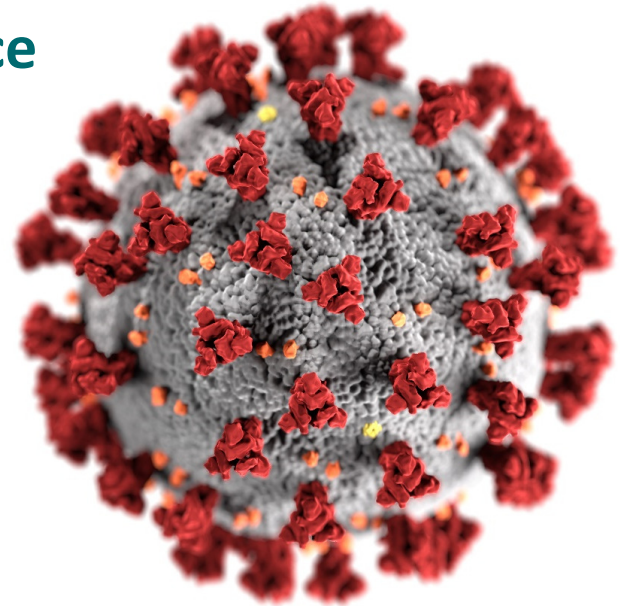# COVID-19 Surveillance Seminar - July 6, 2020

## Leveraging Systems for COVID-19 Surveillance

## Integrated Disease Surveillance and Response (IDSR), Malaria, and Polio

**Michelle Sloan, Division of Global Health Protection**

**John Painter, Division of Parasitic Diseases and Malaria**

**Wilbrod Mwanje, African Field Epidemiology Network (AFENET), Uganda**

**cdc.gov/coronavirus**

www.cdc.gov/coronavirus/2019-ncov/global-covid-19

# Integrated Disease Surveillance and Response (IDSR)

- Integrates common surveillance activities across diseases
  - Identify, Report, Analyze and Interpret, Investigate and Confirm, Prepare, Respond, Communicate, Evaluate
  - Activities linked across community, district, and national levels of the health system
- Reporting on country identified priority diseases (e.g. case based, aggregate)
- Standardized data collection tools and data reporting to district level
- Thresholds defined for public health response
- Improved data use through routine data analysis

# Incorporating COVID-19 into IDSR

- Include COVID-19 on country priority disease list
- Develop COVID-19 reporting tools
  - Individual case report, aggregate reporting form, contact tracing form
- Train surveillance focal points
  - Case identification using standard case definition
  - Immediate reporting of suspect cases
- Case-based reporting of cases and deaths (aggregate if resources constrained)
- Initiate response strategies based on threshold, for example
  - Investigation and contact tracing for each individual case
  - Population level interventions for clusters and outbreaks

# Leveraging Other IDSR Data

- Monitor existing disease surveillance for signals
  - Influenza
  - Malaria
  - Other fever producing diseases
- Indicators to analyze
  - Case and death counts
  - Trends
  - Geographical spread
  - Completeness
  - Timeliness

# Leveraging Other Disease Surveillance Strategies

- Identify potential signals overall or by region where there might be missed COVID-19 cases
  - Malaria surveillance
- Incorporate COVID-19 into existing disease surveillance activities
  - poliomyelitis / AFP surveillance
  - Country example from Uganda

# Malaria and COVID-19 Surveillance in sub-Saharan Africa

## Leveraging routine health facility data for signs of COVID-19

**John Painter, DVM, MS**

**Malaria Surveillance Team, CDC-PMI**

# Outline

- Routine surveillance for malaria
- Indicators of potential COVID-19 in the community
- Keys for interpreting routine surveillance data

# Routine surveillance data for malaria

# Routine Health System Data



**Patient register**

| MINISTRY OF HEALTH AND SANITATION | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| PHU MONTHLY SUMMARY OF MORBIDITY - PHUF 1 | | | | | | | | | |
| PHU MORBIDITY CASES (refer to tally sheets PHUT 1a & 1b) | | | | | | | | | |
| AGE GROUP | | 0 - 11m | | 12 - 59m | | 5 - 14y | | 15y+ | |
| DISEASE | | N | F | N | F | N | F | N | F |
| Rapid Diagnostic Test for Malaria | Positive | 2357 | | 3795 | | 1002 | | 1158 | |
| | Negative | 917 | | 948 | | 393 | | 428 | |
| MALARIA treated at PHU with ACT | < 24hrs | 2248 | 231 | 2587 | 165 | 715 | 121 | 695 | 90 |
| | >24hrs | 1848 | 175 | 2966 | 229 | 434 | 43 | 1009 | 81 |
| MALARIA treated at PHU without ACT | < 24hrs | 239 | 36 | 210 | 27 | 78 | 21 | 141 | 26 |
| | >24hrs | 228 | 39 | 209 | 15 | 45 | 7 | 115 | 21 |
| DIARRHOEA without severe dehydration | | 481 | 70 | 599 | 101 | 122 | 21 | 197 | 8 |
| DIARRHOEA with severe dehydration | | 51 | 19 | 69 | 14 | 20 | 1 | 25 | 4 |
| DIARRHOEA with blood (Dysentery) | | 74 | | 75 | 11 | 26 | 3 | 77 | 6 |
| ARI treated without antibiotics (cough) | | 668 | 89 | 621 | 93 | 88 | 14 | 73 | 7 |
| ARI treated with antibiotics (Pneumonia) | | 2648 | 265 | 2516 | 189 | 340 | 49 | 315 | 27 |
| CLINICAL MALNUTRITION | | 223 | 140 | 581 | 281 | 41 | 17 | 11 | 8 |
| ANAEMIA | | 97 | 15 | 182 | 13 | 62 | 2 | 78 | 5 |
| MENINGITIS / severe bacterial infection | | 2 | | 5 | 2 | | | | |
| MEASLES | | 2 | | | | | | | |
| TETANUS | | | | | | | 1 | | |
| NEONATAL TETANUS | | | | | | | | | |
| ACUTE FLACCID PARALYSIS (AFP) | | | | | | | | | |
| LASSA FEVER | | | | 3 | | | | 2 | |

