

Grippenet: A New Tool for the Monitoring, Risk-Factor and Vaccination Coverage Analysis of Influenza-Like Illness in Switzerland

Aude Richard ¹, Laura Müller ¹, Ania Wisniak ¹, Amaury Thiabaud ¹, Thibaut Merle ¹, Damien Dietrich ^{1,2}, Daniela Paolotti ³, Emilien Jeannot ^{1,4} and Antoine Flahault ¹

¹ Institute of Global Health, Faculty of Medicine, University of Geneva, 1202 Geneva, Switzerland;

² Luxembourg Institute of Health, Strassen 1445, Luxembourg

³ Institute for Scientific Interchange Foundation, 10126 Torino, Italy;

⁴ Addiction Medicine, Department of Psychiatry, Lausanne University Hospital and University of Lausanne, 1004 Lausanne, Switzerland

* Correspondence: aude.richard@unige.ch

Background

Key points on Influenza

- Affects an estimated one billion people every year around the world
- Every year in Switzerland, influenza is responsible for several thousands of hospitalizations and hundreds of deaths
- National influenza surveillance by Sentinella, a national Sentinel network of 150 to 250 physicians

Grippenet.ch

- Participatory online platform for influenza surveillance
- Part of Influenzanet, a 10-country european consortium
- Implemented in Switzerland in 2016



Objective to evaluate Grippenet's performance between 2016 and 2019 in monitoring influenza-like illnesses (ILI) in Switzerland, identify risk factors associated with contracting an ILI and investigate medical-care seeking behaviors

Methods

Participant Recruitment

- Through local and national media, communication campaigns
- Inclusion criteria: residency within Swiss territory
- Registration of family members possible (e.g. children, elderly)
- Registration at any time of the year

Data collection

- Intake questionnaire: socio-demographic characteristics, medical history, lifestyle
- Weekly questionnaire: reporting of new symptoms and associated behaviors
- All questionnaires are harmonized within member countries of Influenzanet for comparability

Definitions

Influenza-like illness

1. Sudden onset of symptoms;
 2. AND (fever or fatigue or muscular/articular pain);
 3. AND (coughing or sore throat or shortness of breath)
- Active User**: at least one weekly questionnaire completed within the previous 14 days OR any user who reported an ILI

Results

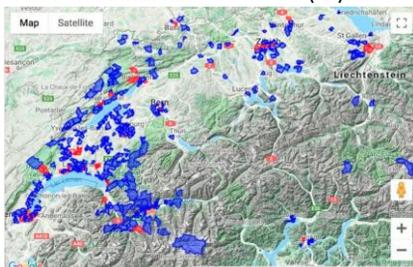
Population description

1247 participants (total users) included between 7 November 2016 and 28 April 2019.

Not representative of the Swiss population:

- More individuals aged 30 to 64
- More women
- Higher level of education
- Larger households
- Lower prevalence of chronic illness
- More respiratory allergies
- Lower prevalence of smoking
- Higher vaccination rate

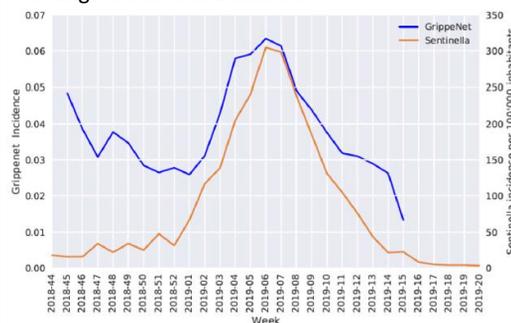
Geographic distribution: Blue: areas with at least one active user; Red: areas with at least one influenza-like illness (ILI) case.



Participants were mostly located in the French-speaking part of Switzerland

ILI incidence comparison for season 2018-19

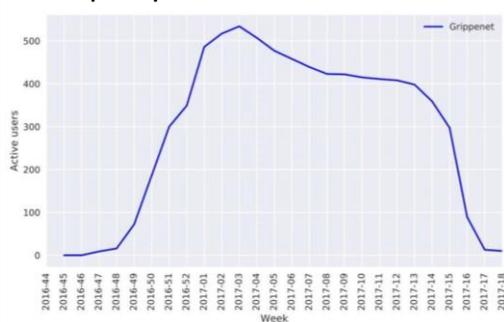
Blue: Grippenet incidence
Orange: Sentinella incidence



ILI risk factors

- Ages 0–4 compared with 5–14 (AOR 0.6, 95% CI 0.19–0.99), 15–29 (AOR 0.29, 95% CI 0.15–0.60), and 65+ (AOR 0.38, 95% CI 0.16–0.93)
- Female sex (male AOR 0.81, 95% CI 0.7–0.95)
- Respiratory allergies (AOR 1.58, 95% CI 1.38–1.96)
- Not being vaccinated (AOR 2.4, 95% CI 1.9–3.04)
- Self-employment (AOR 1.97, 95% CI 1.33–3.03).

User participation rate



Increase in participation rate at the beginning of influenza season, which declines after ILI peak.

Vaccination rates within risk categories (2018–2019 season)

Age > 65	66.2% (47/71)
Contact Risk	44.5% (81/182)
Chronic Disease	53.8% (35/65)
Pregnancy	50% (1/2)
All users	47.8% (165/345)
All at risk users	51.3% (164/320)

Medical care-seeking behavior

Percentage of users reporting one or more ILIs who did not consult a medical doctor

2016–2017	42.5% (183/431)
2017–2018	37.6% (261/695)
2018–2019	36.2% (176/486)
Mean over 3 seasons	38.50%

Conclusion: A participatory monitoring system such as Grippenet can help **monitor ILI cases in a fast and flexible way**, identify **ILI risk factors** and gaps in the **influenza vaccination coverage**, and analyze **medical care-seeking behaviors**. It has the potential to enhance traditional surveillance systems by collecting information in real time from a different population profile, including people who do not seek medical help.