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# Consultation pour état grippal et activité dans le système de soins : une étude réalisée dans le réseau Sentinella

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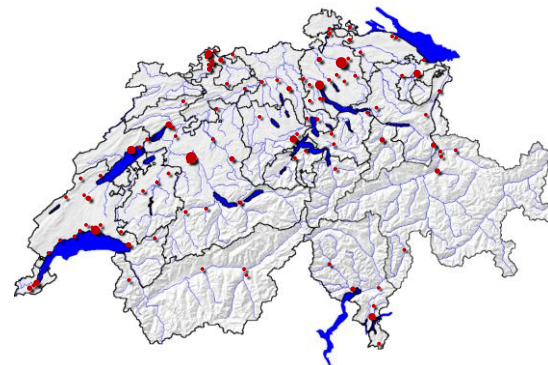
Symposium Prévention contre la grippe, Berne, 17.09.2019

# Research question

- Are healthcare workers at increased risk of influenza compared to the general population?
- Aim:
  - to estimate the association between being professionally active in the healthcare-system and consulting for an influenza-like illness (ILI) in primary care practices of the Sentinella network

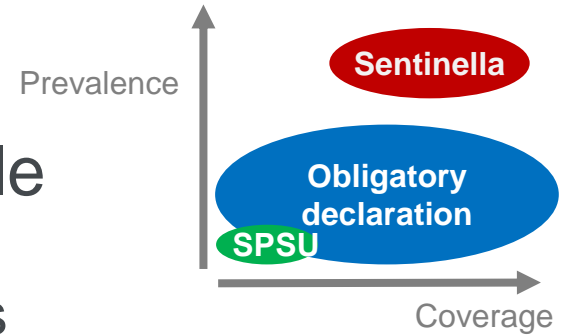
# What is Sentinella?

- Surveillance system for transmissible diseases
- Founded in 1986
- Based on the Law on Epidemics
- Sentinel principle
- ~165 declaring practices
  - General internal medicine and paediatrics
  - All Swiss regions
  - Voluntary

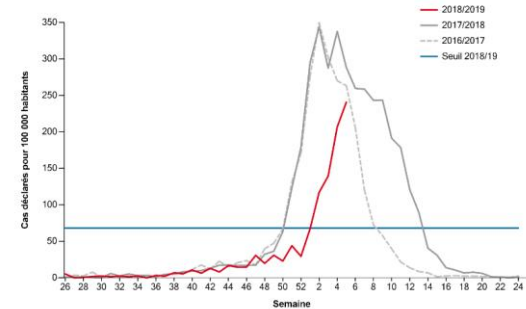


# Sentinella: interest

- Surveillance of frequent transmissible diseases
  - Influenza, Borreliosis, Mumps, Pertussis
  - ILI case definition: history of fever AND (sore throat OR cough)
- Data for planification, implementation and evaluation of public health measures
- Research on healthcare provision in the context of family medicine



Annual surveillance of influenza-like illness



# Methods: case-control study

- **Cases:** influenza-like-illness, resp. confirmed influenza, declared within Sentinella in 2018-2019
- **Controls:** all physician-patient contacts during week 11-12, 2019 (minus those counted among the cases)
  - Routinely: age and sex
- Exposure of interest:  $\geq 15$  years old: are you **professionally active<sup>°</sup> in the healthcare system\***? If yes:
  - Which profession<sup>§</sup>?
  - Which context?
- **Outcome:** association (odd ratio) between professional activity in the healthcare system and consulting for ILI, respectively confirmed influenza

## **Definitions:**

<sup>°</sup> Professionally active: definition of the International Labor Office

\* Healthcare system: part of the health system in direct contact with patients

§ International classification of profession type, also used by OFS

**CONTACTS MÉDECIN-PATIENT** du \_\_\_\_\_ au \_\_\_\_\_

Jour de la semaine: SA DI LU MA ME JE VE

Nombre de contacts médecin-patient: \_\_\_\_\_

(0 = aucun contact)

