

Outbreak of influenza A (H1N1) in a semi-closed military facility, Spain May 2009

Elga Mayo Montero; Elena Ballester Orcal; Antonio J. Piñeyroa Sierra;
Fernando Morilla García; Juan de Mata Donado Campos



Introduction

•April 24th: first human declared cases of virus influenza A 2009 H1N1 (USA and Mexico)

•April 27th: first influenza A 2009 H1N1 imported case (Spain)

•April 29th: phase 5 pandemic influenza

The alert



•May 19th: 21 reported cases of Influenza Like Illness corresponding to recruits belonging to a military training facility. Neither travel to a risk area nor previous contact with confirmed cases.

•May 21th : influenza A 2009 H1N1 virus lab-confirmed.

Military training facility in Madrid receive recruits grouped in companies or Instruction Cycles (IC)

Objetives

- **To describe the outbreak**
- **To estimate the parameters of the transmission for this new infection.**

Methods:

Case definition

- A. **Suspected case** : Influenza like Illness (ILI) (16 May-1 June)
(Fever + Upper respiratory symptoms)
- B. **Probable case** : ILI AND
contact with case of IC affected
- C. **Confirmed case** : Probable case AND
PCR-RT confirmed Influenza A(H1N1)v

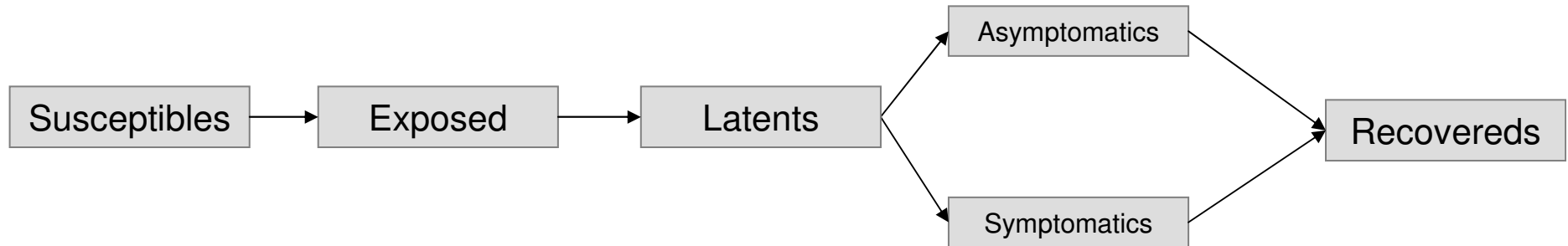
Methods:

Data collection:

- Epidemiological and clinical questionnaire
- Sample sera and nasopharyngeal swabs
- National Reference Laboratory

Methods:

Dynamic Model SEIR



Simulation Method 1: Adjusting to outbreak epidemic peak curve (EP)

Simulation Method 2: Adjusting with Least squares (LS)

