

# **Estimating the burden of influenza-associated SARI and ILI, Ghana's experience**

**Michael Ntiri**

Noguchi Memorial Institute for Medical Research (NMIMR),  
University of Ghana

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# Background

- Influenza is an important contributor to acute respiratory infection (ARI) - a leading cause of morbidity, mortality and economic loss worldwide
- Substantial impact of seasonal and pandemic influenza on Africa due to the prevalence of other infections and comorbidities
- Enhanced influenza surveillance capacity sub-Saharan Africa from 2006 onwards
- Established NICs and regular reporting of circulating influenza strains to the WHO's Global Influenza Surveillance and Response System (GISRS)
- Despite these advancements, there are few data describing influenza disease burden in West African countries

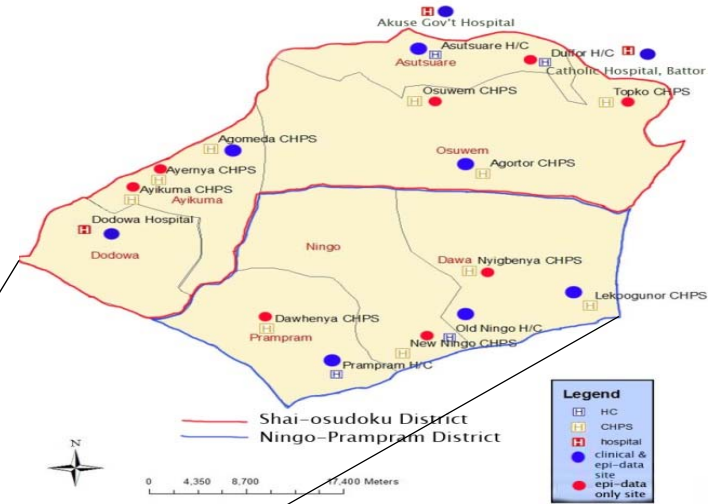


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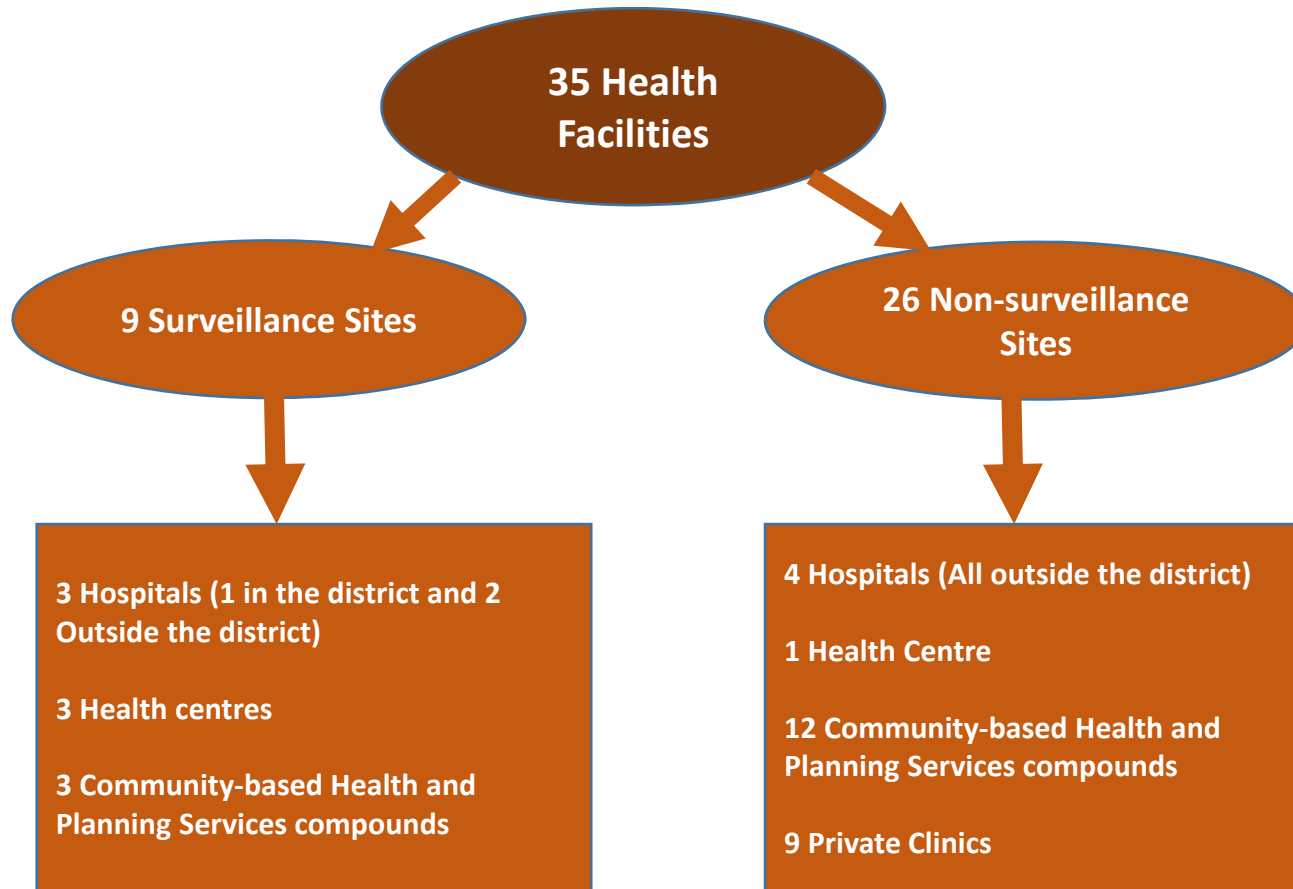
- In 2013, the NMIMR (University of Ghana), Ghana Health Service and the CDC (Atlanta) established a health facility–based surveillance for influenza and other respiratory viruses among residents of SONPD in the Greater Accra Region of Ghana
- The 2 districts are under a Health and Demographic Surveillance System (HDSS) established in 2005
- Estimation of the burden of medically attended influenza in a peri-urban area of Ghana through health facility-based prospective surveillance



