WHO Meeting of Mid-term Review of the RSV Surveillance Pilot based on GISRS

Estimating community and hospital burden of RSV

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GISRS: what cannot be measured?

- Surveillance data on RSV cases do not provide population-based burden of disease estimates since the denominator (or catchment) populations of the surveillance sites are not generally known

- However, in settings in which population-based denominators are available or can be estimated then it may be possible to obtain these estimates

Epidemiological outputs from hospital RSV surveillance

- RSV surveillance will report the proportion of RSV positive cases meeting the RSV case definition in different age groups.
- Surveillance outputs that give some information about RSV healthcare burden
  - Percentage of extended SARI cases that are RSV positive by age group *[to identify most important age groups at risk]*
  - Number and percentage of extended SARI cases that are RSV positive by calendar week *[to define seasonality]*

Additional outputs if

- one can estimate the total number of extended SARI cases [by age group and month]
  - Estimated total number of extended SARI cases that are RSV positive [by age group and month]
  - Percentage of total number of hospital admissions that are due to RSV positive disease * [by the specified age groups and by month];
  - Relative number of cases of RSV positive disease * compared to those for influenza and other locally defined priority conditions [by the specified age groups]
  - Proportion of extended SARI RSV positive cases that would have been identified with the original SARI case definition [by age group]

Estimating hospitalisation rates/ national hospitalisation rates

- Example from influenza data in South Africa (Jocelyn Moyes)
  - Estimating population-based rates from sentinel surveillance site counts
  - Estimating national rates from data from several sentinel sites [Stefano Tempia]

SUPPLEMENT ARTICLE

Epidemiology of Respiratory Syncytial Virus–Associated Acute Lower Respiratory Tract Infection Hospitalizations Among HIV-Infected and HIV-Uninfected South African Children, 2010–2011

Jocelyn Moyes,[1,2] Cheryl Cohen,[1,2] Marthi Pretorius,[1] Michelle Groome,[3] Anne von Gottberg,[1] Nicole Wolter,[1] Sibongile Walaza,[1] Sumayya Haffejee,[4] Meera Chhagan,[4] Fathima Naby,[4] Adam L. Cohen,[1,5] Stefano Tempia,[1,5,6] Kathleen Kahn,[7,8,9] Halima Dawood,[4] Marietjie Venter,[3] and Shabir A. Madhi,[1,3] for the South African Severe Acute Respiratory Illness Surveillance Group

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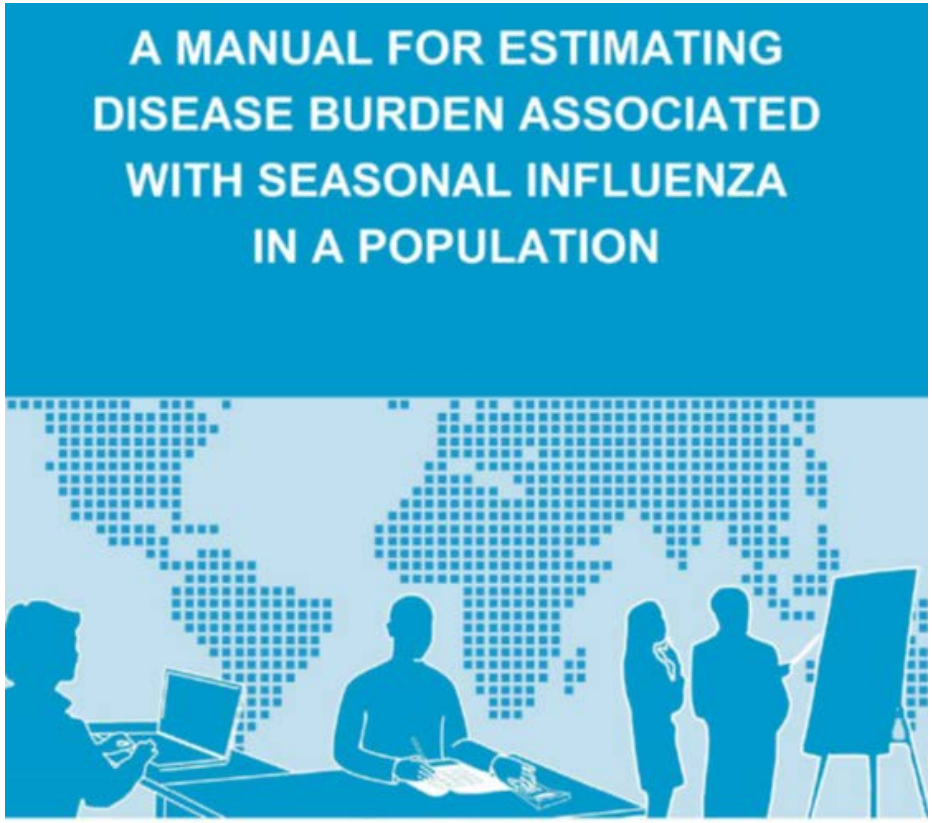
Background. There are limited data on respiratory syncytial virus (RSV) infection among children in settings with a high prevalence of human immunodeficiency virus (HIV). We studied the epidemiology of RSV-associated acute lower respiratory tract infection (ALRTI) hospitalizations among HIV-infected and HIV-uninfected children in South Africa.