**Monthly tally sheet**

# Routine Health System Data

- For most countries in sub-Saharan Africa (SSA)
  - Collected on paper form and entered into electronic platform such as District Health Information Software *DHIS2*
  - Possible to modify data collection forms to collect new information
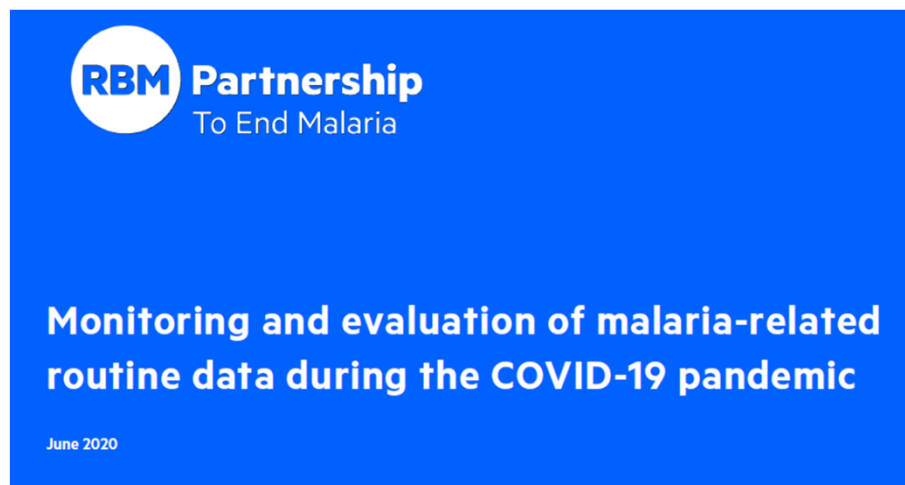    - May require printing new paper forms

# Indicators of potential COVID-19 in the community

# COVID-19 Impact on Malaria Programs

- Roll-Back Malaria's Monitoring and Evaluation Reference Group (RBM-MERG) providing guidance for evaluating change to essential programs



RBM Partnership
To End Malaria

**Monitoring and evaluation of malaria-related routine data during the COVID-19 pandemic**

June 2020

https://endmalaria.org/sites/default/files/Monitoring%20and%20evaluation%20of%20malaria-related%20routine%20data%20during%20the%20COVID-19%20pandemic.pdf

# Indicators of potential COVID-19 in the community: Attendance

- Outpatient department (OPD) attendance
  - Increase could suggest an increase in the number of cases due to COVID-19 or other illnesses
  - A decrease could mean a shift towards self-care at home because:
    - Safety concerns
    - government policy (stay at-home orders)
    - lack of health care workers in facilities
    - disruptions to public transportation systems, etc.

# Indicators of potential COVID-19 in the community: Febrile Illness

- Patients with fever may be due to malaria, COVID-19, or other febrile illnesses
  - Shifts in age patterns to older individuals could suggest a non-malaria cause(s) <span style="color:red">such as COVID-19</span>
  - An increasing fever rate *in the absence* of increasing confirmed malaria might suggest that fevers are occurring due to COVID-19
  - When fever not reported, number tested for malaria may be a surrogate

# Indicators of potential COVID-19 in the community: Hospitalizations

- Could be proxy indicators of severe illness due to malaria or COVID-19 (or other causes) that warrants further investigation

