Workshop on the development of climate information systems for heat–health early warning

Assessing knowledge, needs and the path forward

James Creswick, Technical Officer
Climate change, green health services and sustainable development programme

Chicago, 28–30 July, 2015
Outline

Heat–Health Action Plans (HHAP)
- Guidance
- Core elements
- Public health messages for heat
- Development and implementation
- Monitoring and evaluation

Tools and country support

Current and future developments
Heat–Health Action Plans Guidance

- **Heat and Health:**
  - Short-term relationships between temperatures and health outcomes
  - Vulnerable populations
  - Interaction between heat and pollution

- **Heat–health action plans**
  - General principles
  - Core elements

www.euro.who.int/heat-health-action-plans-guidance
Heat and health

- Short-term relationships between temperatures and health outcomes
- Heat projections
- Vulnerable populations
- Interaction between heat and pollution (including forest fires)

## 9 Core elements of a HHAP (1–3)

<table>
<thead>
<tr>
<th>Core element</th>
<th>Sub-elements</th>
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</thead>
</table>
| 1. Agreement on a lead body and clear definition of actors’ responsibilities | - clearly defined lead body  
- involvement of >1 other agencies  
- regular meetings and/or reviews  
- inclusion in national disaster preparedness  
- cross-border cooperation |
| 2. Accurate and timely alert systems, heat–health watch–warning systems | - threshold definition scientifically sound  
- regionally-adapted definitions  
- warning is issued well in advance  
- different alert levels for different levels of action  
- alert is communicated following a clear plan |
| 3. Health information plan | - clearly defined actors/recipients/contents  
- effective dissemination of information (>1 channel)  
- quality of advice  
- public and professionals addressed  
- appropriate timing of information campaign |
## 9 Core elements of a HHAP (4–6)

<table>
<thead>
<tr>
<th>Core element</th>
<th>Sub-elements</th>
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<tbody>
<tr>
<td>4. Reduction in indoor heat exposure</td>
<td>- giving advice</td>
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<tr>
<td></td>
<td>- providing cool rooms/spaces</td>
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<td></td>
<td>- provision or use of mobile coolers</td>
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<td>- planning or support for increased albedo or shading</td>
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<td>- planning or support for better insulation</td>
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<td>5. Particular care for vulnerable groups</td>
<td>- identification of relevant groups (&gt;1)</td>
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<td>- activation of a telephone service</td>
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<td>- specific measures (buddies, neighbours…)</td>
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<td></td>
<td>- regular re-assessment of vulnerable population groups</td>
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<td>- information and training for care-givers</td>
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<td>6. Preparedness of the health/social care system</td>
<td>- increase of capacity of health services</td>
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<td>- heat reduction in healthcare facilities</td>
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<td>- special precautions in nursing homes</td>
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<td></td>
<td>- special resources for patients/public</td>
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<td>- improving health-care networks</td>
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## 9 Core elements of a HHAP (7–9)

<table>
<thead>
<tr>
<th>Core element</th>
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<tbody>
<tr>
<td>7. Long-term urban planning</td>
<td>- increased green and blue spaces</td>
</tr>
<tr>
<td></td>
<td>- changes in building design (albedo, insulation, passive cooling)</td>
</tr>
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<td></td>
<td>- changes in land-use decisions</td>
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<td></td>
<td>- energy consumption reduction</td>
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<td>- individual and public transport policies</td>
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<td>8. Real-time surveillance</td>
<td>- less than 48-hour interval</td>
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<td></td>
<td>- involving data from &gt;1 region/city</td>
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<td></td>
<td>- involving data from &gt;1 health effect</td>
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<td></td>
<td>- use for adjustment of measures</td>
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<td></td>
<td>- use for evaluation of effectiveness</td>
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<tr>
<td>9. Monitoring and evaluation</td>
<td>- end-of-summer evaluation</td>
</tr>
<tr>
<td></td>
<td>- monitoring health outcomes</td>
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</tbody>
</table>

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Public health advice for heat-waves

- Information for different audiences: a series of 15 information sheets targeted to different audiences:
  - for the general public,
  - for health authorities,
  - for medical professionals and care providers,
  - for general practitioners (GPs),
  - for retirement and care home managers,
  - for employers, and
  - for city planners.

www.euro.who.int/public-health-advice-on-heat

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Public health messages for heat

• **For the general public** (with practical advice):
  • Keep your home cool
  • Keep out of the heat
  • Keep the body cool and hydrated
  • Help others
  • Seek help if you feel unwell

• **For health authorities and medical professionals**
  • Risk factors: vulnerable populations, medical conditions and medication, socioeconomic and environmental conditions (including air quality)
  • Treatment of heat-related illness
  • Specific information on protecting health from vegetation fires during heat-waves
  • Communicating “heat”
Development and implementation

Heat–health action plans can save lives, but…

How far is development & implementation in Europe?