Assumed parameters

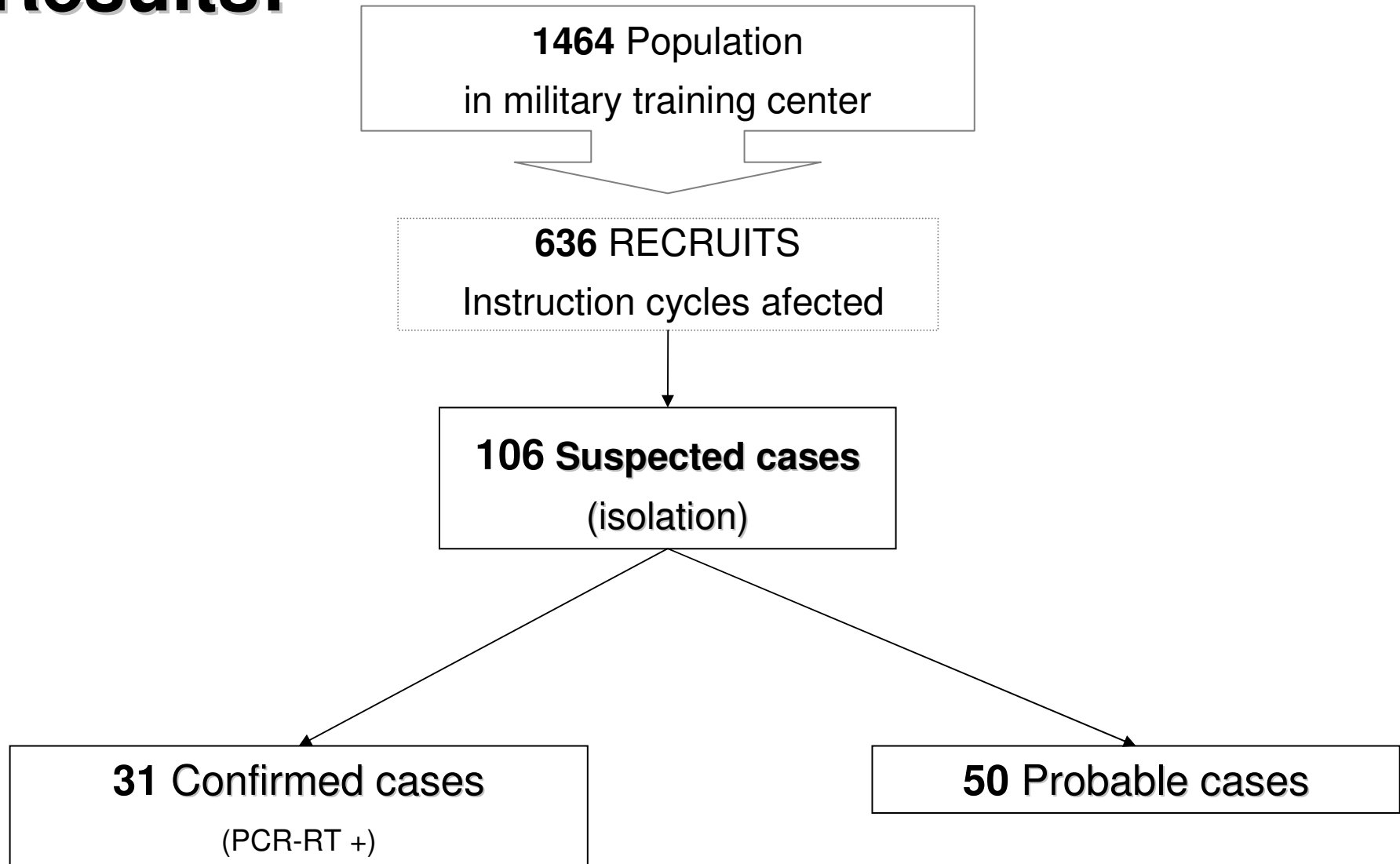
- Incubation period : 2 days
- Infective period (IP): 6 days.
- Asymptomatic cases: 50 %.
- Suscetibles: 100%

Estimated parameters

- Number of Effective contacts per day(EC)
- Probabilty of effective contact
- **Basic Reproduction Number (Ro) =**

