Background

- Codex Alimentarius Commission (CCFH)
  - International intergovernmental food standards-setting body
  - Under auspicion of FAO and WHO food standards programme
  - Standards benchmark for food safety under WTO SPS agreement
  - Standards based on science (advise FAO/WHO)
  - Member countries make up Codex decide its agenda

- Current work on parasites
  - **Guidelines for control of specific zoonotic parasites in meat: Trichinella and Cysticercus bovis**
  - Provide control measures proportional to the risk
  - Work complementary to OIE
  - At 42nd meeting of CCHF 2010: Public Health and trade importance of foodborne parasites; developing a general guideline for foodborne parasites
Background

- 2010 CCFH request to FAO/WHO

  - Review the current status of knowledge on parasites in food and their public health and trade impact in order to provide CCFH with advice and guidance on parasite commodity combinations of particular concern, issues need to addressed by risk managers and options available to them.

Expectations

- Ranked list of foodborne parasites and commodities/food combinations associated with them that could be addressed

- Possible risk management options

- Feasibility of having general guidelines for foods or food groups

- Recommendations of the midterm report used during 44th CCHF, dec 2012 and further recommendations after final report
FAO/WHO organised the activities

Objectives

- To develop a ranked list of foodborne parasites of global importance
- To identify the foods of greatest concern for the most important foodborne parasites
- To provide an overview of the risk management options and approaches available for the control of the most highly ranked foodborne parasites

Data input before the workshop

- Call for data 2011 to select foodborne parasites & workshop input
  - Impact on public health
  - Socioeconomic impact
  - Monitoring and inspection systems
  - Control and management
  - Risk assessments: risk profiles
  - Risk ranking

Outcome: 22 countries responded: 95 parasites listed: Trichinella, Cryptosporidium, Echinococcus, Giardia, Toxoplasma, Taenia most important

- Call for experts. Regional reports: data input for workshop
- Online questionnaire importance of criteria
**Experts**

- **Pascal Boireau**, France
- **Jorge E. Bolpe**, Argentina
- **Allal Dakkak**, Morocco
- **Brent Dixon**, Canada
- **Ronald Fayer**, USA
- **Jorge E. Gómez Marín**, Colombia
- **Erastus Kang'ethe**, Kenya
- **Malcolm Kennedy**, UK
- **Samson Mukaratirwa**, S.Africa
- **K. Darwin Murrell**, DK
- **Tomoyoshi Nozaki**, Japan
- **Ynes Ortega**, USA
- **Subhash C. Parija**, India
- **Lucy Robertson**, Norway
- **Mohammad Bagher Rokni**, Iran
- **Patrizia Rossi**, Italy
- **Said Shalaby**, Iran
- **Paiboon Sithithaworn**, Thailand
- **Rebecca Traub**, Australia
- **Nguyen van De**, Vietnam
- **Joke van der Giessen**, NL

**RESOURCE PERSONS**

- **Michael Batz**, USA.
- **Annamaria Bruno, Verna Carolissen**, Joint FAO/WHO Food Standards Programme,
- **Steve Hathaway**, New Zealand.
- **Iddya Karunasagar**, FAO
- **Gillian Mylrea**, OIE, France.
- **Patrick Otto**, FAO
- **Edoardo Pozio**, EURL-P, Rome
- **Andrijana Rajic**, FAO
Approach to ranking of foodborne parasites

1. Identification of parasites for ranking
2. Identification of key foods of concern for each parasite
3. Identification and definition of criteria by which each parasite will be evaluated
4. Expert scoring of each parasite along criteria
5. Weight importance of each criteria in overall parasite scoring
6. Calculation of parasite scores and subsequent ranking

Ad 1 Selection of parasites

- List of 95 parasites
- Define in and exclusion criteria:
  - Grouping of parasites
  - Common transmission routes
  - Clinical manifestations
  - Attributable foodborne sources

- Exclusion:
  - Negligible foodborne illness
  - No global concern only of regional importance

**List reduced to 24 parasites to be ranked**
### Ad 2 Key foods identified

**TABLE 1. FOOD CATEGORY SCHEME**

<table>
<thead>
<tr>
<th>Food category</th>
<th>Food subcategory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land animals</td>
<td>Beef, Pork, Poultry, Small ruminants, Other meat, Game/wild animals</td>
</tr>
<tr>
<td>Aquatic animals</td>
<td>Marine fish, Freshwater fish, Shellfish, Aquatic mammals</td>
</tr>
<tr>
<td>Dairy products</td>
<td>Dairy products</td>
</tr>
<tr>
<td>Plants</td>
<td>Berries, Fruit juices, Other fruit, Leafy greens, Other vegetables, Fresh produce (refers to 2 or more of the above)</td>
</tr>
<tr>
<td>Other</td>
<td>Other foods</td>
</tr>
</tbody>
</table>

### Ad 3 Defining criteria (9)

1. Number of global foodborne illnesses (manifesting disease)
2. Global distribution (number of regions)
3. Acute morbidity severity (disability weight)
4. Chronic morbidity severity (disability weight)
5. Fraction of illness that is chronic (%)
6. Case-fatality ratio (%)
7. Likelihood of increased human burden (%)
8. How relevant is this parasite/food pathway for international trade?
9. What is the scope of impact to economically vulnerable communities?
In subgroups 4-5 experts scored each parasite for 9 criteria based on scientific literature available using scoring levels (bins) and clear decision rules how to do it.

**Table 3. Criteria Weights Used for Scoring**

<table>
<thead>
<tr>
<th>Criteria weight</th>
<th>Average weighting from experts</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1. Number of global foodborne illnesses</td>
<td>0.24</td>
</tr>
<tr>
<td>W2. Global distribution</td>
<td>0.15</td>
</tr>
<tr>
<td>W3-4-5. Morbidity severity</td>
<td>0.23</td>
</tr>
<tr>
<td>W6. Case-fatality ratio</td>
<td>0.16</td>
</tr>
<tr>
<td>W7. Increasing Illness potential</td>
<td>0.06</td>
</tr>
<tr>
<td>W8. Trade relevance</td>
<td>0.06</td>
</tr>
<tr>
<td>W9. Impacts to economically vulnerable communities</td>
<td>0.09</td>
</tr>
</tbody>
</table>

**2.6. Calculation of Parasite Scores**

The overall score for each parasite is given by the following equation:

\[
\text{Score} = C_1 \times W1 + C_2 \times W2 + (C_3 \times (1-C5) + C4 \times C5) \times W3 + C6 \times W6 + C7 \times W7 + C8 \times W8 + C9 \times W9
\]
Risk management options for the higher ranked parasites

- General management options
  - Lack of data of food attribution
    - Prolonged period before symptoms occur
    - Chronic progression of disease
  - General risk practices also relevant for parasites (biosecurity)
  - Primary production and pre harvest
    - Water related
    - Soil related
    - Fecal oral related
  - Post harvested (freezing, time/temp)
  - Education
Conclusions

- The ranking exercise gives a current picture of the foodborne parasites of global importance.
- Useful tool transparent and reproducible (with or without weighting), need regular updates!
- Parasites that are highly ranked:
  - *Taenia solium* top 1, 2-4 ranked less marked differences
  - Ranked 5, 6 and 7 are very close together so individual ranking seems less important than the overall picture that the ranking provides (clustering to significant difference)
  - Public health importance was the primary driver of ranking with almost equal importance being given to illness and severity.
- Several knowledge gaps identified and research needed

Output

- Final report (in progress)
- Session FAO, IAFP's European Symposium on Food Safety 15-17 May 2013 in Marseille
- Letter in TiP March 2013, Pages 101-103