# Study Area



# Study Design



# Case Definitions

## Influenza-like Illness (ILI)

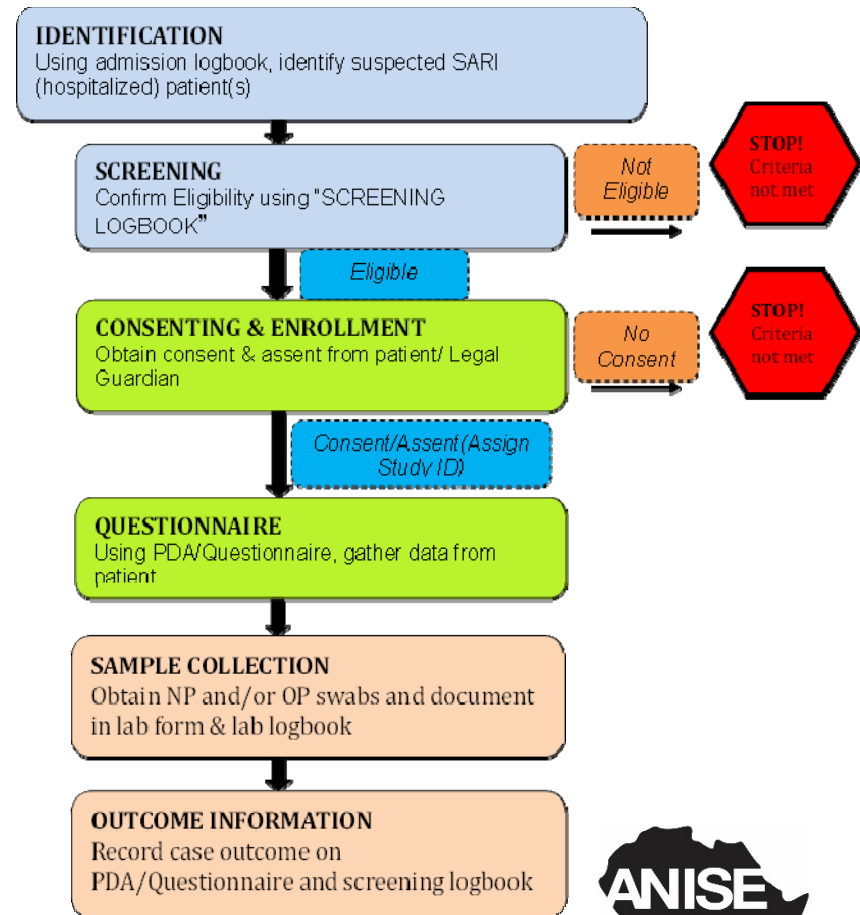
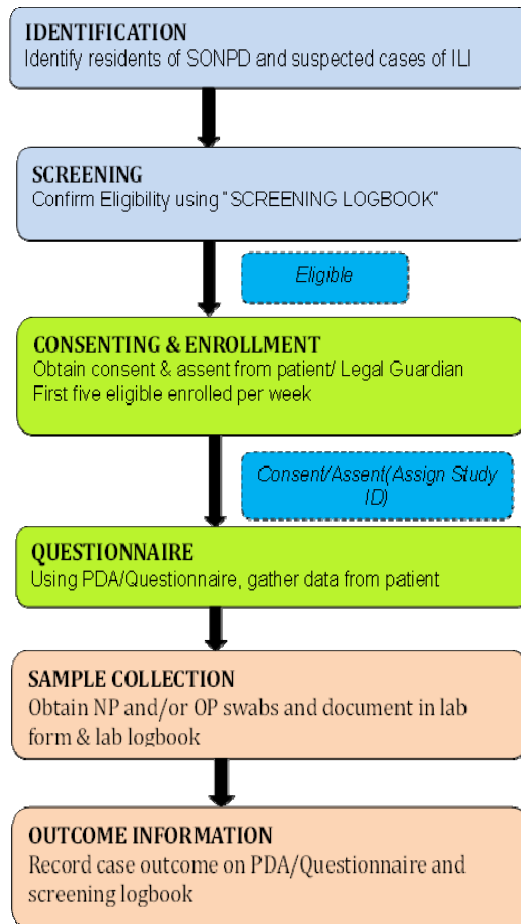
- An acute respiratory infection with:
  - history of fever or measured fever of  $\geq 37.5^{\circ}\text{C}$  (Axillary)
  - and cough
  - with onset within the last 10 days

