 11-13 November 2010, Lisbon, Portugal.

Mølbak K, on behalf of all EURO-MOMO partners. EuroMOMO. Presented at the DG-SANCO cofunded project Triple S kick off meeting in Luxembourg, 22-25 November 2010, Luxembourg

Nielsen J, on behalf of all EURO-MOMO partners. EuroMOMO. Presented at the health indicator workshop, 22 November 2010, Luxembourg

*Presentation at the WHO Regional office for Europe*

Mazick A. EuroMOMO project. Presentation of EuroMOMO to representatives from the WHO Regional Office for Europe, Scherfigsvej 8, Copenhagen, January 2009.

All presentations are available from the project hub, euromomo@ssi.dk upon request.

*External experts invited and participated in EuroMOMO meetings:*


Paola Michelozzi; Department of Epidemiology of Rome, National Coordination Center, Department of Civil Protection. Plenary meeting Rome, 2009, title of presentation: Results of the heat prevention system in Italian cities.


3.5. Scientific publications


3.6. Plan for sustainable mortality monitoring in Europe

ECDC acknowledges excess mortality monitoring as an important public health surveillance activity in Europe that should be continued in the future.

The following plan for sustainable mortality monitoring in Europe was devised in agreement with ECDC.

ECDC will in 2011 carry out a comprehensive assessment the EuroMOMO project including the mortality monitoring system piloted by EuroMOMO. Strength, limitations and needs of mortality monitoring will be evaluated and based on the assessment recommendations for the future of mortality monitoring in Europe will be made. A potential outcome could for example be that ECDC will launch a tender for continuation and expansion of real time mortality monitoring.

Meanwhile, ECDC will issue a tender to bid for bridging funding to be able to continue mortality monitoring using the EuroMOMO algorithm into 2012. The EuroMOMO hub will apply to this tender.

4. DISCUSSION AND CONCLUSIONS

Extensive dissemination work was undertaken during the EuroMOMO project to make EuroMOMO known to the relevant stakeholders in order to sustain and expand European mortality monitoring beyond the project phase. Project results were shared with decision makers at European level, with national and international public health authorities and experts at national and European level, with the scientific community and the general public. The recognition of EuroMOMO as an important network has been underlined by the fact that EuroMOMO as well as individual EuroMOMO countries are taking part in the WHO coordinated project to determine excess mortality associated with the 2009 influenza A/H1N1 pandemic.

In close consultation with experts from ECDC as well as with the ECDCs Advisory Forum a plan for sustaining mortality monitoring in Europe was devised.

The plan of an ECDC led evaluation of the EuroMOMO project and monitoring system is a natural way to proceed. It will greatly enhance the chances of sustaining European mortality monitoring in the future. Such continuation of mortality monitoring, building upon the experiences of EuroMOMO, will integrate an important information source for risk assessment under the umbrella of the ECDC, thus contributing to a more efficient and extensive use of excess mortality outputs to detect and to determine the impact of serious threats to public health in Europe. This opinion was further underlined by the expression of interest from WHO Regional office for Europe to collaborate on and to some extent fund expansion of mortality monitoring to the non-EU countries of Europe.

However, it is still important to continue to advocate for sufficient funding and recognition of the importance of mortality monitoring to ensure the vital national and European commitment to sustain and to expand the network.
Draft 1

Report of the

3rd EuroMOMO Plenary Meeting

27-28 April 2010, Berlin

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This project has received funding from the European Union, in the framework of the Public Health Programme
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5. **MEETING OBJECTIVES**

The objectives of the third EuroMOMO plenary meeting were:

- To review results of the second year of EuroMOMO activities (especially A-MOMO, pilot), to suggest adaptation where necessary
- To discuss the remaining tasks of the project phase to ensure EuroMOMO delivers its outputs.
- To discuss the future of EuroMOMO network beyond Jan 2010 when the EC funded EuroMOMO project phase comes to an end and to develop a roadmap for EuroMOMO extension and sustainability, both for operational and scientific issues.

6. **MORNING SESSION 27 APRIL 2010**

6.1.1. *Welcome to the 3rd EuroMOMO plenary meeting*

*Kåre Mølbak*

Since the last plenary meeting there has been a pandemic, an especially cold winter, and an ash cloud. All of the above were or could have been a concern for public health. Here EuroMOMO has a great role to play, especially to control rumours. There should be other systems to detect a great public health event, but MOMO could control rumours, estimate the impact of an event and identify the groups in society who experienced the impact.

In this plenary meeting we will:

- Share the results from the pilot project and other projects within the network.
- Plan for the future, how to continue after the project.

For more details on the following presentations, please see the power points on the restricted website.

6.1.2. *EuroMOMO – status of the project and plenary meeting objectives*

*Anne Mazick*

AM gives an introduction to the project and the objectives, description of the work packages and their outputs.

The key output is a robust and simple model for all-cause mortality.

WP4: inventory of existing and planned activities - have finished with their deliverables and report. Publication is pending.

WP5: definition of objective - most output still not there.

WP6: understanding of crude mortality patterns - proceeding according to plan

WP7: identification of uniform analysis approach - piloted

WP8: the pilot was launched before schedule due to the pandemic.