	OREILLONS		COQUELUCHE		VISITES À DOMICILE			HERPES ZOSTER		NEURALGIE POST-ZOSTÉRIENNE
	1	2	1	2	1	2	3	1	2	
Numéro de patient										
Né: jour										
mois										
année										
Sexe (m=1, f=2)										
Complications: 1- hospitalisation=2, les deux=3										
Vacciné s1 dose (sau=1, non=2, inconnu=3)										
Analyse demandée au laboratoire Sentinella (oui=1, non=2)										

**PIQÛRES TIQUES ET DÉBUT TRAITEMENT BORRELIOSÉ**

Numéro de patient \_\_\_\_\_

Année de naissance \_\_\_\_\_

Sexe (m=1, f=2) \_\_\_\_\_

Piqûre de tiques=1, début traitement borreliose de Lyme=2, les deux=3

Exposition aux tiques (trousses prof.=1, loisirs=2, les deux=3)

Vacciné FSME au moment de la piqûre (oui=1, non=2, inconnu=3) \_\_\_\_\_

**PNEUMONIE - LÉGIONELLOSE**

Numéro de patient \_\_\_\_\_

Année de naissance \_\_\_\_\_

Sexe (m=1, f=2) \_\_\_\_\_

Maladie aiguë avec toux (oui=1, non=2, inconnu=3)

Nouveaux foyers pulmonaires (oui=1, non=2, inconnu=3)

Fièvre > 4 jours (oui=1, non=2, inconnu=3)

Cybernetochéype (oui=1, non=2, inconnu=3)

Traité à l'hôpital dans les 14 jours précédant le début de la manifestation (hospitalisé=1, ambulatoire=2, non=3, inconnu=4)

Patient est dans une maison de retraite (oui=1, non=2, inconnu=3)

avec vaccin antigrippal: \_\_\_\_\_

- 1=antiflu (Influvac, Mutagri®)
- 2=quadrivalent (Fluarix Tetra, Vivotriq Tetra)
- 3=adjuvanté (Fluarix)
- 4=autre
- 5=inconnu

Forêtis envoyé au CNRI (oui=1, non=2) \_\_\_\_\_

Facteur de risque (Fumer=1, Diabète=2, Immunosuppression=3, Insuffisance rénale=4, SIDA=5, Cancer=6, Alcoolisme=7)

Patient a été immédiatement hospitalisé (oui=1, non=2, inconnu=3) \_\_\_\_\_

Antibiotique=1, Autre=2, Inconnu=3

Test rapide de l'antigène urinaire commandé ou NRZ (oui=1, non=2) \_\_\_\_\_

État général selon l'évaluation du médecin lors de la première consultation de la pire imaginable à 10=excellent

**REMARQUES, PRÉCISIONS**

**PRESCRIPTION D'ANTIBIOTIQUES**

Numéro de patient \_\_\_\_\_

Année de naissance \_\_\_\_\_

Sexe (m=1, f=2) \_\_\_\_\_

Attitude du patient face à la prescription de l'antibiotique (excellent=1, neutre=2, désfavorable=3)

Classe d'antibiotique

- 1=Penicilline
- 2=Amoxicilline
- 3=Acétylsalicylate
- 4=Céfalosporine (anc.)
- 5=Céfalosporine (nou.)
- 6=Bêta-lactames
- 7=Triméthoprime/sulfaméthoxazole
- 8=Fluoroquinolone (anc.)
- 9=Fluoroquinolone (nou.)
- 10=Polymyxine
- 11=Nitrofurane
- 12=Triméthoprime
- 13=Actinomycide
- 14=Autres

Indication (indiquez qu'un code par prescription)

- 1=Influenza et streptocoque gr.
- 2=Otitis moyenne
- 3=Sinusite chronique ou infectieuse
- 4=Zébrilla
- 5=Bronchite aiguë
- 6=BPCO
- 7=Bronchopneumopathie chronique obstructive
- 8=Voyage
- 9=Voyage
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- 50=Voyage

