

Using HMIS data for COVID-19 Surveillance

A short course: Lecture 1



Background and Overview



Cross-PIH site collaboration

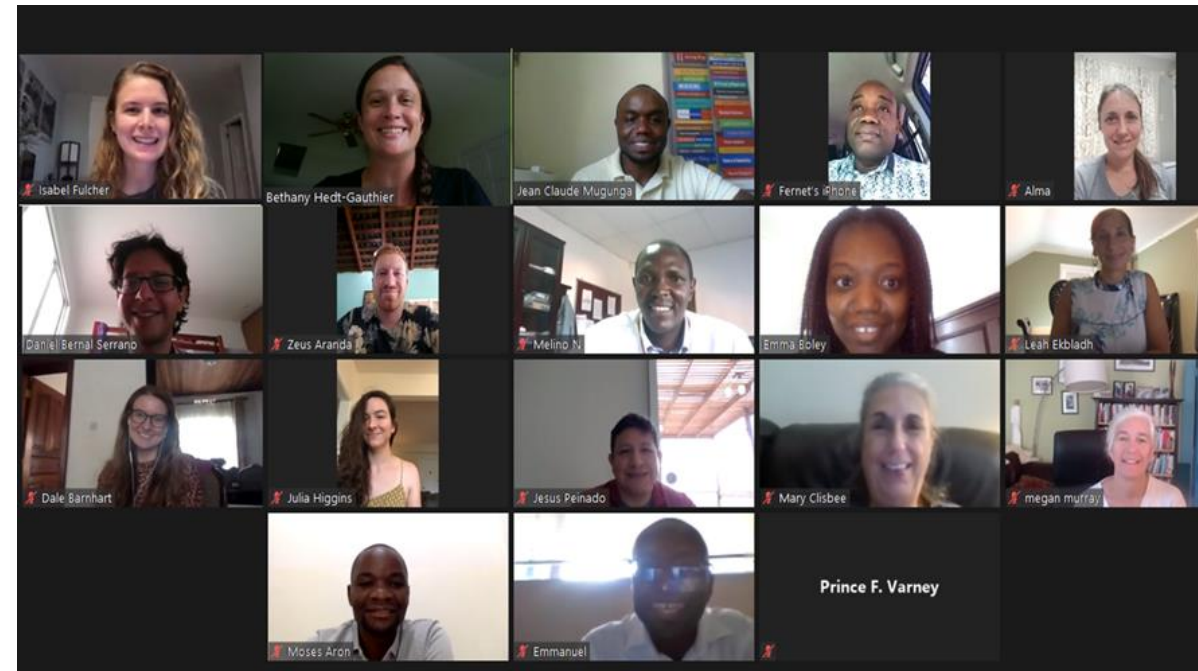
- Identify the core and common questions.
- Develop rigorous methods that are contextually appropriate to answer these questions.
- Work collaboratively to implement, and share results and lessons learned across sites.



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Core common questions

- What is the burden of COVID-19?
- How is COVID-19 directly affecting health, particularly in high-risk groups?
- How is COVID-19 affecting care and outcomes across the health system?



How can we leverage routinely collected data to improve COVID-19 response?

Syndromic Surveillance

What regional areas have a higher than expected increase in the number of patients with COVID-19-associated symptoms?

Health Service Utilization

How do the number of individuals receiving care during the COVID-19 pandemic compare to what is expected?

The methods for routine monitoring will involve identifying “deviations” from what is expected for further investigation.

Increased in ARI cases at 3 PIH-supported facilities in Maryland County for ages ≥ 5 years

- Higher proportions of ARI cases were also observed at JJD, Edith Wallace and St. Francis late 2019 into early 2020 at these 3 PIH-supported facilities in Maryland County for individuals 5 years or older.