# Keys for interpreting routine surveillance data

# RBM* Example: Interpreting Temporal Trends in Outpatient Attendance
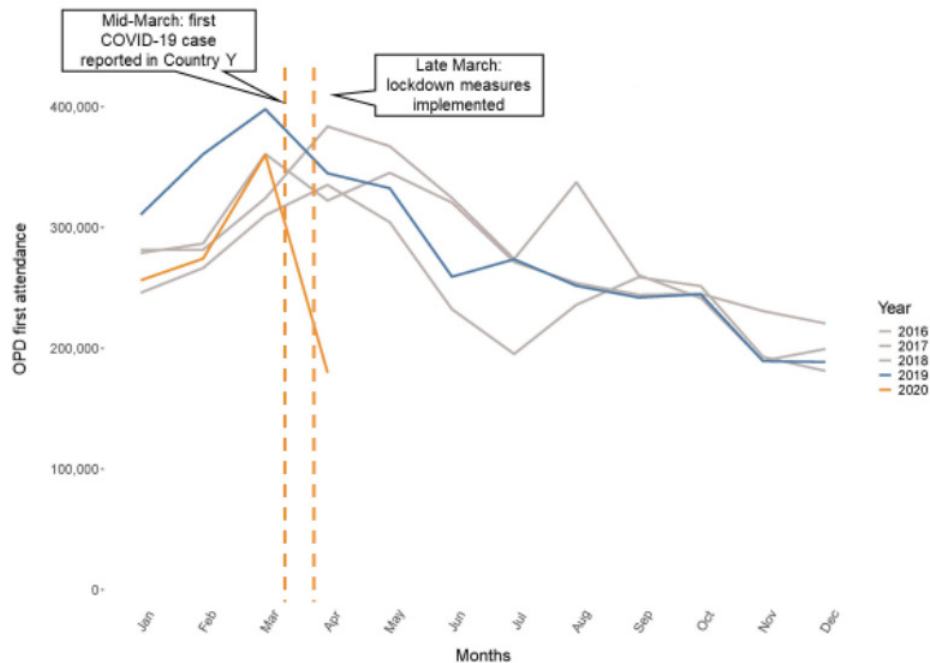


"…in 2020 all outpatient visit attendance dropped (orange) in March and April in relation to the four previous years (blue and grey) …
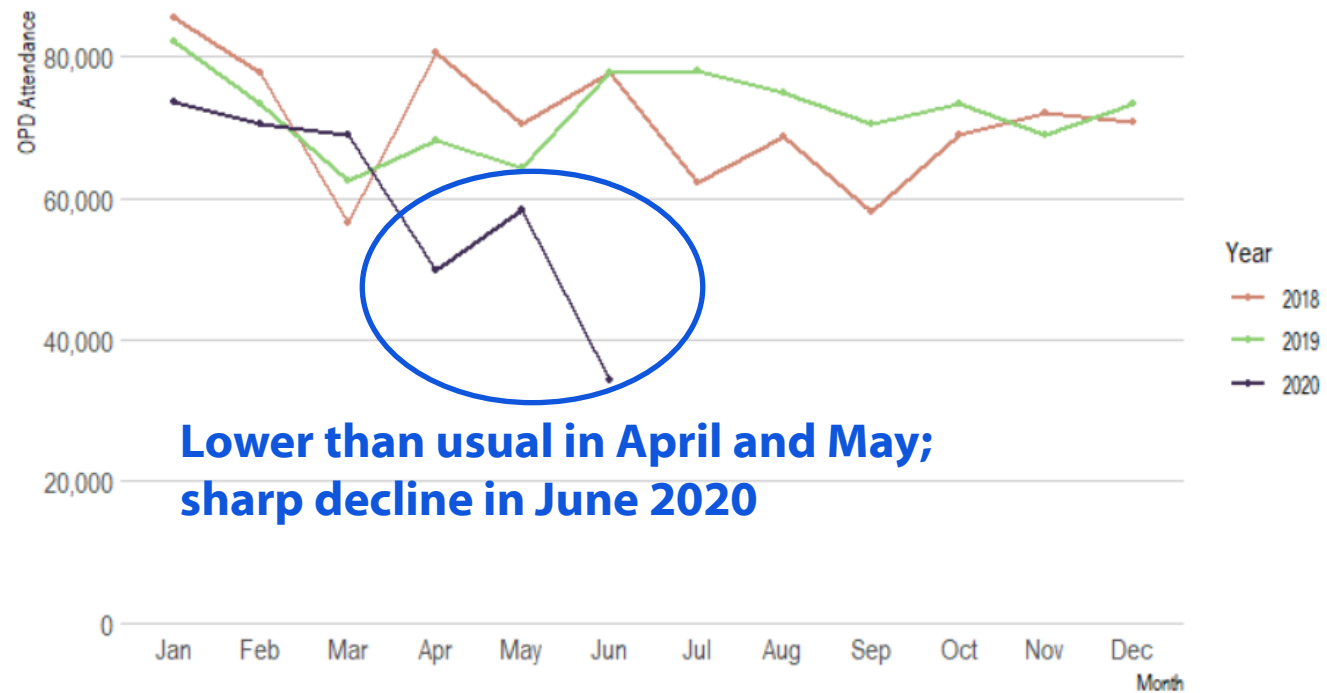
Further investigation should be conducted to determine the reasons behind this decrease (e.g. shift towards self-care at home, stay at home orders, lack of health care workers in facilities…"

**What about reporting???**

# Example 1: Interpreting Trends in Reported Outpatient Attendance



**Lower than usual in April and May; sharp decline in June 2020**

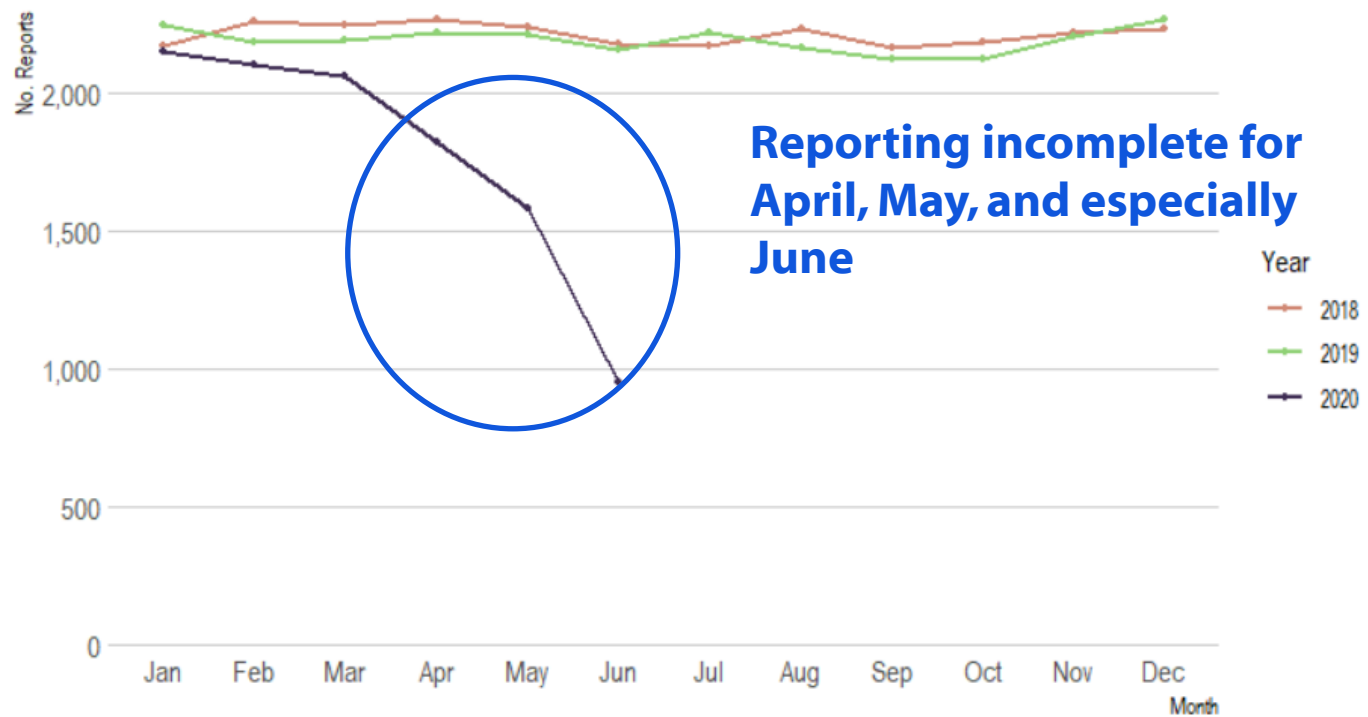# Example 1: Interpreting Trends in Reported Outpatient Attendance



Lower than usual in April and May; sharp decline in June 2020
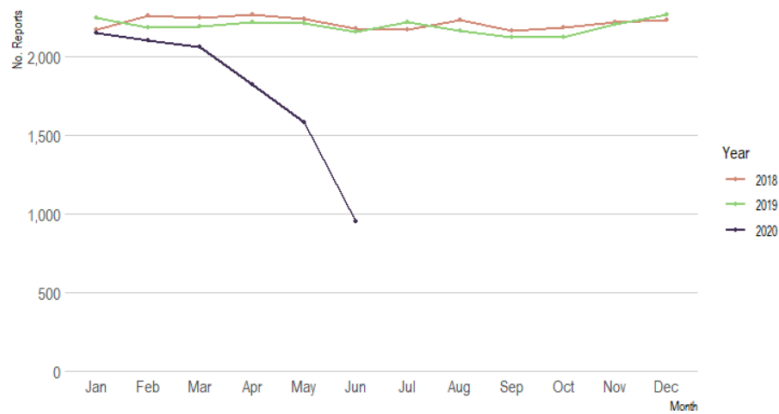
Evidence of service disruption?