• Assessment performed in 2013: Are European countries prepared for the next big heat-wave? Bittner, Matthies, Dalbokova, Menne (2013) EJPH 24(4):615-619

• HHAPs from WHO European Member States

• 18 of 51 countries have developed HHAP (no data for 2)
  • 3 are federalized: Austria, Germany, Switzerland (and UK)
  • Only 3 described all 8 core elements (Croatia, FYROM, UK)
Monitoring and evaluation

- Only 2 countries included evaluation measures; evaluation was only mentioned in 7 countries
- Long-term measures (i.e. urban planning, reduction of indoor heat exposure) underrepresented – perhaps in other sectors’ policies
Tools and country support

- **Heat-wave probability tool**
- **Start of season:** annual heat-alert sent to all national focal points in mid–late April
- **Throughout the season** (April through September):
  - Check heat-wave probability tool
  - If actionable, email alert sent to affected country focal point if no national/local heat–health action plan implemented
Current and future developments

- Seasonal-to-decadal climate forecasts could provide an opportunity to anticipate temperature-related mortality
- Within FP7-funded EUPORIAS project, WHO/Europe and IC3 are developing a climate-driven mortality model for heat-waves
- Part of a wider initiative to stimulate climate service use and development for the health sector

Background and data

- Daily regional counts of mortality from Jan 1998–Dec 2003 were collected for 187 NUTS2 regions in 16 European countries.
- Data were aggregated to 54 larger regions in Europe, defined according to similarities in population structure and climate.
- Transfer functions were formulated for each region.
Heat-wave scenario

(a) Probabilistic map of exceeding emergency daily mortality threshold (75th percentile of daily mortality distribution in the warm tail);

(b) Corresponding observations during a heat wave scenario (1–15 August 2003). The graduated colour bar represents the probability of exceeding the mortality threshold (ranging from 0%, pale colours, to 100%, deep colours).
Evaluation of model

- The model was successfully able to anticipate the occurrence or non-occurrence of mortality rates exceeding the emergency threshold in most regions, particularly for the heat wave scenario.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Emergency Threshold Defined for Each Region</th>
<th>ROC Score</th>
<th>Probability Decision Threshold</th>
<th>Hit Rate</th>
<th>False Alarm Rate</th>
<th>Proportion Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat wave 1–15 August 2003</td>
<td>75th percentile of mortality distribution</td>
<td>97%</td>
<td>70%</td>
<td>85%</td>
<td>5%</td>
<td>89%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30%</td>
<td>100%</td>
<td>55%</td>
<td>80%</td>
</tr>
<tr>
<td>Cold spell 1–15 January 2003</td>
<td>75th percentile of mortality distribution</td>
<td>78%</td>
<td>70%</td>
<td>66%</td>
<td>20%</td>
<td>69%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30%</td>
<td>93%</td>
<td>40%</td>
<td>87%</td>
</tr>
</tbody>
</table>
Future development

• Ideally, observed temperature data would be replaced with an ensemble of climate forecasts from state-of-the-art European forecasting systems (EUPORIAS and SPECS projects), to make mortality predictions several months ahead of imminent heat waves and cold spells.

• Through an iterative evaluation process with public health decision-makers, we hope to develop this work into a prototype climate service for public health, in line with the needs and understanding of future users.

• Need for downscaling to support local decision-making.
Links and references

Heat–Health Action Plans – Guidance
www.euro.who.int/heat-health-action-plans-guidance

Public health advice on preventing health effects of heat – information sheets
www.euro.who.int/public-health-advice-on-heat

EuroHEAT heat-wave probability tool
http://www.euroheat-project.org/dwd/

http://www.mdpi.com/1660-4601/12/2/1279

Thank you!
creswickj@who.int