Red: predicted visits based on prior data with 95% prediction intervals

Black: observed visits

Dotted line: Extrapolation period begins

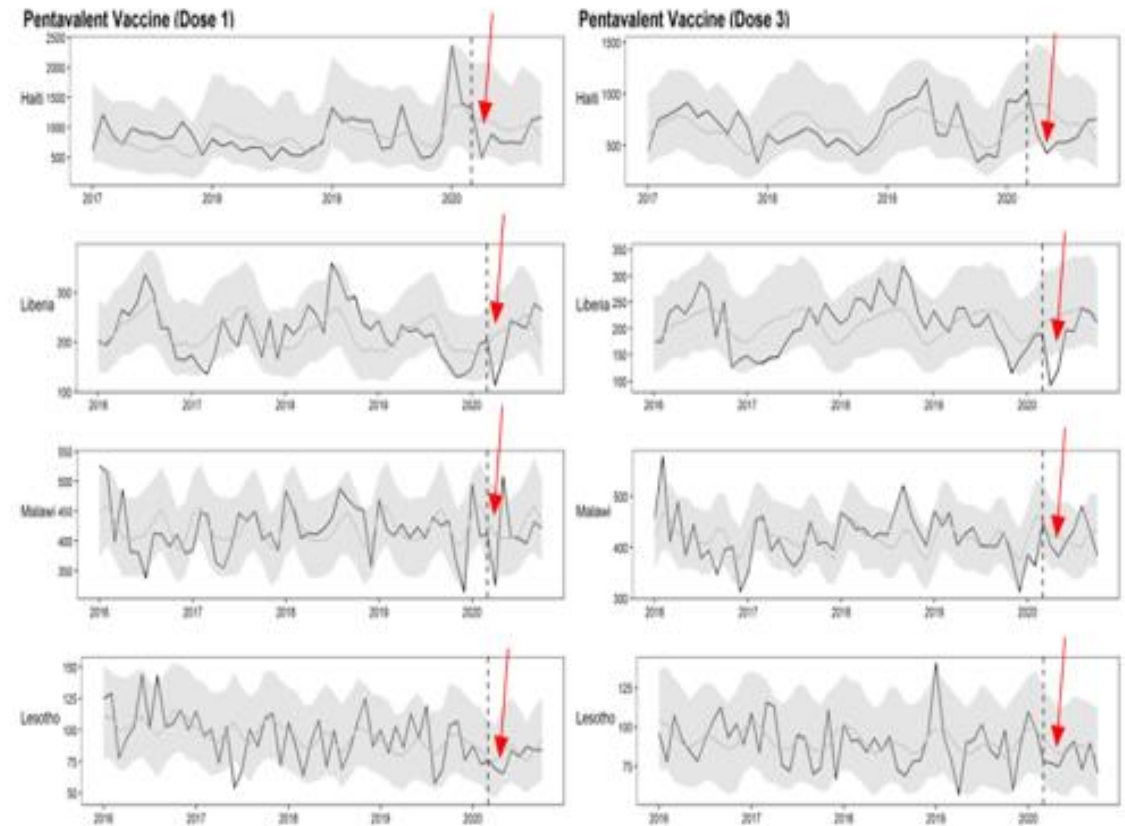
Credit: Emma Boley, Izzie Fulcher



GLOBAL HEALTH
RESEARCH CORE

Steeper reductions observed in Pentavalent in Haiti, Liberia & Malawi early in 2020

- We observed reduce pentavalent vaccination coverage for both doses (1 & 3), but reduction was not sustained!



Credit: Emilia Connolly, Emma Boley, Izzie Fulcher

Resources

USING ROUTINE HEALTH SYSTEMS
DATA FOR DATA-DRIVEN
COVID-19 RESPONSE

▶

SEPTEMBER 30, 2020
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 **HARVARD**
MEDICAL SCHOOL

BLAVATNIK INSTITUTE
GLOBAL HEALTH &
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Goals of this course

Overview of the course: The goal of this course is to better understand the methods used for syndromic surveillance and health service utilization monitoring, as applied to HMIS/DHIS2 data in the context of the COVID-19 pandemic. By the end of the 5-session course, we expect participants to know the process of creating these models and can understand and more confidently explain how to interpret the results.