# Example 1: Interpreting Trends in Reported Outpatient Attendance
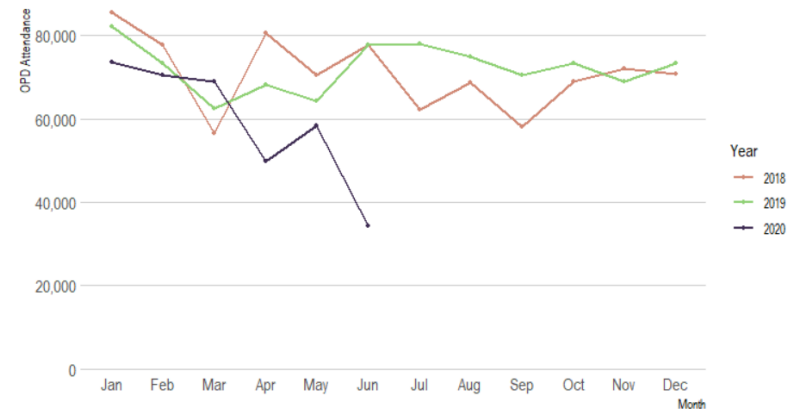## Number of Reports, 2018-2020

# Example 1: Interpreting Trends in Reported Outpatient Attendance
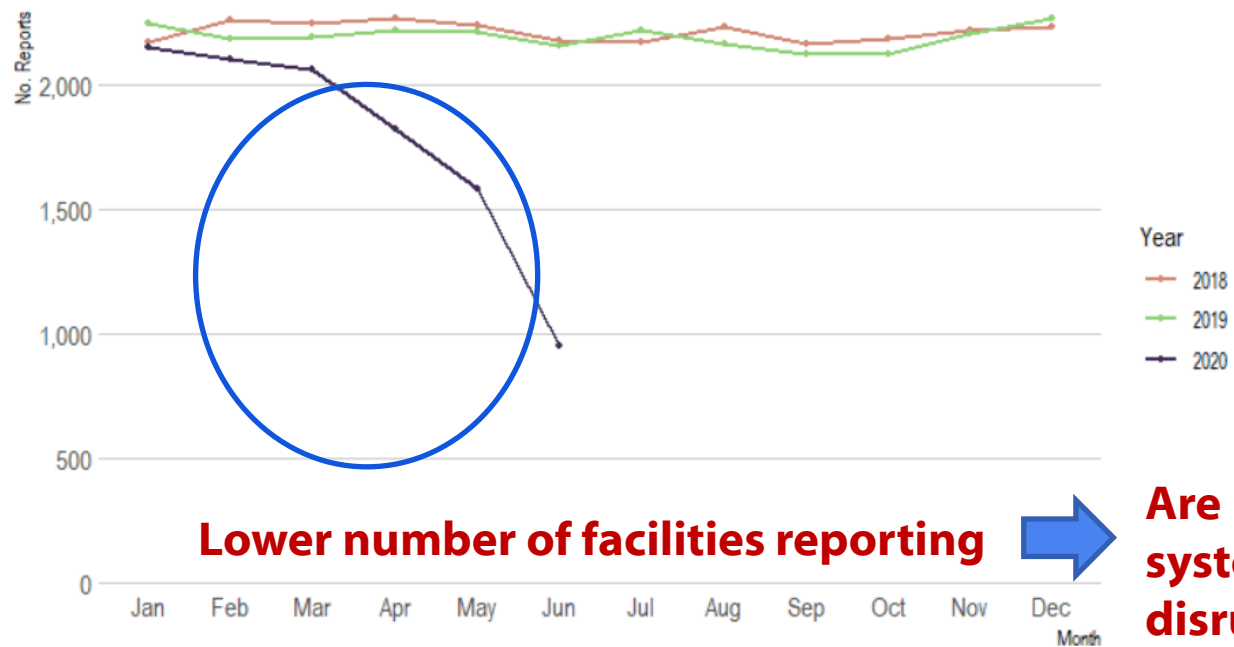
## Number of Reports