Methods. Children aged <5 years admitted to sentinel surveillance hospitals with physician-diagnosed neonatal sepsis or ALRTI were enrolled. Nasopharyngeal aspirates were tested by multiplex real-time polymerase chain

Estimating sentinel sites hospitalisation rates/ national hospitalisation rates

- Example from WHO influenza manual on estimating disease burden from surveillance data
- Hospitalisation data with denominator estimates and assessment of bias
  - Implemented now in many LMIC
  - Recent IORV journal supplement in 2017 with many flu burden articles from LMIC

Flu-associated ALRI disease burden

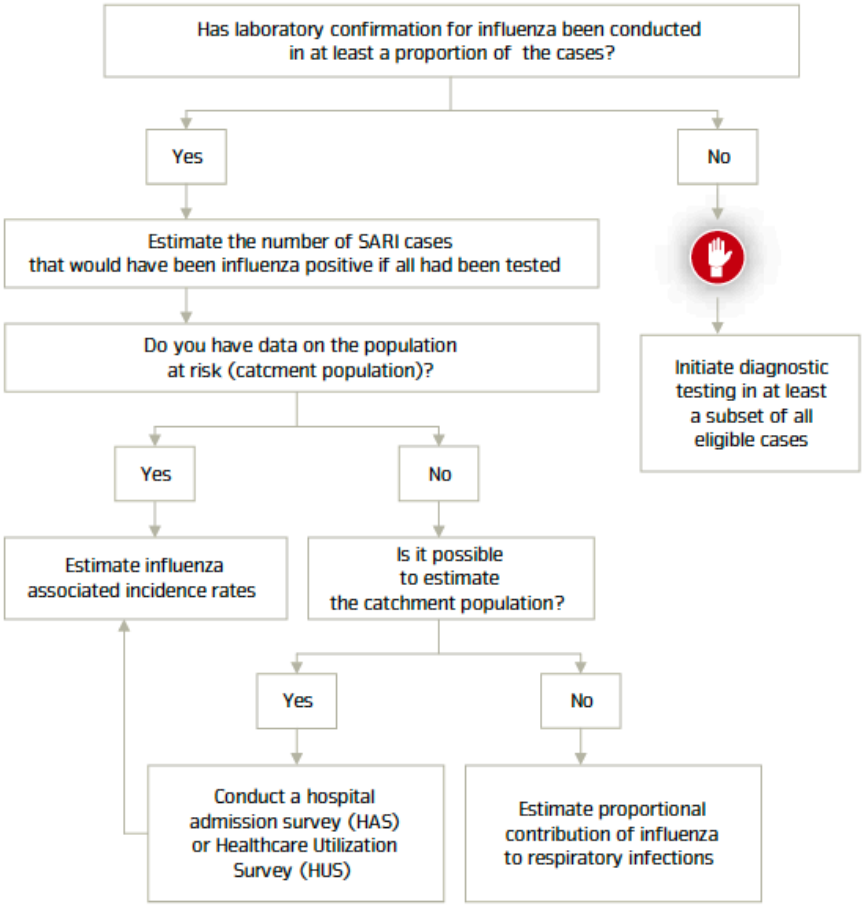


Manual

WHO workshops

WHO Online course https://openwho.org/courses/seasonal-influenza-burden

Figure 5: Schematic diagram outlining the possible influenza disease burden estimates based on availability of data on the denominator population