The whole project: interim report submitted and second instalment of money distributed.

There has been lots of visibility of MOMO at DG-SANCO, ECDC, ESCAIDE meeting etc.

6.1.3. *The EuroMOMO pilot*

*Anne Mazick*

- Simple, robust and comparable European output. Countries can add more complicated aspects to the model if they so wish.
• Walk through the data flow.
• Lacking countries from Eastern Europe.
• Minimal requirements: date of death and date of registration, age of death. Or aggregated weekly data, total number of deaths by age groups and the normal time of delay for registration. Need for 3 years of historical data.
• Presentation of Z-scores and maps on the website, if countries allow there will also be number graphs.
• There is a need to look over the routines, and the use of the web-discussion forum.
• Most countries are sending complete datasets, i.e. including number of deaths.
• Difficult to interpret the most recent weeks, though the correction for delay works really well.
• Few comments from the countries on their output. No public output during the pandemic, though asked for. Because the countries were not comfortable with that. Decision is needed on what should be public output.
• Added value for pooled analysis advantages and disadvantages.
• Publication in Eurosurveillance of pooled analysis showing the excess in the children.
• With the input from this meeting the pilot will be revised. Hopefully continue monitoring and also increase inputs.
• Aim to have a ready to implement system when MOMO ends. Secure funding for the future.

6.1.4. A-MOMO

Bernadette Gergonne
Presentation for those not part of the pilot. To open the black box!
• A-MOMO provides weekly observed, expected and excess mortality, corrected for delay. Robust models also for subgroups. Even smaller sub-groups can be defined by each country.
• BG goes through the methods, the input, the correction for delay, the model, and standardised indicators for comparison.
• More focus on the delay problem and why we correct for this and the need for date for registration in order to correct for it.
• Assumption: mortality pattern has a Poisson distribution. We model the baseline on the spring and autumn weeks. During the meeting we should discuss what to do with the cutting of weeks for the pandemic season.
• To compare countries and to avoid using weekly population data we compare the standardised excess as Z-score.
• Brief introduction to CUSUM.
• The output when running the model is shown. All the output files and how to read them are gone through.

6.1.5. Pooled analysis

Jens Nielsen
Individual data received from six of the pilot countries, with this data JN has investigated the effect of age group and gender.
• How to pool over countries? Excess deaths in numbers too dependant on the size of the countries. Z-scores is comparable over countries and over other subgroups.
• The z-score pooled for all countries can actually emphasize findings compared to when looking at the countries separately.
• When pooling all the (14) countries, regular summer peaks appear around week 28.
• Findings of the pooled analysis depend on the countries included, thus as many countries as possible should be included.

Question: what is excess? The southern countries have another pattern and the model is not fitted to that, is that excess? Should we look at regions instead as the results might differ between European regions?
• It would be feasible to do pooling on certain groups such as women of fertile age etc., as discussed in the workshop in September. Pooled analysis gives an added value to analysis of these smaller groups.
• Any problems with the model could become more apparent in the pooled results; this possibility should not be forgotten.

Question: Do the big countries not dominate the pooled analysis too much? Should there be weighting according to population size? JN says this is the rationale for using z-scores. But the bigger variability of deaths in small countries could give over-weighting to the small countries. This is a big issue, are there enough deaths in each group?
• Results from A-MOMO; 9 countries and 4 age groups. Cumulative excess for all countries. There is nearly a significant excess in this season. There is particularly an increase in the age groups 5-14, whereas there seems to be a decrease in the elderly.
• There was an overall excess of 15 000 deaths, i.e. about 2.5% of deaths. In age group 2 this excess is around 18% and also in age group 3 the excess is significant but not as high.
• Findings: General excess mortality. Significant in 5-14 from week 44 and 15-64 from week 46.

Discussion:
• Is it possible to distinguish if this excess is in all countries and all age groups or not? If a few countries stick out this should be visible in the Z-score graphs.
• To look at excess per population would make it easier to put into perspective, but the data on population size is not given within MOMO. This could of course be found elsewhere.
• Virological data could be accessed through ECDC, this could be a next step in the model and data could be synchronized according to epidemic week.

6.2. Pandemic/winter mortality: Experiences from pilot countries

Chair: Fernando Simon

6.2.1. Belgium

Bianca Cox
• Pandemic mortality: (Week 40-49, decided according to ILI consultation rates) Not much excess in the elderly, but excess in the >85 years in week 43. There are also peaks around new years, not related to the pandemic.
• Excess compared between the A-MOMO and the Be-MOMO systems: large differences in the excess between the systems with much lower excess in Be-MOMO. In the winter, there was excess in the eldest age groups.

• A vs Be-MOMO: Different age groups. Be-MOMO also has daily system to monitor mortality during heat waves. Similar model (Poisson model with correction for overdispersion). All age groups in Be have sine-waves. Down-weighting of outliers. 99.5% CI limit threshold.

• Be-MOMO has a higher baseline in winter and a lower in the summer, i.e. has higher amplitude than A-MOMO. The A-MOMO spline model gives lower baseline at the end of a series.

• Tried with removing outliers depending on other data (ILI and temperature.) In the beginning of the series there is not much difference between this and down-weighting. Doing both is almost the same as down-weighting.