## Attendance



**Lower numbers of facilities reporting**

**Leads to lower reported attendance**

# Example 1: Interpreting Trends in Reported Outpatient Attendance
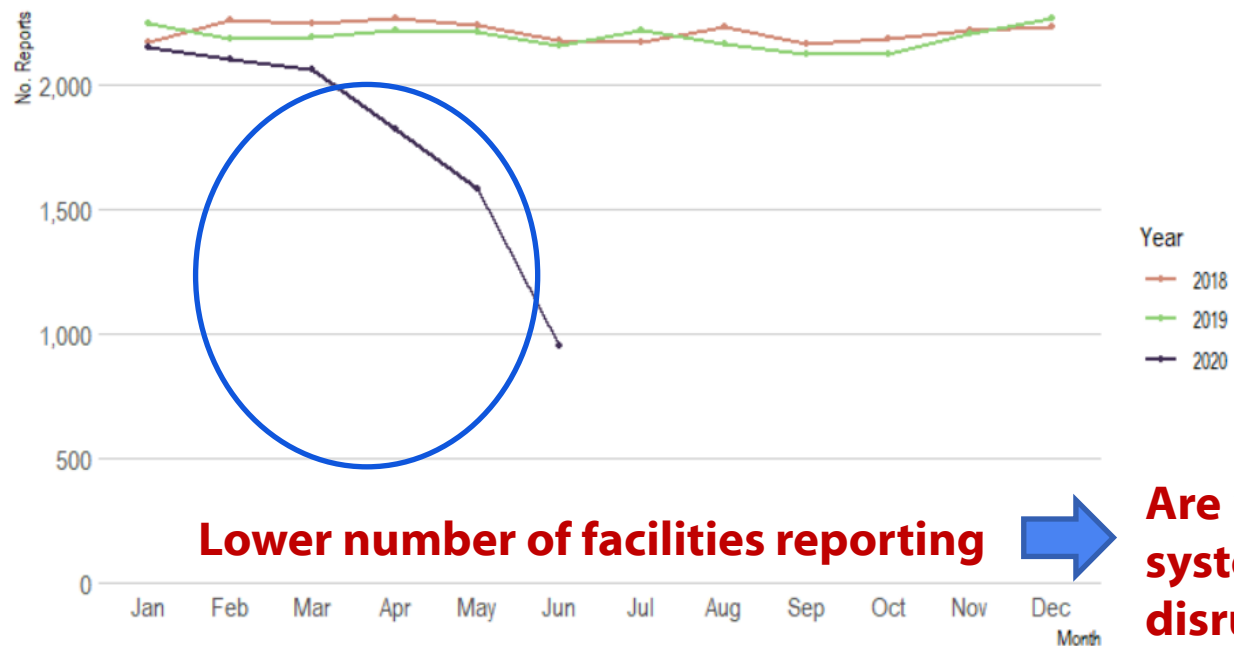## Number of Reports, 2018-2020



**Lower number of facilities reporting** → **Are reporting systems disrupted?**

## Example 1: Interpreting Trends in Reported Outpatient Attendance
## Number of Reports, 2018-2020



**Lower number of facilities reporting** ➡ **Are reporting systems disrupted?**

**Probably not: Reporting typically lags by several months**

# Example 1: Interpreting Trends in Reported Outpatient  Attendance
## Number of Reports, 2018-2020



**Typically, there is a subset of facilities that report on time (e.g. 3 weeks after end of month)**

**Probably not: Reporting typically lags by several months**

# Example 1: Interpreting Trends in Reported Outpatient Attendance
## Number of Reports, 2018-2020



**Reports from remaining facilities trickle in over several months**

**<u>Probably not:</u> Reporting typically lags by several months**

# Example 1: Interpreting Trends in Reported Outpatient  Attendance
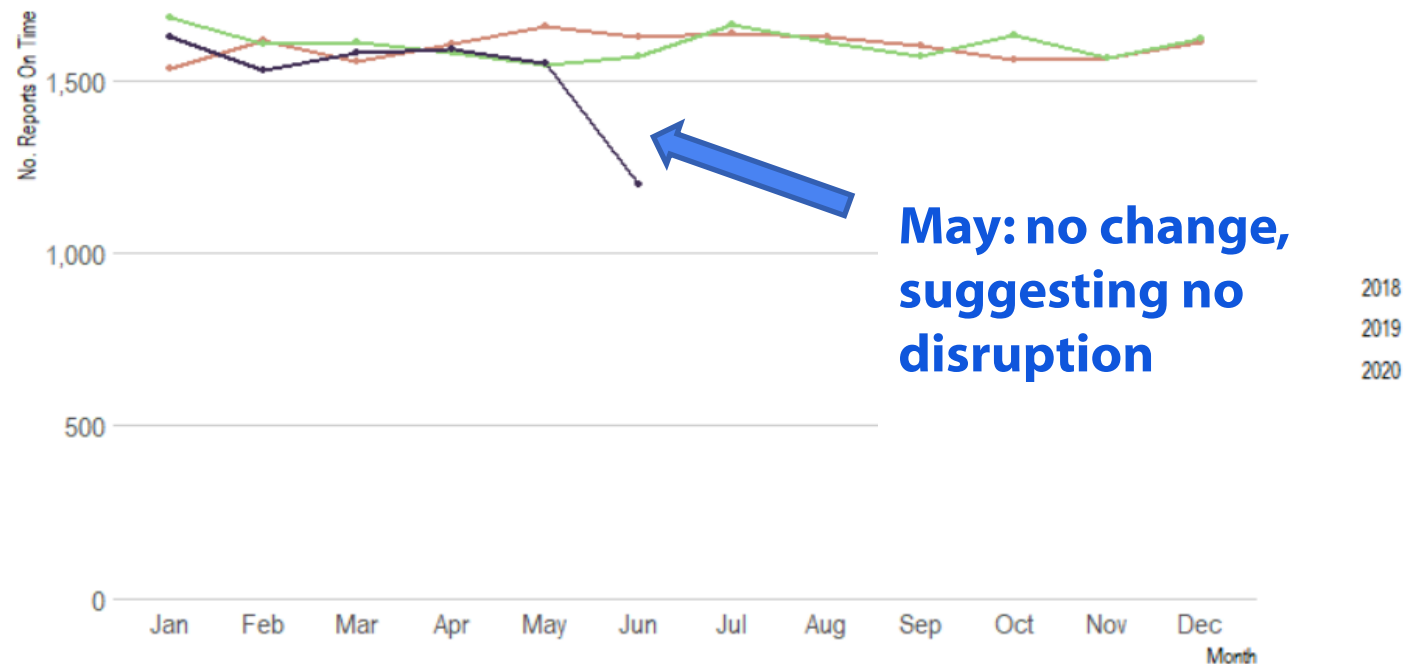## Number of Reports On Time, 2018-2020
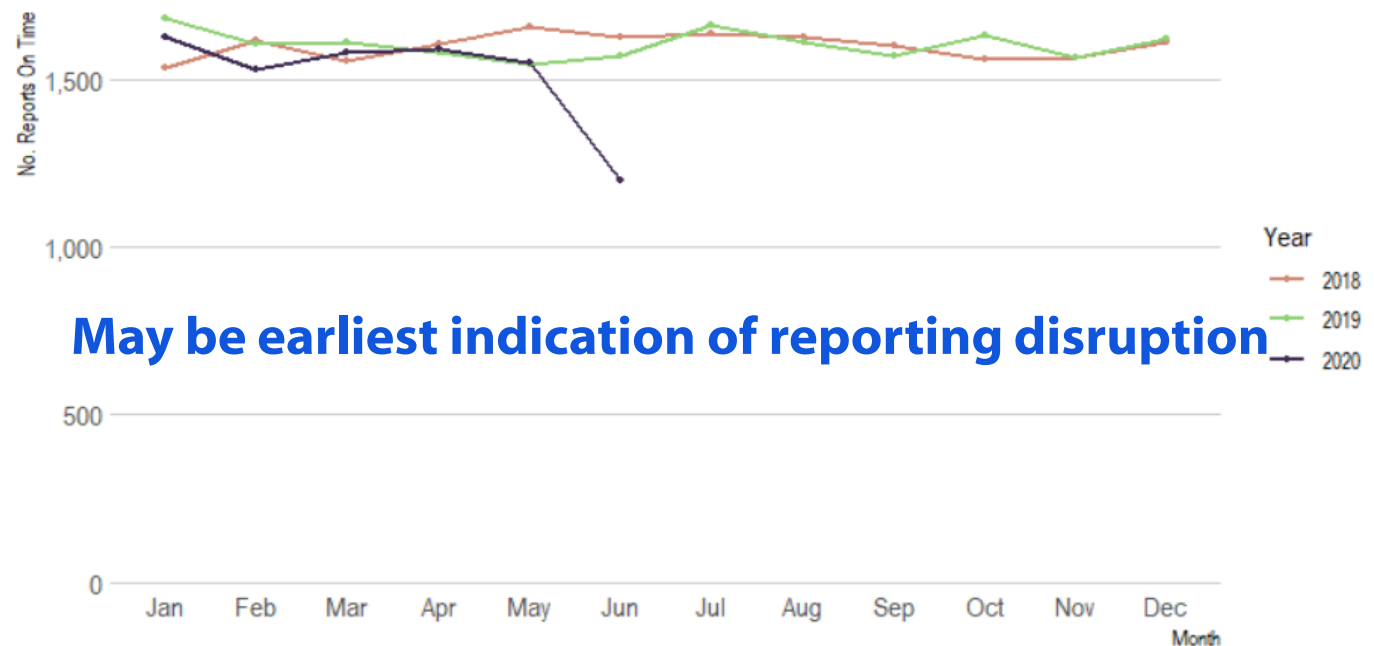
**May be earliest indication of reporting disruption**

