RANEMA: A COMPUTER ASSISTED LEARNING TOOL FOR BASIC EPIDEMIOLOGY

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Montpellier, August 21st
Since 2004, CIRAD has worked in partnership with the Ecole Nationale Vétérinaire de Maisons-Alfort (ENVA) to develop a computer assisted learning (CAL) course in basic epidemiology for animal diseases (namely RANEMA).

This CAL tool refers to drill-and-practice, tutorial, or simulation activities designed to stimulate and motivate students from developing countries, and offered either alone or as supplements to traditional, teacher-directed instruction.
The current method is based largely on a veterinary epidemiology handbook (Toma B. et al. Applied Veterinary Epidemiology and the Control of Disease in Population. Maisons-Alfort, AEEMA. 1999)
The CAL sessions were programmed in E-learning Maker 2.5.0 (produced by E-doceo), a development application for creating interactive software. The interface was originally designed in consultation with a graphic designer and epidemiologist.
Pedagogic Rules

❖ If you want acquisition of knowledge, the contents of the training tool must be in adequacy with the needs and the personal background of the trainees (objective, volume, level, work activities...).

❖ If you want the trainees to take the tool in its full meaning, it must captivate him, exploit his affects, be held as a movie of which he is the hero.

❖ The trainee has to establish interaction between problems asked and his own knowledge, and then exploit acquired competences. It is why each activities should answer specific training objectives.
The contents of RANEMA are structured around this scenario: the trainee is a veterinarian working for the Veterinary Service of a virtual country named RANEMA.

To carry out his professional duties, he must refresh his knowledge in epidemiology through a given set of activities.

The course is divided into chapters that follow the logical framework of the book (Scheme 1).
Lesson 0: Presentation of Ranema
Lesson 1: Reminder on definitions

Chapter 1
Lesson 1: The different type of epidemiology
Lesson 2: How to measure disease frequency
Lesson 3: Incidence/Prevalence

Chapter 2
Lesson 1: Sensitivity and Specificity
Lesson 2: Prediction of results

Chapter 3
Lesson 0: Basic statistics
Lesson 1: Sampling
Lesson 2: Sample size with a quantitative objective
Lesson 3: Sample size with a qualitative objective
Lesson 4: Interpreting results (Chi2 test)

Chapter 4
Lesson 1: Causality
Lesson 2: Factor of causality

Chapter 5
Lesson 1: Standardisation of data
Lesson 2: Sampling (advanced course)
Lesson 3: Interpreting results (t test)
Several activities based on real life situations are proposed to the trainees:

- drag and drop exercises (in which the student drags the correct answer into the correct box or into a gap in the test)

- calculations that must be performed with the answer entered at the appropriate place;
1.1 - The different types of epidemiology

Connections between the types of epidemiology...

Place the various labels into their correct positions by sliding them into the diagram.
1.3 - Incidence / Prevalence

Activity - 5 Concept of incidence - exercise

The concept of incidence...

Reminder of data
Your technician returns from a survey carried out on a farm of 10 cattle, Mr Chang’s farm. He was collecting daily data about FMD during the month of January. They appear on the graph below.

The bars represent the period during which clinical signs were present in each individual.

4. How many animals fell ill during the month of January 2003?
Use only figures.

Activity 5  Score 4 %  Length 00:47  Training path
**HPAI in the district of Ranematown**

The population concerned consists of 750 villages, the course of the disease was summarised in the table on the previous page.

*30 outbreaks reported on January 1st,*
*14 on December 31st,*
*70 villages were infected during the year.*

**Combine the measures of frequency with the calculated results.**

*Slide the figures in front of the corresponding measure of frequency.*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. prevalence on January 1st</td>
<td>9%</td>
</tr>
<tr>
<td>2. prevalence on December 31st</td>
<td>100</td>
</tr>
<tr>
<td>3. annual incidence</td>
<td>70</td>
</tr>
<tr>
<td>4. annual prevalence</td>
<td>2%</td>
</tr>
<tr>
<td>prevalence rate on January 1st</td>
<td>4%</td>
</tr>
<tr>
<td>prevalence rate on December 31st</td>
<td>14</td>
</tr>
<tr>
<td>annual incidence rate</td>
<td>30</td>
</tr>
<tr>
<td>annual prevalence rate</td>
<td>13%</td>
</tr>
</tbody>
</table>
Relation between prevalence and incidence ...