• Timeliness: after 1 week 25% and after 3 weeks 95%. Happy with the timeliness (delay correction) of A-MOMO as most signals (z-score over 2sd) were detected already after 2 weeks. The Be-MOMO does not correct for delay as well.

• Large differences in baseline. A-MOMO too high in summer if we want to capture heat wave effect and in winter it is to low, where Be-MOMO is too high, somewhere in between would be appropriate.

Discussion:
• Suggestion from UK and Finland to do double down-weighting.

• Discussion about the ILI consultation rates, there are large difference in these systems between the countries and it could be difficult to compare.

6.2.2. Netherlands

Kees van den Wijngaard

• Before July 2009 NL actively participated in EuroMOMO and planned to participate in the pilot, but when the pandemic came an ad-hoc surveillance system was launched in the country. NL joined the MOMO pilot in December 2009.

• The NL system uses weekly data, for a simple time-series model and an easy correction for the delay by running the analysis several times. 25% outliers were excluded in the historical data for the baseline.

• Looks at age groups and regions, further analysis on sub-groups if needed. Nothing was detected during the pandemic and very little in general during this winter.

• Very timely data; within a week 40% complete, after 2 weeks 99% complete.

• There was a signal in the age group 0-4 years in mid-November. Confirmed by 10 weeks cumulative residual and also detected with the A-MOMO model. They could not further investigate this signal in NL as there are regulations for data protection in this case. What to do with signals???. Only half a year later the cause of death can be accessed.

• No striking excess in other age groups.

Discussion:
• Question regarding the viral circulation during the peak for children. The peak was at exactly the same moment as the pandemic.

• How should a signal be investigated? It could not be done in NL. No public health measures could be taken. Hence, it was difficult to communicate this signal.
• Strikingly different signals in the various countries. Can NL verify their data somehow, by hospitalisation data etc. This will be possible with cause of death data further on.
• There was mandatory reporting of pandemic influenza; 5 deaths in the young children.

6.2.3. Spain

Fernando Simon

• Historical data and current data come from different sources due to delay issues. The current data has very little delay. By day 4 there are 90% of complete records.
• Have had problems with the data from 2007.
• Huge excess mortality in the winter of 2008, also with the new MOMO model. Also an increase in mortality in the summer.
• The new MOMO version gives better estimations. It is difficult to manage dates in the graphs. Still flagging too often, both in the summer and the winter. In Spain they want to detect when the peaks are higher than expected not “just peaks”.
• Spain also had excess deaths in the young in November and in the total population in December. Young age groups are not normally analysed, as the main aim is to pick up deaths from heat waves. Though, the age groups of the system could be amended.
• 2-3% excess death in the whole population at the time of the pandemic.
• Cause of death can not be accessed.
• The peak of influenza was in week 48, which was the last week of the excess death peak. Normally the mortality peak happens with a couple of week’s delay, so influenza cannot really explain the mortality excess detected. Temperature was therefore investigated; mild autumn and then very cold winter with 10-15 degrees rapid drop in temperature coinciding with the peak of mortality.
• Important to add age groups.
• Hard to find the reason for the peak in November. However, pollen is a theory.

Discussion:
• Difference in influenza transmission between age groups could explain the non-matching of peaks. But FS still do not think it can explain the time difference in the peaks.
• The pollen theory needs a special analysis only for Spain. This highlights the need for multi-disciplinary interpretation of the signals within MOMO and raises the issue of the role of MOMO; should we just provide an excess estimate or should we make interpretations. We should not carry out a full risk assessment.

7. AFTERNOON SESSION 27 APRIL 2010

7.1. Pandemic/winter mortality: Experiences from pilot countries continued

Chair: Helmut Uphoff

7.1.1. France

Anne Fouillet
• 2 systems for surveillance of mortality: One for severe cases dying in hospital during the pandemic period, and another one using all-cause deaths from administrative data. The latter one used for the MOMO-pilot.
• Weekly bulletin on INVS website. Also one bulletin on all-cause data.
• Individual data and historical data available. 90% completeness after 7 days.
• Poisson regression model with linear trend.
• For the two youngest age groups there is no difference to previous years. Modest CUSUM signal first in the young and then in the adults, though not above normal.
• Currently only the Z-score is provided to the MOMO hub. Discussions are ongoing about including numbers in the report as well.
• Plans to include MOMO model in the national syndromic surveillance.

Discussion:
• France does not make exclusion of past outbreaks. Hence, less excess will be detected.

7.1.2. Sweden

Bernadette Gergonne
• Pandemic peak was seen in week 47.
• A-MOMO was used in Sweden. CUSUM also explored for this year and previous years. There is a slight excess (1.3) in cumulative excess in the weeks 40-52 in the age group 5-14 years whereas children and elderly mortality was below baseline. For adults it was very similar to baseline.
• No official diagnosed deaths in the age group where excess was seen. Though, deaths reported among multi-sick children could explain this excess.
• Very little excess detected by the system, could be explained by chance.
• CUSUM reset to zero at week 40. With CUSUM, cumulative excess was detected here and there during the past years, but was not found in the Z-score graphs. No detection during the pandemic wave for any of the age groups. No added value of CUSUM in older age groups, but in the younger age groups it made it possible to sometimes detect excess earlier. How to interpret?
• There is an excess due to cold weather during the past winter.
• Possibly small pandemic impact on the 5-14 years age group.