# Example 1: Interpreting Trends in Reported Outpatient Attendance
## Number of Reports On Time, 2018-2020



**May: no change, suggesting no disruption**

2018
2019
2020

# Example 1: Interpreting Trends in Reported Outpatient Attendance
## Number of Reports On Time, 2018-2020
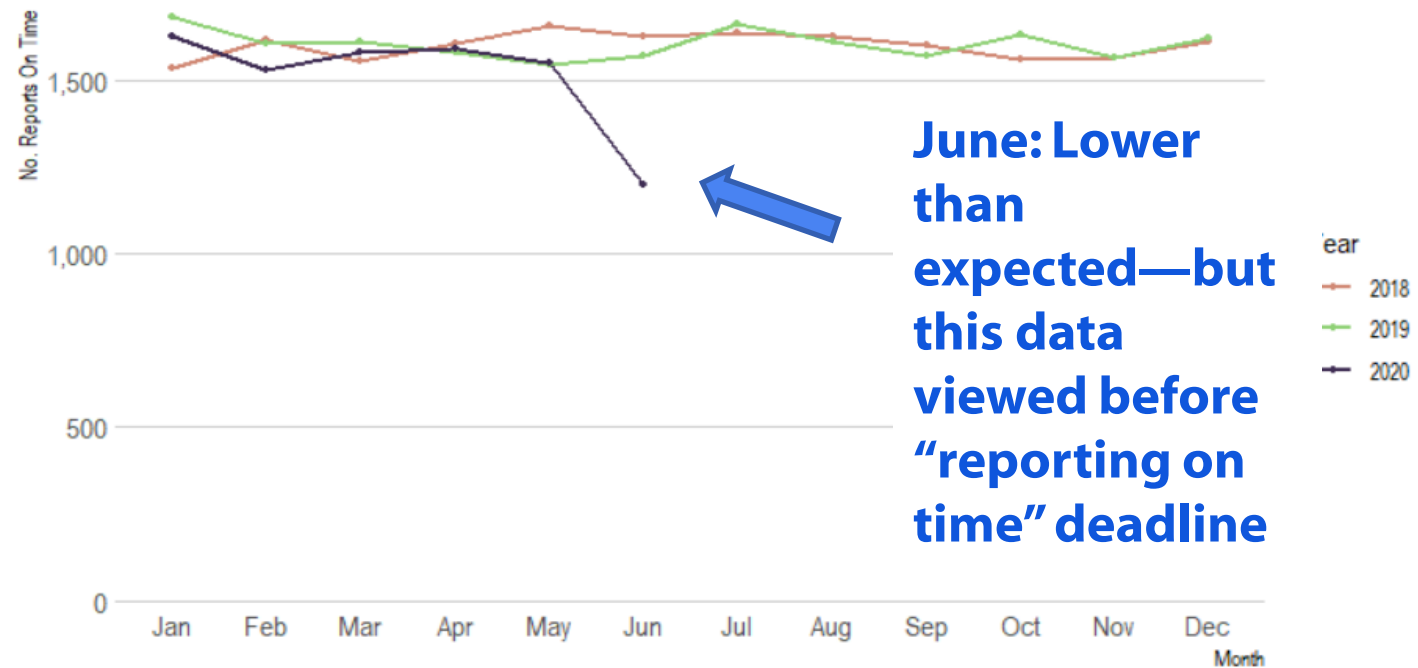


June: Lower than expected—but this data viewed before "reporting on time" deadline