Goals of this course

The specific objectives are:

- To identify indicators most relevant for these purposes.
- To describe and interpret the models used to a) establish a baseline; b) assess higher or lower levels than expected during the pandemic.
- To understand the data processing pipeline - from receipt of indicator data to production of figures.
- To interpret results from the various visualizations of the data and results.
- (Optional, for those with background in statistics and R) To be able to implement the data cleaning, modeling and visualization process in R.

Structure:

- 5 weeks
- First 1-1.5 hours, lecture and discussion
- Second 1.5-2 hours, practice (in R)



Acknowledgements

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Selecting indicators



What is an indicator?

An indicator is a quantitative metric that can be used to:

- Monitor uptake
- Assess achievement
- Provide warnings

Indicators should be well-defined and consistently measured.

For this project, we are limiting to indicators available in health management information systems (HMIS) and for many places, specifically captured in DHIS2.



COVID-19 Surveillance

- Ideally, we would monitor COVID-19 directly.
 - What indicators are countries using to look directly at COVID-19?
 - Why is it not always possible to use these indicators to monitor COVID-19?

Syndromic surveillance

Monitor disease symptoms rather than the disease itself.

- Not as good as monitoring the disease itself.
- May give indicators of where disease is present, if it is difficult to monitor directly.

Syndromic Surveillance

What regional areas have a higher than expected increase in the number of patients with COVID-19-associated symptoms?

Group work

- In small groups (3-4 people), discuss:
 - What are ideal properties for indicators to be used for syndromic surveillance?
 - Three indicators for COVID-19 Surveillance.
- 10 minutes.
- Designate a notetaker and someone to report back.

●

| | | |
|---|---|---|
| Group 1: <<NAMES OF PARTICIPANTS>> | | Notetaker: <<name>> Reporter: <<name>> |
| <p>What are the ideal properties for indicators to be used for COVID-19 syndromic surveillance?</p> <ul style="list-style-type: none">- <<??>>- <<??>> | <p>Give three HMIS/DHIS2 indicators that could be used for COVID-19 syndromic surveillance.</p> <ul style="list-style-type: none">- <<Indicator 1>>- <<Indicator 2>>- <<Indicator 3>> | |