# Data collection sheet

## SUSPICION D'INFLUENZA ET DÉCÈS DÛ À L'INFLUENZA

Professionnellement actif au sein du système de soins? (oui=1, non=2, inconnu=3)

Si oui, profession: \_\_\_\_\_

- 1=Médecin
- 2=Personnel infirmier et sage-femme
- 3=Aide-soignant.e
- 4=Assistent.e médical.e / dentaire / ambulancier
- 5=Physiothérapeute, ergothérapeute, psychologue, diététicien.e
- 6=Technicien.ne en radiologie médicale, technicien.ne de laboratoire, assistant.e pharmacien.ne
- 7=Pharmacien.ne, dentiste
- 8=Personnel administratif
- 9=autre
- 10=inconnu

Si oui, contexte de travail: \_\_\_\_\_

- 1=Cabinet médical / centre ambulatoire
- 2=Hôpital
- 3=Pharmacie
- 4=Soins à domicile (CMS, Spitex)
- 5=Établissement médico-social
- 6=Établissement de réadaptation / réhabilitation
- 7=Cabinet dentaire / de physiothérapeute / ergothérapeute / psychologue
- 8=Centre de radiologie / laboratoire
- 9=Administration
- 10=autre
- 11=inconnu

# Results

	Cases (ILI)		Controls	
<b>N observation</b>	N=4'287		N=28'561	
<b>Median age in years (IQR)</b>	33	12-52	52	26-71
<b>N female (%)</b>	2147	50.2%	15047	52.7%
<b>Active in health care sector*</b>				
- <b>Yes</b>	<b>235</b>	<b>5.5%</b>	<b>872</b>	<b>3.1%</b>
- <b>No</b>	3506	81.8%	24824	86.9%
- <b>Unknown</b>	546	12.7%	2865	10.0%

\* Missing activity and born before 1954 and after 2003 recoded as “not active”; otherwise recoded as unknown.

Crude OR	(95%CI)	AdjOR	(95%CI)	p-value
1.91	(1.65-2.21)	<b>1.66</b>	<b>(1.40-1.97)</b>	<0.001

\*adjusted for age (linear and quadratic), gender, and cluster effect by practice.  
Unknown excluded.

# At risk professions

	Cases (ILI) N=3'741		Controls N=25'696		Crude OR	AdjOR*	(95%CI )	p-value
Not active in health	3'506	93.7%	24'824	96.6%	1	1		
Profession if active in health								
- Nurse	61	1.6%	259	1.0%	1.67	1.28	(0.95-1.74)	0.108
- Nursing aid	54	1.4%	156	0.6%	<b>2.45</b>	<b>2.01</b>	<b>(1.42-2.85)</b>	<b>&lt;0.001</b>
- Medical assistants / paramedics	24	0.6%	66	0.3%	2.57	1.46	(0.88-2.44)	0.146
- Administrative staff	17	0.5%	65	0.3%	<b>1.85</b>	<b>1.84</b>	<b>(1.02-3.30)</b>	<b>0.042</b>
- Physician	14	0.4%	42	0.2%	<b>2.36</b>	<b>2.85</b>	<b>(1.47-5.53)</b>	<b>0.002</b>
- Occupational, physical therapy, dietitian	7	0.2%	52	0.2%	0.95	0.96	(0.41-2.24)	0.923
- Laboratory and radiology technicians, pharmacy assistants	8	0.2%	14	0.1%	<b>1.77</b>	<b>1.95</b>	<b>(1.40-2.72)</b>	<b>&lt;0.001</b>
- Pharmacist dentist	2	0.1%	14	0.1%				
- Other	31	0.8%	101	0.4%				
- Unknown	17	0.5	74	0.3%				

Model adjusted for age (linear and quadratic), sex, and cluster effect by practice. Unknown or missing activity excluded.



