Data collection systems and ad-hoc data collections

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What do we know about influenza?

- It is a disease (and a virus) with a worldwide impact.
- It has a wide range of impacts on individuals (risk-factors, clinical presentations).
- It can change every year and may be responsible for pandemics.
- Its surveillance is a worldwide approach based on the collection of both epi and viro data.
- Different approaches have been used.
- The most consistent data is provided by networks that can provide good clinical and virological data (be aware of confounding pathogens and misinterpretation of the results).
Influenza: a viral respiratory disease to be reported in in- and out-patients
Types and sub-types of human influenza viruses

- **Type B**
  - H1N1

- **Type A**

- **Type C**
  - H3N2
Usual trends of influenza activity

- Influenza is responsible for epidemics
- Influenza can be circulating all year round
- Influenza is unpredictable
- One must keep in mind that a pandemic virus will emerge in the future
Clinical surveillance
How to detect flu in a patient

Clinical syndrome: ARI – ILI
Clinical form?
Virological testing
Report of clinical surveillance: ARI vs ILI
Example: collection of ARI data in France (2001-04)

Weekly report of ARI by GP and pediatricians of the GROG influenza network
Influenza: estimating impact through disease (P&I) surveillance in the US

122 cities weekly P&I mortality data

- Observed P&I ratio
- Predicted Baseline

2009 Pandemic
Different seasonal patterns of influenza circulation

Tamerius et al.; *Environ Health Perspect*, 2011
Clinical surveillance of Influenza

• Can be based on community and hospital surveillances

• Can be done through ARI or ILI surveillance

• Should be carried out all year round in tropical areas

• Clinical activity should be reported on a weekly basis

• Age-groups surveillance should be implemented

• Additional items can be reported depending if detailed clinical data is collected
Virological surveillance
Virological surveillance of influenza: an added value to clinical surveillance
Influenza, a short lasting disease

Sample Day 6 negative
Influenza, a less short lasting disease in children
Report of influenza detection by labs: i.e. in France (combined hospital and community detection)
Virus type/subtype dominance
sentinel vs. non sentinel
The need for virological data to avoid confounding factors

- Other pathogens (if not detected)
  - RSV
  - Rhinoviruses
  - Others…

- Diagnostic methods
  - Rapid tests
  - Molecular testing

- Surveillance system
  - Impact of age groups
  - Hospital-based or community-based surveillance
Clinical specimens and virological data
RSV circulation in different latitudes
Virus type/subtype dominance
sentinel vs. non sentinel

Virus distribution (Norway (Non-Sentinel) 2008) 50%

Virus distribution (Norway (Sentinel) 2008) 50%

Virus distribution (Norway (Non-Sentinel) 2011) 60%

Virus distribution (Norway (Sentinel) 2011) 60%
Integration of Clinical and Virological Surveillances
Number of ARI observed by age groups
Incidence of ARI by age groups and by week

Consultations pour IRA (/ 100 000) par groupe d'âge

Week

Taux

0 to 4  5 to 14  15 to 64  >65
Estimation of GP consultations for influenza in France

Between week 2 and 10: 1,702,393

IC95% = [1,095,041 – 2,313,393]
Distribution of confirmed cases per age groups

Estimation du nombre de consultations pour grippe confirmée par classes d’âge et par semaine

Semaine

Nombre de grippe
0-4 ans
Nombre de grippe
5-14 ans
Nombre de grippe
15-64 ans
Nombre de grippe
>=65 ans
Incidence of GP consultation for virologically confirmed influenza by age groups

GP consultation for confirmed influenza by age groups

Weeks

Taux

0 to 4
5 to 14
15 to 64
>65
Overall

- Influenza is all over the world, with different epidemic patterns according to latitudes
- Influenza surveillance can be carried out by different approaches
- Integrated clinical and virological surveillance is providing the most accurate picture
- Should combined hospital- and community-based surveillances
- Confounding factors must be kept in mind to avoid misinterpretation of the data collected by the system
- This surveillance may provide a wide range of data, but should be structured together with influenza labs
- Installed surveillance for seasonal influenza is a pre-requisite for efficient surveillance in a pandemic