Estimate of total number of RSV positive disease cases in a specific age group in a sentinel site

Equation 3: Calculating the proportion of all cases sampled

$$\text{Proportion of all cases sampled (x\%) month/week} = \frac{\text{Number of SARI cases from whom clinical specimen were tested by month/week}}{\text{Total number of SARI cases by month/week}} \times 100$$

Note: if there is significant under-reporting of SARI cases at the sentinel site, it may be necessary to perform a chart audit to know the actual total number of SARI cases to use in the denominator of Equation 3 (see step 2 in the previous section).

AND

Equation 4: Calculating the total number of influenza-associated SARI cases

$$\text{Total number of influenza-associated SARI cases} = \sum_{k=1}^{n} \frac{\text{Number of laboratory positive SARI case by week or month}}{\text{Proportion of all SARI cases sampled by week or month}}$$

n= number of month or weeks available

Note: it is critical to do this scaling up for each epidemiologic week or month and add the total for the annual number rather than to simply scale up the annual figures.

Estimate of total number of RSV positive disease cases in a specific age group in a sentinel site

Assumptions

- This approach assumes that
  - the % of RSV positive cases are similar in those who were tested and those who were not tested (during a particular time period) and
  - there is no significant bias in the selection of patients for RSV testing
- So the true number of RSV positive cases can only be an approximation
- Need to do a chart audit of the total number of cases meeting the extended SARI case definition in each group needs
  - separately for each surveillance site
  - separately for the main age groups – 0-4 yrs; 5-64 yrs; and ≥65 years
  - Ideally by calendar month and then aggregated to give an annual estimate

Hospital denominator data

- countries should collect the following summary denominator data for each hospital surveillance site each month:
  - Total number of hospital admissions (by the specified age groups) each month;
  - Total number of hospital admissions for pneumonia or other severe acute respiratory illness (also include admissions for sepsis in those 0-5m of age).

Reviewing ICD discharge codes to estimate total number of cases

- If it is not possible to obtain data on the total number of cases meeting extended SARI case definitions then in some settings it may be possible to obtain an approximation of the true number of extended SARI cases by a review of hospital discharge codes where these are available and of high quality.
- A review should be made of ICD coding (in any of the first 3 diagnostic code positions for an episode) of admissions. These include:
  - ICD9 codes 487, 488.01, 488.11 [for SARI] and 771.81, 995.91, 995.92 [for sepsis] or
  - ICD10 J09.01, J09.11, J10.0, J11.0 [, for SARI] and P36.0-36.9, R65.2, A40, A41 [, for sepsis].
- Ideally, an audit of how these ICD codes relate to the extended SARI case definition should be carried out as coding practices can vary from country to country. An estimate can then be made of what proportion of those admitted with these ICD codes were recruited and tested for RSV in each surveillance site.

RSV Surveillance Pilot: primary objectives

- Establish feasibility of RSV surveillance built on the GISRS platform for future global expansion
- Identify RSV seasonality in different countries/regions
- Provide improved knowledge on RSV healthcare burden in hospitalized and community patients
- Determine age/ risk groups for severe RSV disease
- Evaluate RSV case definitions/ sampling strategies
- Assess feasibility of FluNet & FluID for data reporting
- Report surveillance statistics to raise awareness and provide evidence to inform policy decisions
- Build lab capacity for RSV testing in pilot countries
- Standardize laboratory procedures for RSV detection and quality assurance

Community clinic denominator data

- Countries should report the following summary data (aggregated across community sentinel sites) each month:
  - Total number of sentinel site visits (by the specified age groups) each month;
  - Total number of sentinel site visits for pneumonia or other respiratory illness (by the specified age groups) each month