$$EC \times AR \times IP$$

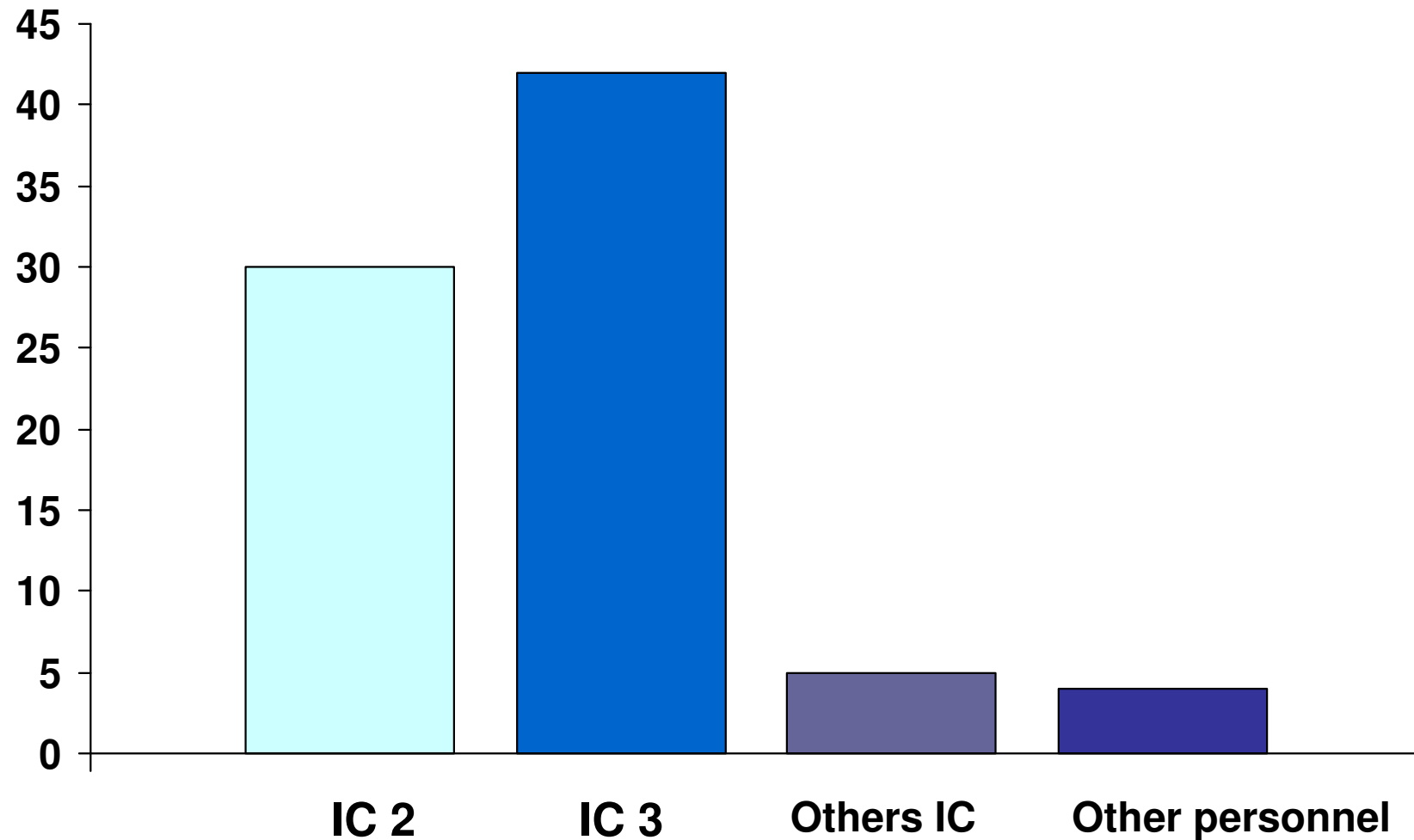
Results:



Results:

- Total cases studied = 81
- Mean age: 22.7 years (18-31)
- Sex distribution (Men %): 84