Discussion:
• There are many peaks that can not be assigned to any special cause.

7.1.3. Hesse (Germany)

Helmut Uphoff
• Raises the issue of cause of death and excess.
• Due to the detection of P&I deaths in USA, Hesse had high expectations to be able to detect excess. Relative measurements as these can be affected by reporting bias.
• Look at the time pattern of deaths vs virus circulation and morbidity measured through other surveillance systems.
• In the 5-14 years age group mortality increased slightly before the time of influenza. No excess during the pandemic in any of the age groups. However, something was “going on” in the 15-34 age group.
• Very timely death reports. Could contact the local office for cause of death to investigate any strange signals.
• Possible excess in the age 15-35 and 35-49 years.

7.1.4. Israel

Zalman Kauffman

• Israel uses aggregated hospital data, as this is the only timely data available.
• No correction needed, no possibility to stratify by age groups
• A total of 96 reported deaths due to the pandemic. Estimated excess deaths: 220
• During the main part of the pandemic the increase in mortality came with a lag which made it difficult to judge whether there was a relation or not. Cannot correlate with temperature
• The analysis was stratified by hospital; the model fits the data very well for the bigger hospitals but not for the smaller ones.
• Some agreement for the first phase of the pandemic between influenza and mortality, but not for the second phase.

Discussion:
• In Germany most influenza deaths coincided with the time of reported influenza morbidity, though there are some examples of delay.
• Kåre suggests that the young population of Israel could explain the effect of the pandemic in this country. Here the elderly are not predominant and thus a hospital-based system is particularly good for pandemic surveillance in this setting.

7.1.5. Ireland

Ajay Oza

• Daily reports on individual data with cause of deaths. Complete data from 2005. Long delay, about 3 months. Only 80% by 3 weeks. With the help of the A-MOMO model the delay is well adjusted for in Ireland.
• Ireland has been part of the pre-pilot and has tested several of the MOMO models. They have now modified the model to include more age groups plus gender data and whether hospitalised death or not. There is also a P&I flag.
• AO shows the weekly bulletin with the graphs and tables. Table of Z-scores and CUSUM flags. Possibility to reset CUSUM more often.
• Excess mortality in two periods; more disperse excess during the influenza peak and one peak in the winter. Coldest winter for about 50 years.
• Sharp rise in excess in week 52 - week 3, which was detected in week 4. 440 excess deaths and 90% of those in over 65 year-olds. More than 40% were hospitalised deaths. More than 50% were noted as pneumonia cases.
• 2-week lag on high ILI rates can give some explanation to deaths previously registered in the system. This can give some explanation in the pandemic period, but not enough.
• Found a lag effect on mortality of minimum temperature. Most cases were reported as pneumonia. The cold winter possibly explains most of the excess seen. Need to look at other factors such as RSV. Excess deaths are too few to reach any clear conclusions.
• MOMO very useful. AO appreciates the website and the possibility to check if other countries have signals.
• Routine weekly analysis very straight forward but testing new version is taking too much time. Will be difficult to keep on testing new versions.
• Delay in registration still the main problem. Trying to investigate other routes for data access.

Discussion:
• Jens likes that Ireland has added the gender parameter.

7.1.6. USA

David Shay
• Modelling of influenza-deaths has been used for decades to decide severity of influenza epidemics.
• Data sources: P&I deaths – works as a lower band and constitutes 9% of US deaths, R&C deaths more broad and includes the P&I deaths, constitutes 71% of US deaths.
• Data from registries has 2-3 years of delay.
• Two systems used at CDC at the moment; the multiplier method on ILI data and the 122 cities system.
• Multiplier model: EIP hospitalisation data from 10 US states, gives a multiplier for number of influenza-associated cases. Extrapolates deaths from reported deaths using hospitalisation data. => 57 million cases in US, 257 000 hospitalisations, 11 690 deaths, most found in the young.
• 122 cities system: Reported deaths during the pandemic, with an age shift compared to previous epidemics. This system has previously given a good prediction for the actual NCHS data. The peaks prove to be the hardest to predict.
• Baseline using linear regression
• Huge increase in influenza testing during the pandemic.
• Mean number of all-ages deaths due to influenza is 32 517 per season. This year the overall number is smaller with a huge CI. Though, much higher than normally in the below-25-year age group and substantially lower in the old age group.

Discussion:
• Multiplier method is very dependant on the stability of the different components. For instance the increased testing will affect the estimate. Multipliers will change between the years and needs to be reviewed. It is also very gross in the estimations for the ratio hospitalisations vs deaths
• There were fewer deaths during this pandemic than in many epidemics in the 90s. Though there are age group discrepancies with seasonal influenza and perhaps a more accurate approach would be to compare life-years lost.
• Excess deaths in < 65 year-olds are often notifiable; can we not depend on the reporting of influenza deaths? DS says that the low sensitivity of the PCR testing, especially for children, will underestimate influenza deaths.