# Example 2: A country with declining reporting, evidence of system-wide problem



Expected reports

Reports

Reports on time
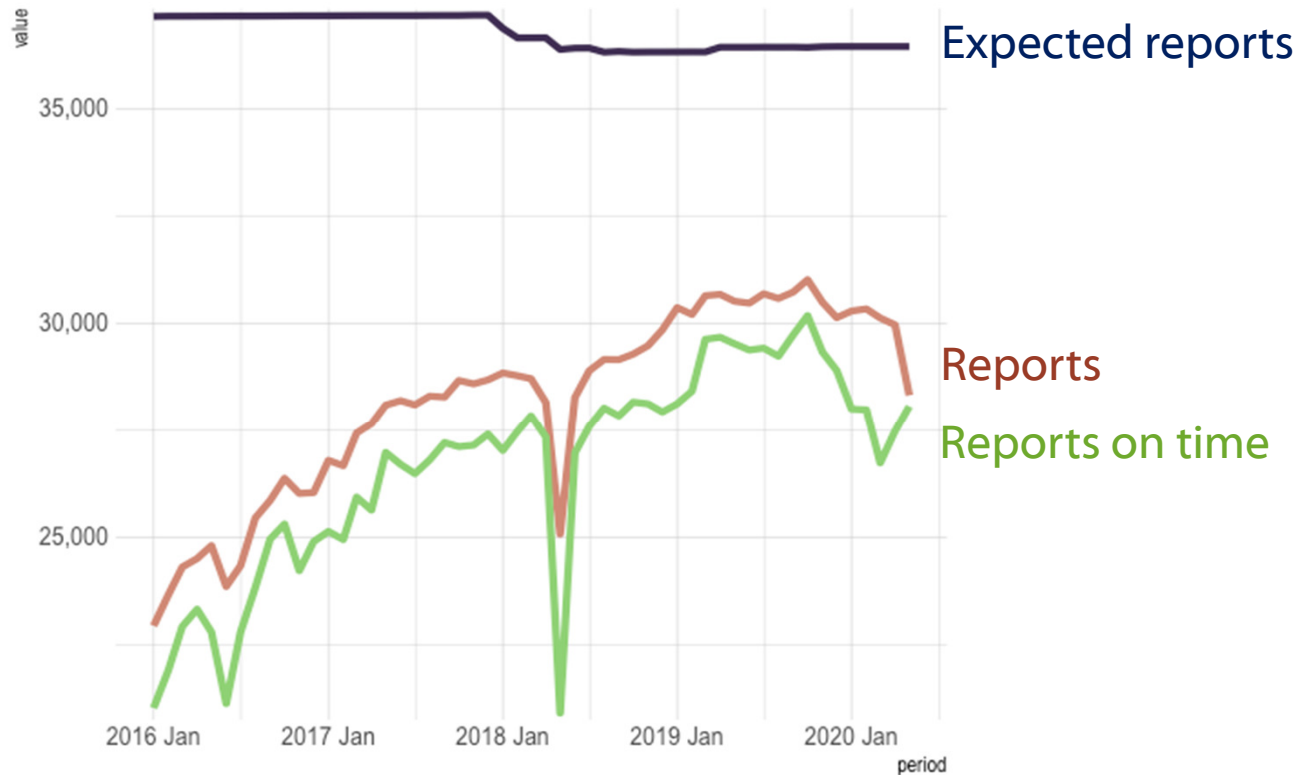
# Example 2: A country with declining reporting, evidence of system-wide problem
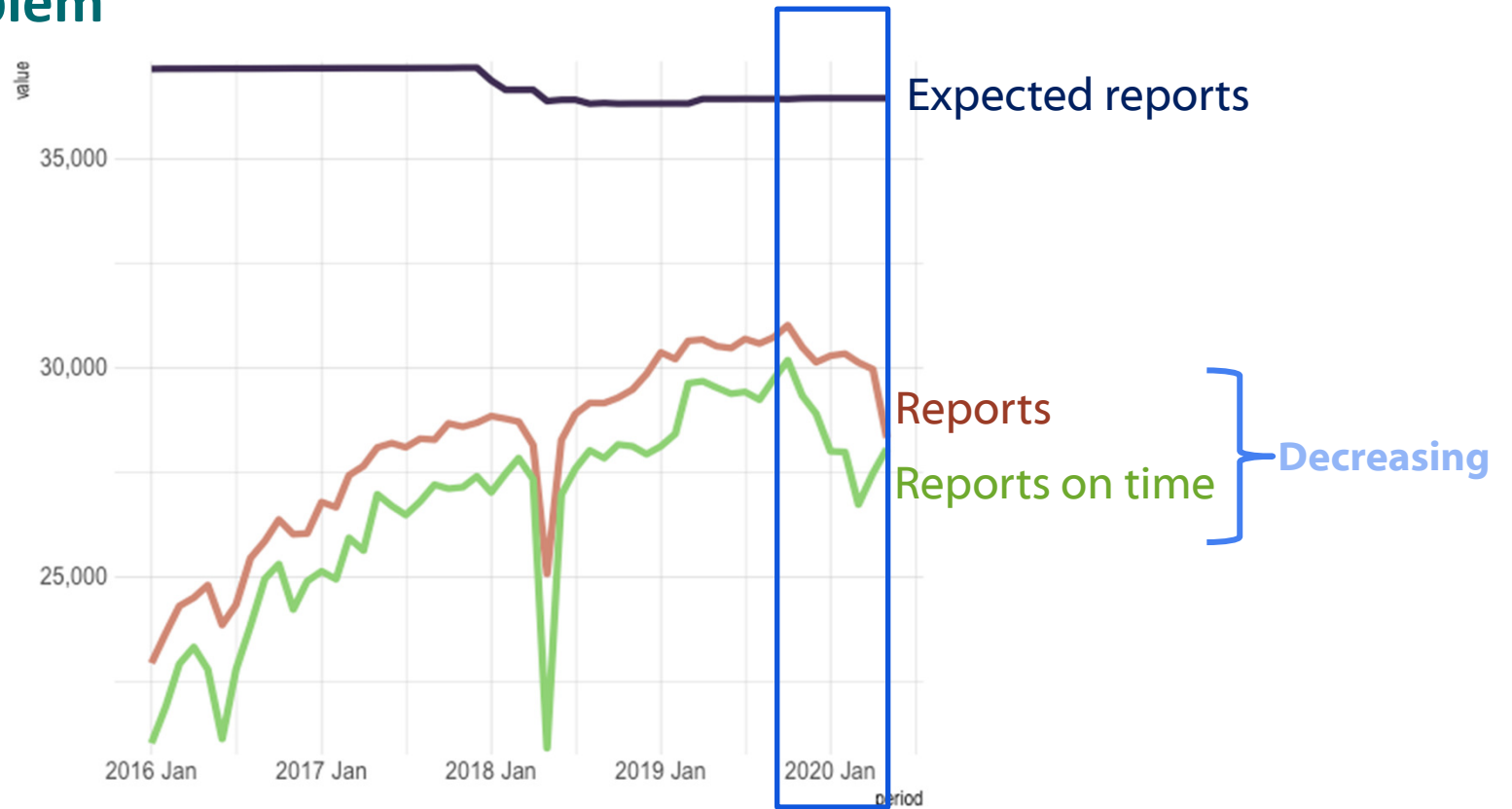