## Severe Acute Respiratory infection (SARI)

- An acute respiratory infection with:
  - history of fever or measured fever of  $\geq 37.5^{\circ}\text{C}$  (Axillary)
  - and cough
  - with onset within the last 10 days
  - and **requires hospitalization**



# Enrolment for ILI/SARI Surveillance









# Virological Testing

- Viral ribonucleic acid (RNA) was extracted using the QIAamp<sup>®</sup> Viral RNA Mini Kit (Qiagen, Hilden, Germany) according to manufacturer's recommendations
- Influenza detection using standardized real-time reverse-transcription polymerase chain reaction (rRT-PCR) protocols from the CDC in Atlanta, Georgia, USA
- rRT-PCR assays performed with AgPath One-Step rRT-PCR kit on Applied Bios systems 7500 fast rRT-PCR instrument





## Data Collection from Non-surveillance Sites

- HUS from 2012 showed that SONPD residents frequented 26 other health facilities in addition to the 9 surveillance sites
- Retrospective assessment in 2015 to determine the number of SONPD residents who met ILI and SARI case definitions in all 26 health facilities during the study period to capture all medically attended ILI/SARI cases
- Consulting room registers, patient folders and admission records reviewed and data captured electronically



# ILI and SARI Cases in SONPD by Age Groups, May 2013 – April 2015

	ILI		SARI	
Age Group-years n (%)	Tested (N=2,322)	Not tested (N=9,544)	Tested (N=612)	Not tested (N=199)
0 to 4	1355 (58)	5161 (54)	386 (63)	74 (37)
5 to 14	433 (19)	2026 (21)	108 (18)	28 (14)
15 to 24	163 (7)	677 (7)	27 (4)	26 (13)
25 to 44	231 (10)	979 (10)	49 (8)	31 (16)
45 to 64	100 (4)	440 (5)	30 (5)	21 (11)
≥65	40 (2)	261 (3)	12 (2)	19 (10)
Influenza-positive n (%)	407 (18)		58 (9)	



# Influenza Burden Estimation

- Annual incidence rates were calculated using the methods described in WHO's Manual for Estimating Disease Burden Associated with Seasonal Influenza
- Using population denominators obtained from the HDSS , we determined rates of influenza-associated ILI and SARI by applying the proportion positive among those tested to those who were not tested, adjusting by month and age-group



## Estimated annual incidence of influenza-associated ILI and SARI in SONPD, May 2013 – April 2015

	Incidence of influenza-associated ILI and SARI (95% CI)	
	Number of cases per 100,000 persons	
	ILI	SARI
<b>Overall, adjusted*</b>	844 (501 – 1099)	30 (13 – 84)
<b>Age Group</b>		
0 to 4 years	3,811 (3,727 – 3,898)	135 (120– 152)
5 to 14 years	1,026 (983 – 1,071)	30 (23 – 39)
15 to 24 years	356 (331 – 383)	16 (12 – 23)
25 to 44 years	327 (303 – 353)	3 (1 – 7)
45 to 64 years	285 (263 – 309)	33 (26 – 42)
≥65 years	246 (225 –268)	28 (21 – 36)
<b>Year of Study</b>		
Year 1 (May 2013 – April 2014)	1080 (707 - 1367)	28 (10 - 87)
Year 2 (May 2014 – April 2015)	608 (296 – 831)	32 (16 - 81)