7.1.7. UK

Nick Andrews
• “Heat, cold or pandemic flu”
• Richard Pebody, Pia Hardelid and representatives from Scotland are sorry not to be present.
• Death registration can be delayed for months due to death inquests; particularly in death registrations for young people this is a big issue.
• Due to the pandemic there was daily reporting, bypassing ONS, from the Home Office to HPA. UK now had records with date of death, age and region. But for historical data, the aggregated weekly data has still been used. UK still do not fulfil the criteria to join the MOMO pilot.
• Daily analysis possible. Similar model to the one presented by Belgium, though using double down-weighting as well as correction for delay.
• There was an excess I deaths in late 2009, especially in the elderly and most likely explained by the cold spell. Two big morbidity peaks; one in early summer and one at the same time as the rest of Europe.
• A little flagging in the age group 5-14 during the second wave of the pandemic. In the two older age groups there was only excess during the cold spell at the end of the winter.
• CUSUM did not show excess at the time of the first transmission wave, but possibly with a little lag after the second wave.
• UK needs to work on the data flow.

Discussion:
• Daily monitoring useful for detecting cold spells. Otherwise mostly weekly analysis used. Useful to be able to switch on daily monitoring when needed.

7.1.8. Climate TRAP project

Joris van Loenhout
• Climate change can affect the human health: directly or indirectly.
• Knowledge in this area is not sufficient among public health professionals.
• Most countries have a U-shaped association between mortality and temperature.
• Objectives of project: change the preparedness of the public health sector with regards to climate change effects.
• 8 countries are partners
• Started May 2008 and duration is 3 years
• Main focus: stressors related to climate, effects in different time-spans, different climate zones.
• Methodology:
  o WP1: inventory of early warning and surveillance systems, what has been done before etc. A report is being compiled.
  o WP2: Impact assessment, what can be expected in terms of health effects. Modelling is being used for this. Not yet decided on which model to use and which stressors to include in the model.
  o WP3: Combination of the two other WPs, a capacity assessment will be made for the project. Guidelines for policy makers specified for the different regions in Europe.
  o Implementation of Guidelines of preparedness by work shops in the 3 regions.
  o Final aim: to train Public Health professionals and potential stakeholders.

Discussion:
• The regional analysis could also be discussed for EuroMOMO and perhaps possible to pool the analysis on regions.
8. MORNING SESSION 28 APRIL 2010

8.1.1. ECDC presentation

Bruno Ciancio

- ECDC needs:
  - Difficult to evaluate severity in pandemic
  - Lack of reliable data on SARI and influenza-related mortality
  - Had to rely on non-EU data
- ECDC-wishes:
  - Routine systems for: all-cause mortality, P&I and P&C monitoring
  - Hospital-based surveillance, similar to EIP in the USA
- ECDC funding process
  - Annual budget, no increases expected in 2011
  - Tendering process
    - Begin in January, expected results at the end of March 2011
    - Public contracts vs grants
    - Duration, normally less than a year
    - Framework contract up to 4 years, can be renewed every year with easy process: projects with a wider scope, may be prone to planning errors – this contract type has worked well for I-MOVE and VAESCO
  - Ownership
- EuroMOMO would fit into the general aims of ECDC
- Need to take into account the vision of the new Director

Discussion:
- There does not always seem to be a high interest for the ECDC-funded projects from ECDC. It is surprising that they do not take bigger part in their projects. ECDC does not agree, there is a lot of interest, the lack of participation has to do with finding a way to collaborate within each project, for I-MOVE ECDC has been more of observer from the outside
- ECDC would have liked to have sooner access to the EuroMOMO data during the pandemic. EuroMOMO stresses that ECDC had access to the restricted MOMO website. ECDC had problems could not easily use the data as it is confidential. MOMO thinks it can be used for internal risk assessment, but kept out of the communication.
- ECDC would like a simple and public picture on the website that could be used for communication.

8.1.2. WHO Euro presentation

John Paget
Josh Mott had to be excused due to the Polio outbreak in European region.

- Why do we want data on disease burden? In order to find a sustainable vaccine programme, it is also needed in order to build the evidence base.
- Variable impact of influenza over Europe due to health care access, age structure, untreated co-morbidities, co-infection, risk factors, secondary infections.
- Direct measures of disease burden: ILI%, SARI hospitalisations
- Brief history of influenza surveillance systems
• New four pillars in influenza surveillance: reference laboratory, sentinel GPs, sentinel hospitalisations, deaths => Integrated weekly surveillance report. Important that MOMO has its own place in this structure.
• EuroMOMO can be used both for early warning but also for the data to be analysed retrospectively to estimate the burden of disease
• Priorities: age groups, special risk groups
• Various countries have various ways of collecting the information, but that is perfectly ok.

Discussion:
• How to define SARI hospitalisations? This debate continues.