Properties of a COVID-19 SS indicator



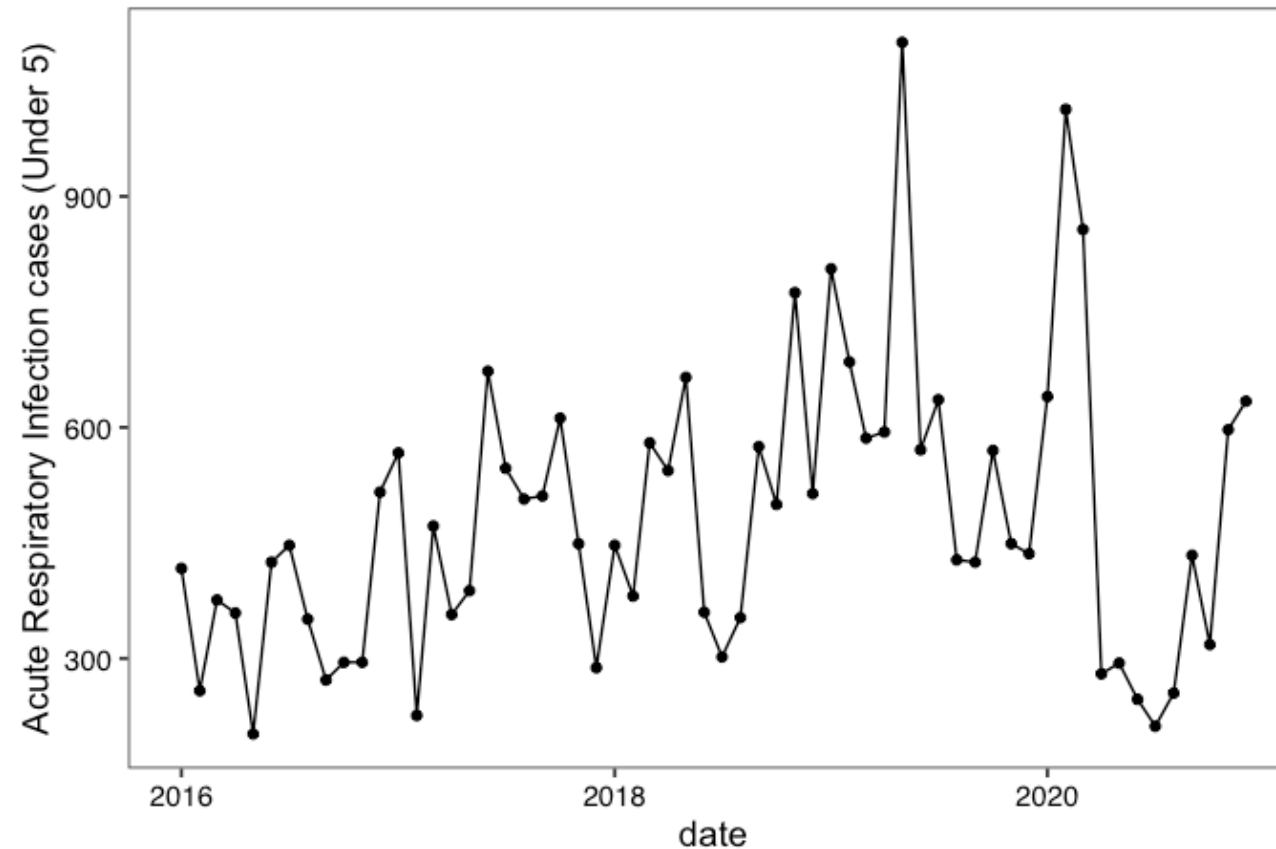
Recommended indicators



Table A1. Syndromic surveillance indicators by country with the specific indicators grouped by bolded indicator categories and X indicating availability for that country

| | Haiti | Lesotho | Liberia | Malawi | Mexico | Rwanda | Sierra Leone |
|---|----------|----------|----------|----------|----------|----------|--------------|
| Pneumonia | | X | X | X | X | | |
| Pneumonia | | X | | X | X | | |
| Severe pneumonia | | X | | X | X | | |
| Aspiration pneumonia | | | X | | | | |
| Respiratory infection or disease | X | X | X | X | X | | X |
| ARI | X | | X | X | | | X |
| Lower ARI | | | | | X | | |
| Upper ARI | | | | | X | | |
| Severe ARI | | | | X | | | |
| Asthma | | X | | | | | |
| Other respiratory tract diseases | | X | | | | | |
| Flu & cold symptoms | X | X | | X | X | X | X |
| Cough | | X | | | | X | |
| Common cold | | X | | | X | | |
| Temperature | | | | | X | X | |
| Influenza like illness | | | | | X | | |
| Fever | X | | | X | X | X | X |
| Headache | | | | | | X | |
| Fast breathing | | | | X | X | | |
| Headache | | | | | | X | |
| Chills | | | | | | X | |
| Gastrointestinal symptoms | X | | X | | | X | X |
| Diarrhea | X | | | | | X | X |
| Bloody diarrhea | X | | X | | | | |
| Vomiting / nausea | | | | | | X | |
| Abdominal pain | | | | | | X | |

Acute Respiratory Infection cases among children (under 5) for Neno District Hospital



Health service utilization indicators

- Assess uptake of essential health services.
- Compare uptake to “expected”.
 - Assessment of reasons for changes.
 - Targeted interventions to address any deficits.