Fill in the ...?... by selecting the correct expression from the list on the right.

Like point prevalence, period prevalence provides ...?... It shows what the ...?... is, but not how it is evolving. It makes no distinction between new cases and old cases. It is equivalent to taking stock of the disease situation at a point in time or over a time period.

Incidence provides ...?... about the disease. It makes it possible to assess the disease's level or ...?..., the incidence measures the ...?... with which the disease is developing.

The period prevalence is greater than or equal to the incidence for the same period.

The values for the prevalence and the incidence for a disease will ...?... more and more the ...?... the duration of the disease.
Advantages

- RANEMA can be used as a CAL tool to reduce traditional lecture time and leave time to focus on tutorials concerning problem areas and more in-depth discussions of specific topics or as a distance-learning training support in basic epidemiology.
In 2005 and 2006, during several training workshops in AI epidemiosurveillance organised by the FAO for Southeast, East and South Asia, Africa, East Europe and Middle East, RANEMA was used as a supplement to increase the impact of the training.

This was a new interactive and recreational way to acquire bases in epidemiology.
RANEMA: Tools for trainers

- RANEMA is a stand-alone tool, the use of the complete set of training material (CD + book + complementary exercises + pedagogic guidelines) has been maximised by the organisation of a specific training of trainers.
- Such training was organised by the OIE Regional Representative for Asia and the Pacific in July 2006 for eight countries of Southeast Asia.

- Participants with sufficient knowledge in epidemiology were identified and targeted to be trainers in their country after having received a specific training of 5 days on how to use this pedagogic teaching-case and how to conduct a clearly determined training sequence.
Such training was organised by the OIE Regional Representative for Asia and the Pacific in July 2006 for eight countries of Southeast Asia.

Between 2006 and 2007, a specific training was organised in each country (excepted Brunei).

During these training a new module, funded by the FAO, was developed and tested RANEMA-FLU.
The content of this training module covers all the aspects necessary to understand in order to prepare a surveillance program for HPAI.
Contents of RANEMA-Flu

- **Chapter 1. Epidemiology of avian influenza**
  - Lesson 1. Review of Virology
  - Lesson 2. Ecology and Epidemiology of AI virus
  - Lesson 3. Public Health aspects of AI virus
  - Lesson 4. Prevention and Control of the virus

- **Chapter 2. Surveillance of the HPAI**
  - Lesson 1. Case-definition adapted to the HPAI H5N1
  - Lesson 2. Surveillance methods for the domestic poultry
  - Lesson 3. Sample size calculation using software
  - Lesson 4. Sample collection and transport

- **Chapter 3. Wild birds and Avian Influenza**
  - Lesson 1 HPAI and wild birds
  - Lesson 2. Birds migration
  - Lesson 3 Wild birds study
  - Lesson 4. Birds species recognition

- **Chapter 4. Introduction to Risk Analysis**
  - Lesson 1. General principal of risk analysis
  - Lesson 2. Application to HPAI

- **Chapter 5. Related subjects**
New modules and planned activities

- New modules more specifics are under development (Ranema-Stat: Basic statistic and the use of free statistical software, Sim-Epi: simulation of surveillance network) and new linguistic version (Spanish, Thaï).

- Evaluation of the efficacy and impact of these type of training should be undertaken by means of surveys in involved countries and/or by a regional meeting.
Acknowledge

- J. Thonnat
- J. Queste
- B. Dufour
- B. Tomas
- F. Roger
- S. Desvaux
- F. Biteau
- E. Etter
- C. Trevennec
- M.M. Olive
- S. Molia
- M. Peyre
- R. Metral
- J. Cappelle