8.2. Final session: EuroMOMO and beyond: Report from group work, discussion

8.2.1. Presentation Group work 1: EuroMOMO outputs, future funding

Ajay Oza
• Output:
  o Pooled analysis: one graph with both pooled and individual countries (in lighter shade of grey) in same graph on the website, not all countries can be part of this. Important to start with this as soon as possible.
  o Age groups: the current ones plus the total. For the pooled data, there could be division into more narrow age groups later on.
  o Gender
  o Divide by regions (north south etc). The group did not reach a conclusion regarding this.
  o Text file of alerts (country and age group) sent to everyone/put on website as a summary of the graphs on the website.
• CUSUM
  o Rolling 10-week window
  o Make it less sensitive (fewer alerts)
  o More thinking needed; Spain and France have volunteered to work further on this. Other volunteers are welcome – contact Bernadette.
  o Discussion around baseline models, the removing of the winter peaks etc. There should be a special baseline group to discuss this further. However, most people seem happy with the current model for the baseline.
  o Summary table of excess deaths by age group and life years lost added, in the future
    ▪ Problem: the people dying might have co-morbidities giving them a lower life expectancy.
    ▪ This is meant as an attempt to show the impact of a skewed age distribution, as in the case of the current pandemic. On idea-stage - needs to be developed further.
• Uncertainty around estimates
  o Do not present CIs to journalists
  o Report when there is a real excess
  o More work is needed regarding delay adjustments, variance associated with actual excess etc.
• Needs for funding
Find out what is needed by stakeholders before we proceed with further developments
- Many ideas about the website
- Development of software: using R when the process is more stable
- Look at funding in each country
- Start a dialogue with both ECDC and WHO

There is a need to include more countries – this should be balanced when deciding on new and more complicated developments

8.2.2. **Presentation Work Group 2: Signal assessment. Dissemination and expansion.**

**Kees van den Wijngaard**

- Signals, operating procedures
  - First signal interpretation on the national level
  - Guidelines from EuroMOMO on signal analysis/validation to make results more comparable
  - Though, many different opinions and possibilities
    - Definition of a signal?

- Communication pathways
  - Within countries: who is focal point, ministry/researches
  - EuroMOMO can be a link between countries
    - Verification of common signals
    - Between countries and national institutes
      - Further investigation in the role of EuroMOMO vs International Health Regulations

- Output
  - Public on website: only pooled results with links to national institutes for their results to avoid problems with data sharing
  - Restricted part; as it has been
  - All output in national languages

- Expanding EuroMOMO
  - Workshop
    - New funding to sustain and expand; to find new partners, thus an educational type work shop
    - 1-3 people per country, decision-makers and epidemiologists/statisticians
    - 1-2 days is enough, in connection with ESCAIDE etc
    - Add to agenda of managerial ECDC board, to inform about existence and sustain funding
    - Official EuroMOMO power point or leaflet: to give to stakeholders as information about usefulness/interest.
    - Contact with WHO-Euro to include all of Europe.

**Discussion:**

- Take into account that some of the current partners are funded nationally and might not get further funding. Important to invite also these stakeholders to the meeting.
- ESCAIDE work shop on EuroMOMO, Fernando Simon is part of ESCAIDE organisation committee and could be contact for this.
• If it carried out back-to-back with ESCAIDE we would miss the managerial people. Possibility to split the meeting according to target group.

8.2.3. **Discussion about the website**

• There is a need for more information on the public website, for instance the pooled analysis. On the restricted website we will keep the county data and add more of the discussed output. Good idea to link to the national websites, to make website into a mortality portal.
• Translation of the output into all the languages implies a lot of work. Actually, this could be incorporate din the A-MOMO file and the passages that needs translation could be highlighted and each country adapt the do-file with their language.
• Who is doing the analysis and what should be in the explanatory text? Anne would like more interaction and communication around the bulletin/text, especially if this will go public. There could be a draft output by Thursday lunch time, which gives the working group 24 hours to provide a text, i.e. the same system as for the EISS bulletin. Clarification of this process and how to deal with the uncertainty with the estimates. Make a working group to discuss this further. Everyone is encouraged to volunteer for this group. There is need for both reviewers and extras.
• This text/bulletin should be advertised more. At the moment an e-mail is sent to pilot partners when the bulletin goes on the website. The group who receive this e-mail should be enlarged, either with everyone with a EuroMOMO password or that you can sign up for the e-mail.
• Would be nice to be able to change the week of the output shown without having to go via the first page.
• More info/rules on public website about how the data is allowed to be used. Anne will look into this and circulate a draft for such rules. Suggestion to form a website group.

8.2.4. **Discussion about the baseline**

• It will need good arguments to change this common and working baseline. But the work with the baseline should continue (with simulations etc) and if there is a consensus to change it due to validation studies, we should return to this issue. As of yet we have less than one year of experience with the current baseline.
• Christoph Juncker is not happy with the baseline as it is too low and signals too often. Kåre says that the simulations studies rather say the baseline is too high.
• Maybe introduce another cycle due to heat waves in the summer in some countries. This issue needs to be discussed. There is a need for a baseline group, contact Jens to join the group. Also make comments on the website.