Table 2.2 Common reasons for observed disruptions and questions for investigation

| Type of disruption | Guiding questions |
|--------------------------|--|
| COVID-19 | <p>What are the dates of initial COVID-19 cases and outbreak peaks?</p> <p>Where is COVID-19 concentrated – urban or rural areas?</p> <p>Are any particular subpopulations adversely affected? If so, for what reasons?</p> <p>Has service delivery been adapted (e.g. digital platforms) but not captured in reporting?</p> <p>Are COVID-19 symptoms and cases reported under acute respiratory infection (ARI)/pneumonia, fever, etc.?</p> |
| Data reporting | <p>Is the completeness of reporting lower than expected?</p> <p>Are there known disruptions in reporting?</p> <p>Are data typically subject to seasonal variations?</p> |
| Supply | <p>Have there been disruptions to supply chains, including personal protective equipment?</p> <p>Have stockouts occurred?</p> <p>Have facilities struggled to implement infection prevention and control practices adequately?</p> |
| Workforce | <p>Have health workers been deployed to other facilities (e.g. COVID-19 testing sites)?</p> <p>Have health workers been absent through illness or fear of infection?</p> <p>What decisions have been made about use of resources?</p> <p>Have shifts been made to different service platforms?</p> |
| Access and demand | <p>Have there been gaps or weaknesses in messages about continuing to use essential health services?</p> <p>Have there been reports of misinformation or other efforts to undermine public health messaging about COVID-19?</p> <p>Has transportation (local and or emergency) been reduced?</p> <p>Have financial barriers to access increased because of the economic impact of COVID-19?</p> <p>Have there been regulations limiting freedom of movement: e.g. are written civil authorizations required to be in public places, including health facilities?</p> |
| Coverage and quality | <p>Have there been changes or reductions in facility/clinic opening hours?</p> <p>Have patients been sent home or discharged to maintain physical distancing?</p> |
| Other contextual factors | <p>Are there other sociopolitical events, such as elections, extreme weather or seasonal migration, that would affect service delivery?</p> |

ANALYSING AND USING ROUTINE DATA
TO MONITOR THE EFFECTS OF COVID-19
ON ESSENTIAL HEALTH SERVICES

Practical guide for national and subnational decision-makers

Interim guidance
14 January 2021



Extended list of sample indicators for monitoring essential health services during the COVID-19 pandemic

- Total number of outpatient attendances or primary care visits
- Total number of hospital discharges, including deaths (both related and unrelated to COVID-19)
- Number of health workers available, disaggregated by occupational group (i.e. by the International Standard Classification of Occupations, or ISCO-8 classification)
- Number of health workers infected by COVID-19, disaggregated by occupational group, including health or care workers in nursing homes and long-term care facilities
- Percentage of hospital emergency units with a validated triage tool in place
- Ratio of hospital-based deaths from acute injury to overall deaths from acute injury
- Number of inpatient admissions for acute cardiovascular and cerebrovascular emergencies
- Percentage of COVID-19 patients with an existing underlying NCD
- Number of hospital admissions and discharges (including deaths) due to hypoglycaemia and hyperglycaemia
- Essential medicines or supplies for which there is less than 2 months' inventory without confirmation of on-time replenishment or with or without confirmation of replenishment
- Number of women and girls receiving (a) oral and (b) injectable contraceptives
- Number of women presenting to the facility with abortion-related complications
- Number of pregnant women with at least one ANC visit
- Number of antenatal care contacts for which pregnant women were given/prescribed iron containing supplements
- Number of facility births
- Number of births by caesarean section
- Incidence of low birth weight (<2500 g) among newborns
- Number of term infants who were put to the breast within 1 hour after birth
- Number of women screened for cervical cancer
- Number of cases of violence against women and girls (physical, sexual, other), by type of perpetrator, recorded at the health facility level
- Number of persons with severe mental health conditions (e.g. moderate to severe depression, psychosis, bipolar affective disorder, substance abuse disorders) who are using consultative services
- Suicide rate
- Number of new cancer diagnoses
- Number of COVID-19 patients and patients without COVID-19 in need of palliative care
- Number of older people presenting to facility with any sign of acute respiratory infection
- Number of deaths in adults older than 60 due to conditions unrelated to COVID-19