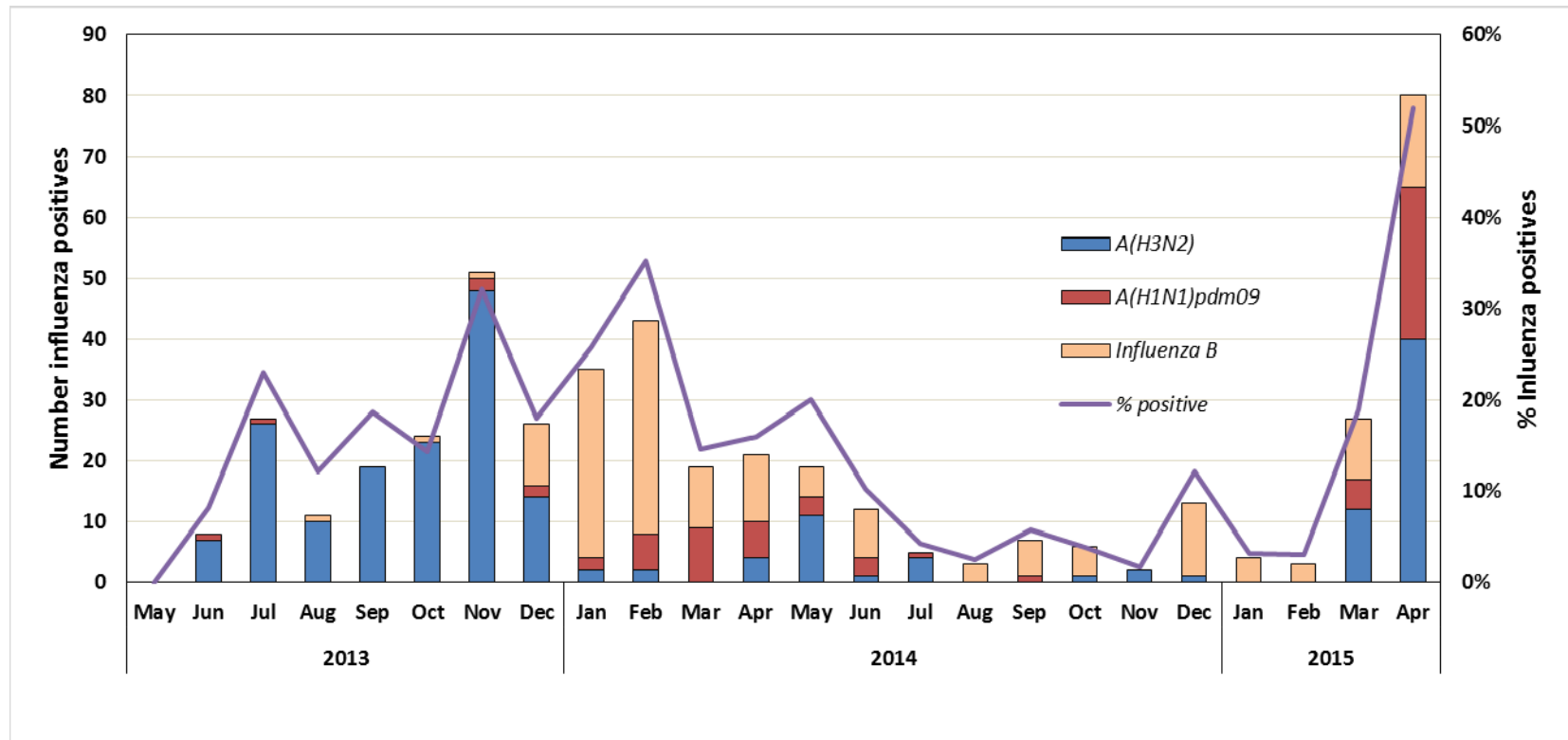
# Discussion

- The incidence of influenza-associated hospitalizations and outpatient visits was highest among children aged 0 to 4 years in SONPD from May 2013 to April 2015
- Consistent with Nair et al.'s finding that the global burden of illness attributable to influenza in young children is substantial
- Influenza circulated year-round in the districts during the study period; consistent with studies summarizing influenza surveillance data from West Africa
- During the 24 month study period, the primary circulating subtype in SONPD was influenza A(H3N2)
- GISRS also reported influenza A(H3N2) as the predominant subtype circulating in West Africa based upon data received from Ghana and 5 other West African countries over the same period





# Distribution of influenza virus types and subtypes among ILI/SARI cases in Shai-Osudoku and Ningoprampram Districts, May 2013 - April 2015



# Conclusion

- Children aged 0 to 4 years had the highest rates of influenza-associated ILI and SARI in our study population
- Our study only assessed medically attended ILI and SARI
- We may have underestimated the true incidence of influenza-associated illness in this community because we did not measure non-medically attended ILI or SARI
- This study fills some of the data gaps related to respiratory diseases in Africa, particularly West Africa needed for public health policies and actions to lessen the impact of influenza on populations
- More data needed to adjust influenza disease burden estimates by healthcare seeking behaviour and in relation to specific high-risk groups, including pregnant women and HIV-infected individuals
- We are currently conducting separate studies in SONPD to address these data gaps



# Acknowledgements

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- Collaboration between CDC, Atlanta, NMIMR, Legon and the Ghana Health Service, Accra



# Thank You!