8.2.5. **Signals**

• National responsibility to interpret signals. However, if there are concurrent/similar signals in many countries it is the role of ECDC and WHO to make risk assessments.
• Some countries do not know how to further investigate signals and guidelines would be very useful. However, this is not the task of the MOMO hub. This responsibility really lies on the national institute. It will differ between the countries how the process (of contacting stakeholders and comparing with other surveillance data) if there is a national signal will look.
• If there are signals in many countries on the other hand, ECDC and WHO should be contacted and informed about signal and possible limitations such as problem with baseline. It should be clearly defined when to contact the international organs in order to not cry wolf to often.
• Identify the responsible bodies in each country would be helpful, as well as focal points for reporting systems (EWRS and IHR) for the threat communication. Create an SOP for this. The SOP should be approved by the ministry of health in each country.

8.2.6. Uncertainty

• For communication purposes it is best to report the midpoint estimates, not the CIs, in order to avoid media focussing on the upper CIs. However, important to report that there is uncertainty around the estimate. David Shay stresses that it is important to communicate that the numbers are variable when it comes to influenza. Consensus: to provide a range along with the midpoint, but not to call it confidence interval.

8.2.7. New members

• More and more countries are coming closer to joining and the hub is open to adjust the process to accommodate for new countries, if there are problems with data delivery etc. Please approach the hub regarding this during the spring or summer. It is now a good time to join the pilot. Remember that also countries with only hospital data or regional data or reports every other week can join.
• The joining of more countries is a pivotal part of MOMO. The hub likes to especially encourage the Eastern European countries to join, as there might be other mortality patterns to explore in that area.
• Slovenia: it is likely that aggregated data can be sent from now on. Not possible to deliver individual data at the moment. Slovenia needs clarifications regarding the data delivery.
• WHO Rome suggests a pilot in the summer, for a few countries with daily data. Good to be prepared for heat waves.
• Sweden: When we publish the pooled data it will become very clear that there was a huge peak due to cold during the passed winter. Who has the responsibility to tackle this? An interpretation will be given in the text on the website. WHO should be alerted before publishing, so that they can be prepared for questions. Kåre suggests we could show temperature data to illustrate the point. A temperature working group for developing a multivariable model using this data would be very welcome!

8.2.8. Meeting evaluation

• Very useful meeting for the hub, they have received a lot of input and will proceed accordingly. Network partners will be contacted to give help with all the new tasks.
• Very well prepared work groups. ClimateTRAP found it useful to participate. David Shay will apply the A-MOMO to the 122 city data. ECDC very happy, the work looks valuable so far. EuroMOMO is moving in the right direction and can become an important public health tool for Europe. Slovenia is happy with the opportunity to discuss and get clarification before joining.
• Great with Berlin and the hotel/venue!
### ANNEX I: MEETING AGENDA

**Plenary Meeting Agenda - Berlin, 27-28 April 2010**

<table>
<thead>
<tr>
<th>Day 1</th>
<th>27 April</th>
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<tbody>
<tr>
<td>8.30-9.00</td>
<td><strong>Registration</strong></td>
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<tr>
<td><strong>Morning session:</strong></td>
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| 9.00-9.20 | Opening (Kåre Mølbak)  
EuroMOMO – status of the project and meeting objectives (Anne Mazick) |
| 9.20-10.00 | The pilot – (Anne Mazick)  
A-MOMO (Bernadette Gergonne) |
| 10.00-10.30 | Pandemic/winter mortality: Experiences from pilot countries  
Ireland  
Belgium |
| 10.30-11.00 | Break |
| 11.00-12.30 | Pandemic/winter mortality: Experiences from pilot countries  
Netherlands  
Spain  
France  
Sweden  
Germany  
Portugal |
| 12.30-13.30 | Lunch |
| **Afternoon session:** | |
| 13.30 – 13.50 | Climate-TRAP (Joris van Loenhout) |
| 13.50 - 15.00 | Pandemic/winter mortality: Experiences from other countries  
US (David Shay)  
UK  
Pooling mortality from European countries (Jens Nielsen) |
| 15.00-15.30 | Break |
| 15.30-17.15 | Synthesis of day one and introduction into group work (Kåre Mølbak)  
Group work I: The future of EuroMOMO |
| evening | EuroMOMO dinner |

<table>
<thead>
<tr>
<th>Day 2</th>
<th>28 April</th>
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<tr>
<td>Time</td>
<td>Session</td>
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<tr>
<td>8.30-9.00</td>
<td><strong>Q&amp;A session for EuroMOMO partners: Project management &amp; administration</strong></td>
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<td>9.00-9.20</td>
<td><strong>EuroMOMO future and European partners</strong></td>
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<td>ECDC (Bruno Ciancio)</td>
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<td>WHO Europe (John Paget)</td>
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<td>9.20-11.00</td>
<td><strong>Group work II: The future of EuroMOMO</strong></td>
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<td>11.00-11.30</td>
<td><strong>Break</strong></td>
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<td><strong>Chair: Kåre Molbak</strong></td>
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<tr>
<td>11.30-13.15</td>
<td><strong>Final session: EuroMOMO and beyond:</strong></td>
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<td>How to expand and how to sustain EuroMOMO and the network</td>
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<td>Report from Group work</td>
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<td></td>
<td><strong>Discussion</strong></td>
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<tr>
<td>13-15-14.00</td>
<td><strong>Lunch</strong></td>
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## ANNEX II: PARTICIPANTS