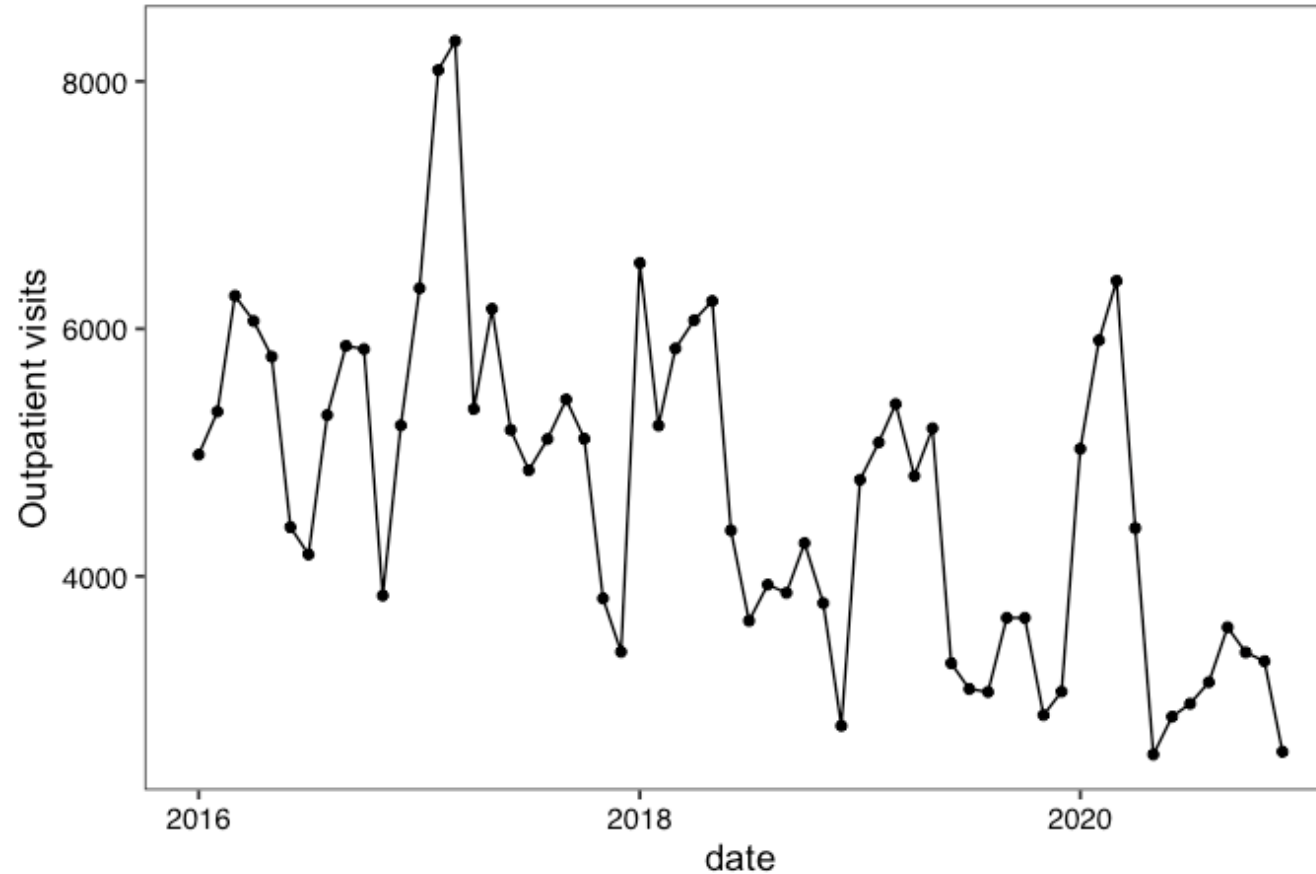
to the breast within 1 hour after birth
in 2 days of delivery
within 2 days of delivery
not receiving kangaroo mother care
admitted to neonatal intensive care unit
with any sign of acute respiratory infection
not receiving their third dose of diphtheria-tetanus-pertussis (DPT3) or their first
dose for each vaccine in the national schedule
not admitted to health facility for treatment of severe wasting and bilateral
pitting oedema
not screened for severe wasting and bilateral pitting oedema
not discharged/recovered/treated for severe wasting and bilateral
pitting oedema
not receiving an age-appropriate dose of vitamin A in each semester
not treated with artemisinin-based combination therapies
not notified
not currently receiving antiretroviral therapy who are affected by treatment disruptions
not receiving antiretroviral therapy who are affected by treatment disruptions

What about service utilization indicators?