# At risk work contexts

	Cases (ILI) N=3'741		Controls N=25'696		Crude OR	AdjOR	(95%CI)	p-value
Not active in health	3'506	93.7%	24'824	96.6%	1	1		
Work context if active in health								
- Nursing home	76	2.0%	198	0.8%	<b>2.72</b>	<b>2.06</b>	<b>(1.53-2.78)</b>	<b>&lt;0.001</b>
- Hospital	51	1.4%	187	0.7%	<b>1.93</b>	<b>1.66</b>	<b>(1.18-2.32)</b>	<b>0.004</b>
- Private practice	31	0.8%	80	0.3%	<b>2.74</b>	<b>2.26</b>	<b>(1.43-3.58)</b>	<b>0.001</b>
- Home-based care	13	0.4%	56	0.2%	1.64	1.53	(0.79-2.94)	0.204
- Pharmacy	5	0.1%	18	0.1%	1.29	1.24	(0.92-1.67)	0.748
- Rehabilitation	1	0.0%	19	0.1%				
- Dentist, physio, ergo practices	5	0.1%	31	0.1%				
- Radiology, laboratory	2	0.1%	18	0.1%				
- Administration	7	0.2%	8	0.0%				
- Other	15	0.4%	90	0.4%				
- Unknown	29	0.8%	167	0.6%				

Model adjusted for age (linear and quadratic), sex, and cluster effect by practice. Unknown or missing activity excluded.

# What about PCR-confirmed influenza?

	Cases (N=346)		Controls (N=15'463)	
Median age in years (IQR)	35	15-55	54	25-72
N female (%)	173	50.0%	8174	52.9%
Active in health care sector*				
- Yes	23	6.7%	434	2.8%
- No	298	86.1%	13478	87.2%
- Unknown	25	7.2%	1551	10.0%



Crude OR	(95%CI)	AdjOR*	(95%CI)	p-value
2.40	(1.55-3.70)	<b>1.81</b>	<b>(1.13-2.90)</b>	<b>&lt;0.001</b>

Profession	AdjOR*	(95%CI)	p-value
Physician	<b>6.83</b>	<b>(1.78-26.12)</b>	<b>0.005</b>
Nurse	1.15	(0.41-3.23)	0.792
Nursing aid	<b>2.32</b>	<b>(1.02-5.29)</b>	<b>0.045</b>
Medical assistant / paramedic	1.40	(0.32-6.24)	0.656
Administrative staff	1.24	(0.16-9.55)	0.839
Occupational, physical therapy, dietician	NA		
Others/unknown	2.25	(0.93-5.46)	0.073

Work context	AdjOR*	(95%CI)	p-value
Private practice	<b>4.53</b>	<b>(1.65-12.41)</b>	<b>0.003</b>
Hospital	<b>2.56</b>	<b>(1.05-6.24)</b>	<b>0.038</b>
Nursing home	<b>2.44</b>	<b>(1.08-5.53)</b>	<b>0.032</b>
Home-based care	NA		
Others/unknown	0.89	(0.35-2.25)	0.804

Models adjusted for age (linear and quadratic), sex, and cluster effect by practice. Unknown or missing activity excluded.

# Limitations

- Consulting for ILI not the same as having ILI
- Healthy worker bias
  - Underrepresentation of health staff among controls
  - But probably even more among cases
  - -> underestimation of the true association
- Controls include both active in other sectors and not active
- Cases and controls not concurrent
- Missing data

# Strengths

- First study assessing risk of influenza in the healthcare sector in general
- The odds of consulting for an ILI are increased by 2/3 for individuals working in the health-care system, after adjustment for age and gender
- Odds are increased for
  - Doctors, nursing aids, and «other professions»
  - Staff in nursing homes, private practices, and hospitals
- Robust in sensitivity analyses (unknown=inactive, age 15-64y)
- Warrants further efforts in infection prevention and control, particularly in outpatient settings

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