<table>
<thead>
<tr>
<th>Name</th>
<th>Institute</th>
<th>Country</th>
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<tbody>
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<td>Christopher Junker</td>
<td>Federal Statistics Office</td>
<td>Switzerland</td>
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<tr>
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<td>US Centers for Disease Control &amp; prevention</td>
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<td>The Netherlands</td>
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<tr>
<td>Zalman Kaufman</td>
<td>Israel Center For Disease Control</td>
<td>Israel</td>
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Monitoring influenza deaths trends

Kåre Mølbak, coordinator
On behalf of all Euro-MOMO partners

Department of Epidemiology, Statens Serum Institut, Denmark
Euro MOMO

- Funded by European Commission
  - Community Public Health Programme
- Three year project
  - February 2008 to January 2011
  - Three months extension: End 30 April 2011
- 25 partners, 22 European countries
- Coordinated by Statens Serum Institut, Denmark
- Advisory Board
  - ECDC, WHO-Euro, Eurostat and independent experts
Weekly Procedures

National Statistics

Partner Institutes

A-MOMO pack

MOMO hub

SSI Denmark

EuroMOMO.eu

Pooled Analysis
- Numbers, total, age-group
- Z-scores, total, age-group
- Map of Z-scores

MOMO restricted Website

- Comparative Graphs
  - By country
  - Total, age group
  - Assessment Forum

- Data sets
- Graphs
- Tables
A-Momo pack: Method

- **Input**
  - Individual record, date of death, date of registration, age groups
  - Aggregated data (but no correction for delay)

- **Correction for delay in data transmission**
  - Binomial regression to model delay distribution
  - Prediction of corrected number of deaths for recent weeks

- **Excess mortality = Observed - expected**
  - Time-series analysis decomposed with time-trends and seasonal variation
  - Poisson regression allowing for over-dispersion
  - Fitted on Spring and Autumn

- **Standardised indicators for comparison between countries and population subgroups**
  - Numbers
  - Standard deviation scores
Recent developments:

- Pilot project continues
- 12-15 countries reporting each week
- Improved weekly bulletin
- Public and restricted outputs

13 countries (Belgium, Denmark, France, Germany (Hesse), Greece (Athens, Keratsini, Pireas and Magnisia), Ireland, Israel, Netherlands, Portugal, Spain, Sweden, Switzerland and United Kingdom (England and Wales)) of the participating countries reported in week 12.

Nine contributed to the pooled analysis
2009: Modest effect of the pandemic

• Children 5-14 years of age had a rise in excess mortality
  – Concomitant to the autumn wave of the influenza A(H1N1) 2009 pandemic
  – Modest in size (~20%) and not sustainable
  – May indicate a “harvest effect”

• For adults: No differences from the previous two seasons

• For seniors: Less excess mortality than seen in the winter of 2008/9
European mortality bulletin Week 12 2011: Mortality has since the mid within the normal range for all countries.

Over the last month, all-cause number of deaths, corrected for delay in local reporting, has been below 2 z-scores. A tendency in some countries to be below the normal range may be due to insufficient adjustment in delay in local reporting.
European mortality bulletin Week 12 2011: Mortality has since the middle of January been within the normal range for all countries.

Over the last month, all-cause number of deaths, corrected for delay in local reporting of deaths, has been below 2 z-scores. A tendency in some countries to be below the expected number of death may be due to insufficient adjustment in delay in local reporting.
Cumulated excess graphs

Cumulative sum of weekly derivations of number of deaths from the baseline by season in EuroMOMO pilot countries

Pooled cumulated excess deaths

0-4 years

5-14 years

15-64 years

Aged 65

2009/10

2010/11
Expressed as percent excess deaths in relation to the expected number (and compared with the three previous seasons):

0-4 years: -3% (low)
5-14 years: +8% (lower than 2009/10)
15-64 years: +0.5% (low, is usually at +2%)
65 years+: +2% (as expected)
Discussion:

• Several countries noted high pressure on intensive care units in 2010/11 season
  – Influenza A (H1N1) and influenza B
  – Often more than during the 2009 autumn

• On the other hand: No excess mortality

• How can we explain this?

• Are we seeing the normal in the intensive care?
Figure 2. Number of Influenza patients in Danish ICUs on Monday 8am (and the percentage of beds used for influenza patients on Monday 8am (re)}
This season:

- Still a pandemic signature
  - Young adults, most with underlying illness being affected
  - This leads to high pressure at ICU
  - Seniors > 60 years relatively spared
- Because seniors were spared:
  - Little overall excess mortality
- But the fact that we also see influenza B at the ICU underscores that influenza A and B as a cause of severe illness probably has been underrecognised

More diagnostic activity and awareness than ever!
Conclusions

• Timely monitoring of excess mortality is feasible
  – Should be sustained and expanded
    • Impact assessment
    • Informing policy makers and controlling rumours
    • (Signal detection)

• Pooled analysis provides an added European value
  – Major health threats
  – Sustained shifts
  – European patterns vs. regional signals
Acknowledgement

Anne Mazick, Bernadette Gergonne, and Jens Nielsen

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FRANCE Cellule de Coordination des Alertes (CCA), Institut de Veille Sanitaire (InVS)
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