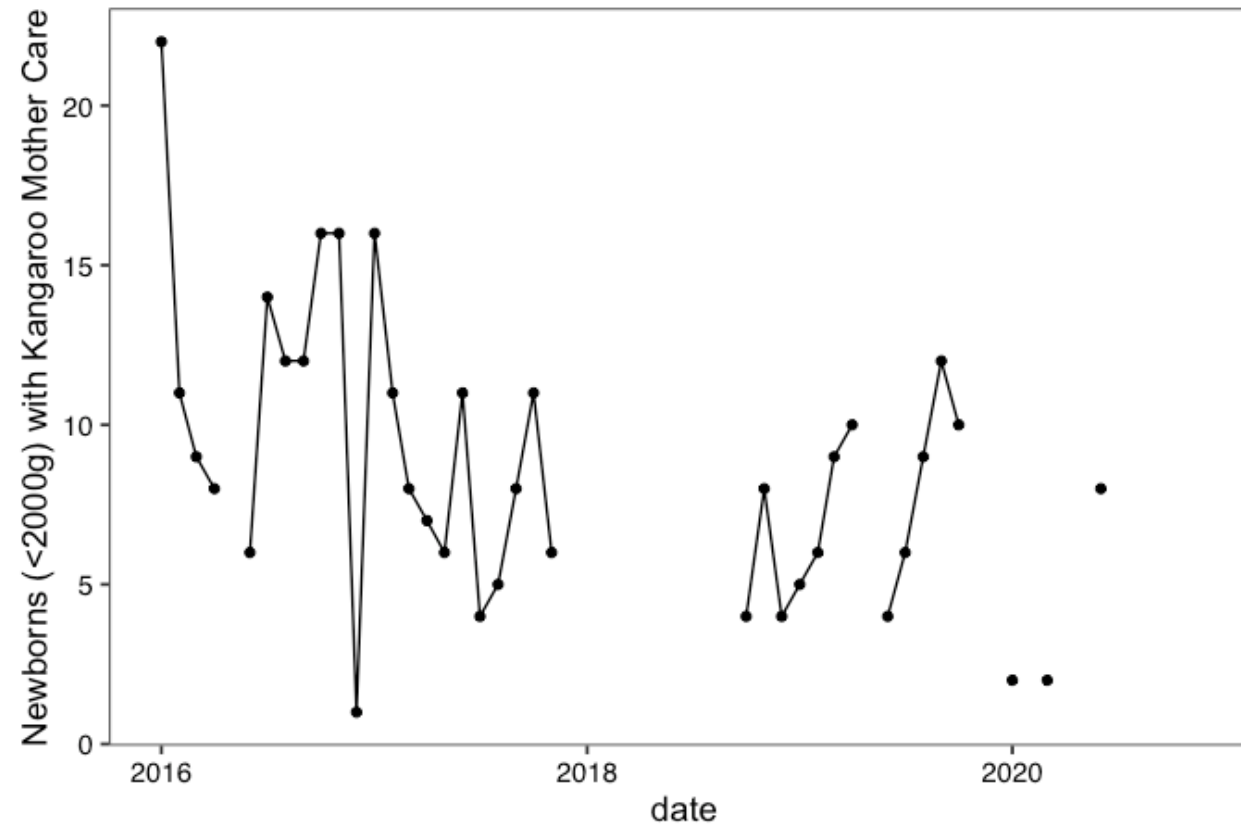
- Which of the ideal properties remain true when looking at HSU indicators?
- Are there any different considerations when selecting HSU indicators?



Outpatient visits for Lisungwi Health Centre



Kangaroo Mother Care indicator for Neno District Hospital



What's next?

- Today's lab: Importing data and producing plots.
- Week 2: Building basic time series models
- Week 3: Determining expected and comparing to observed
- Week 4: Data processing
- Week 5: Visualizations



Questions?