Number of cases



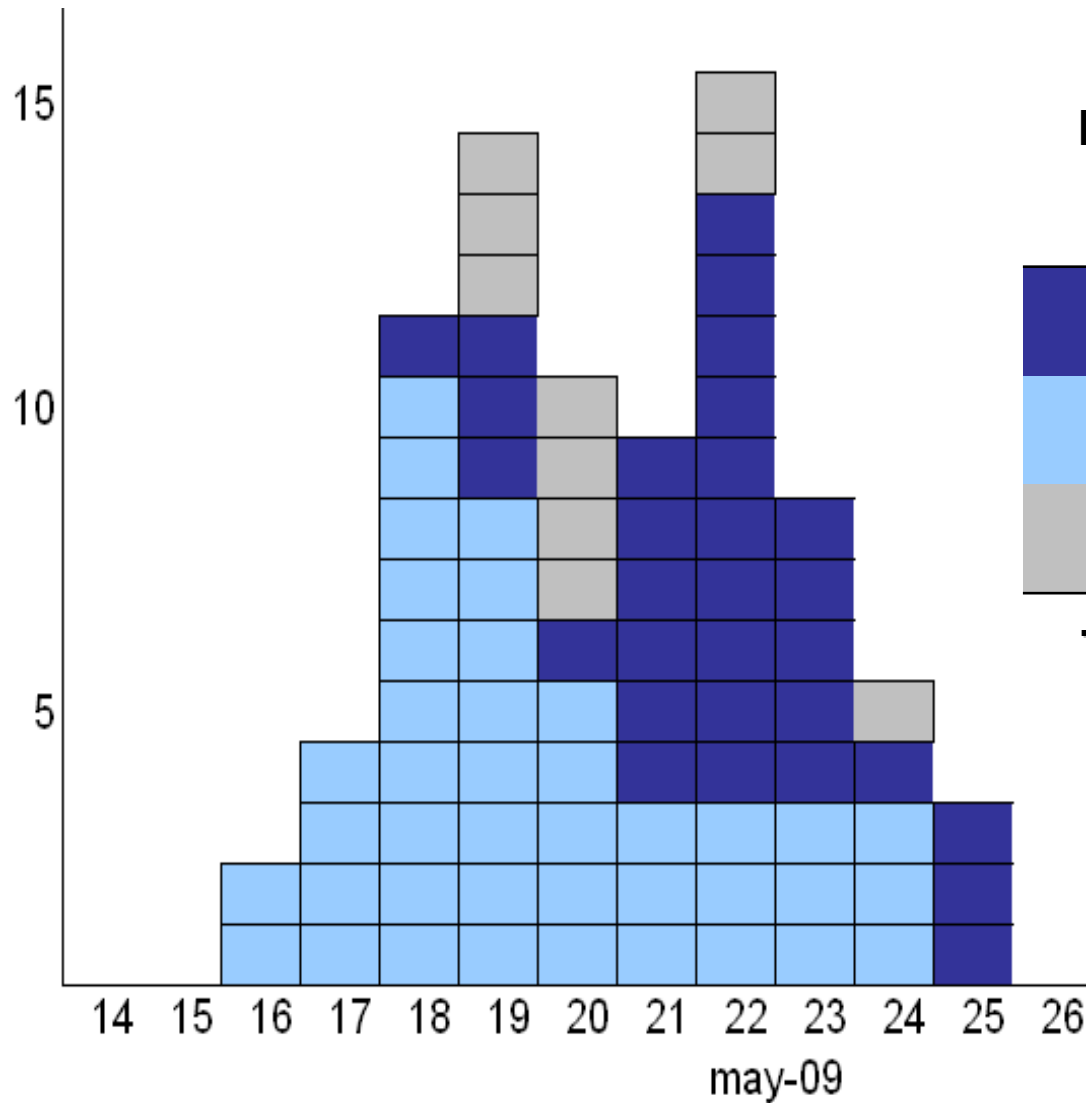
Results: Clinical Characteristics of cases

SYMPTOMS (%)	Total Cases N=81
<u>Fever >38°C</u>	74.7
<u>Cough</u>	88
Throat pain	52.5
Myalgias	58
Joint pain	41.1
<u>Rhinorrea</u>	76.5
Sneeze	45.8
<u>Malaise</u>	85

Mean illness duration: 2d (range 1-7d)

Results:

Number of cases by date of onset and Observed Attack Rate



Instruction Cycles	Attack Rate %(N)
IC 2	19.3 % (156)
IC 3	15.8 % (265)
Other IC	0.04 % (215)
TOTAL AR	12.4 % (636)

Results:

Dynamic Simulation Models for estimated parameters of transmission

	Instruction Cycle 3		Instruction Cycle 2		Total Outbreak	
	Simul. Method 1 (EP)	Simul. Method 2 (LS)	Simul. Method 1 (EP)	Simul. Method 2 (LS)	Simul. Method 1 (EP)	Simul. Method 2 (LS)
Number of effective Contacts per day	4		8		3	
Probability of effective contact	40%	60%	50%	60%	40%	60%
Transmission Period (d)	1.6	2.3	4	4.6	1.2	1.8
Basic Reproduction Number (R0)	9.7	13.4	24	27.8	6.8	10.6

Limitations

- We could not study asymptomatic cases in the facility.
- The parameters assumed for the SEIR model involve uncertainties.
- The SEIR model involves a number of simplifying assumptions, including a single index case, homogeneous mixing, exponentially distributed residence times in infectious status categories, and isolation of the military facility.

Conclusions:

- First confirmed community outbreak of pandemic influenza in Spain with unknown source of transmission.
- Early detection and timely implementation of control measures might have limited transmission out of the IC affected.
- We found no clinical differences with similar outbreaks but different transmission parameters vary from those observed in open communities.
- The special characteristics of this semi-closed population could explain the rapid and extensive spread of virus found in the affected groups.

Recommendations

The rapid investigation of this kind of local outbreaks is important to identify transmission parameters and may help to control the risk of spread of new infections such as pandemic influenza.

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•Coordination Centre of Sanitarian Alerts and Emergencies National Health Ministry, Madrid, SPAIN