October 2019 – June 2020

# Example 2: A country with declining reporting, evidence of system-wide problem



Expected reports

Reports

Reports on time

Decreasing

→ Trend predates COVID-19
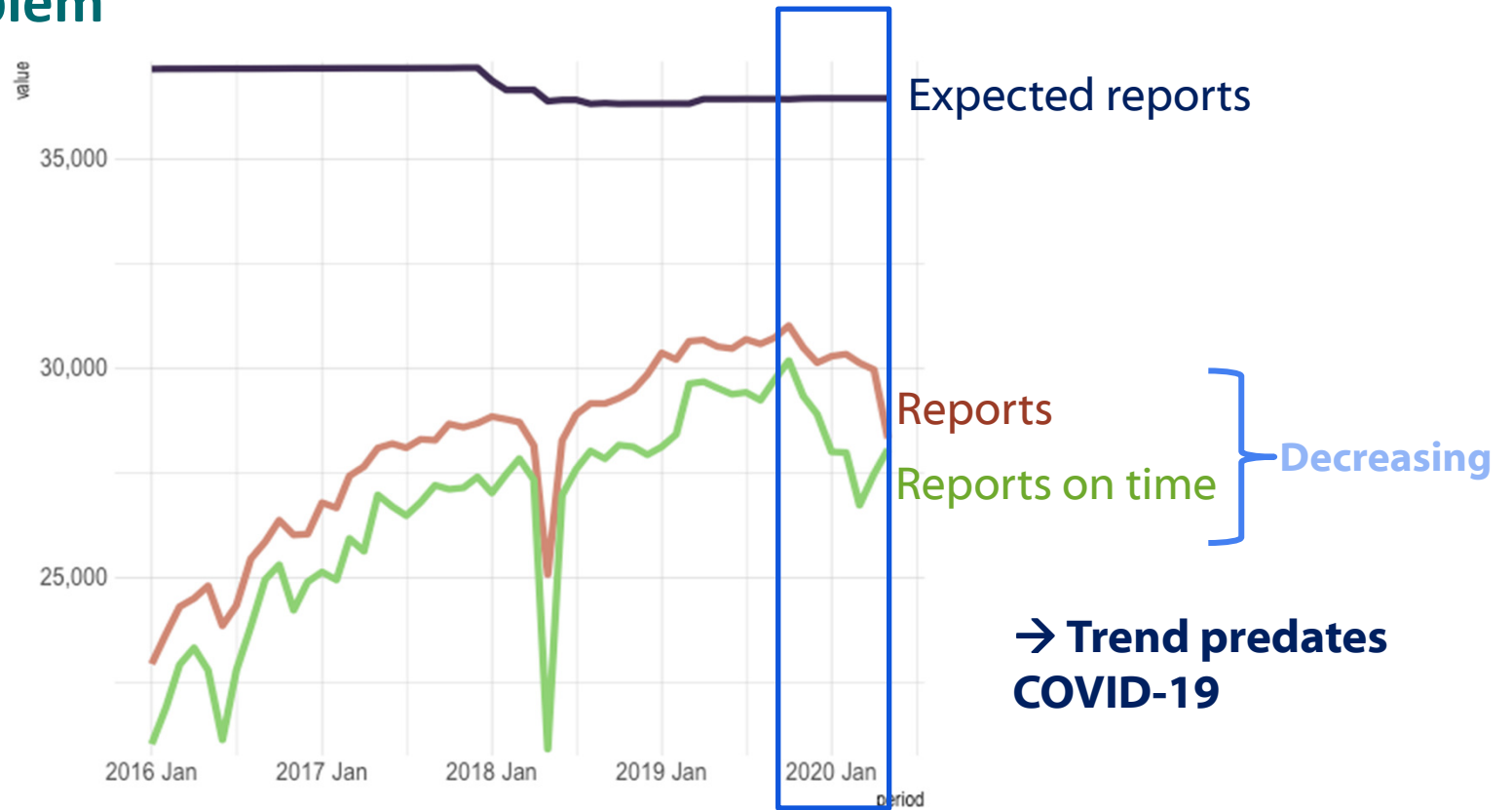
October 2019 – June 2020

# Summary

- Routine health facility data may provide indirect evidence of COVID-19 transmission

- Must account for reporting when interpreting routine data

  - When looking at recent health facility data, remember that reporting is frequently delayed by several months
  - Changing "Reporting on Time" may be indicator of systemic change that has less lag-time than overall reporting rate

# COVID-19 and Polio/AFP Active Surveillance – Uganda Experience

**Wilbrod Mwanje**

**African Field Epidemiology Network (AFENET)**

# Integrating AFP and COVID-19 active surveillance in high-risk districts of Uganda

July 6, 2020

Wilbrod Mwanje MD, MPH

# COVID-19 surveillance in Uganda

- Uganda experienced the unprecedented COVID-19 outbreak when its first case was confirmed on March 21, 2020.

- Border districts with high-volume Points of Entry (PoEs) remain hotspots for the epidemic.

- Cargo truck drivers – a key population for COVID-19 infection.

# Approaches to COVID-19 surveillance in Uganda are risk-based



Uganda last country in region to register a case of COVID-19, amid high incidence rates in neighboring countries

South Sudan

Democratic Republic of Congo

Kenya

Rwanda

Tanzania

Legend

☐ Non border districts
— Major highways
☐ Border district

0

✓ ✈

✓ 🚚

✓ 🚗

✓ 🏠 14 DAYS

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African Field Epidemiology Network
A healthier Africa
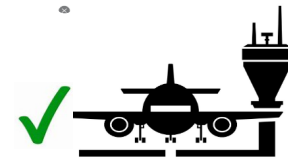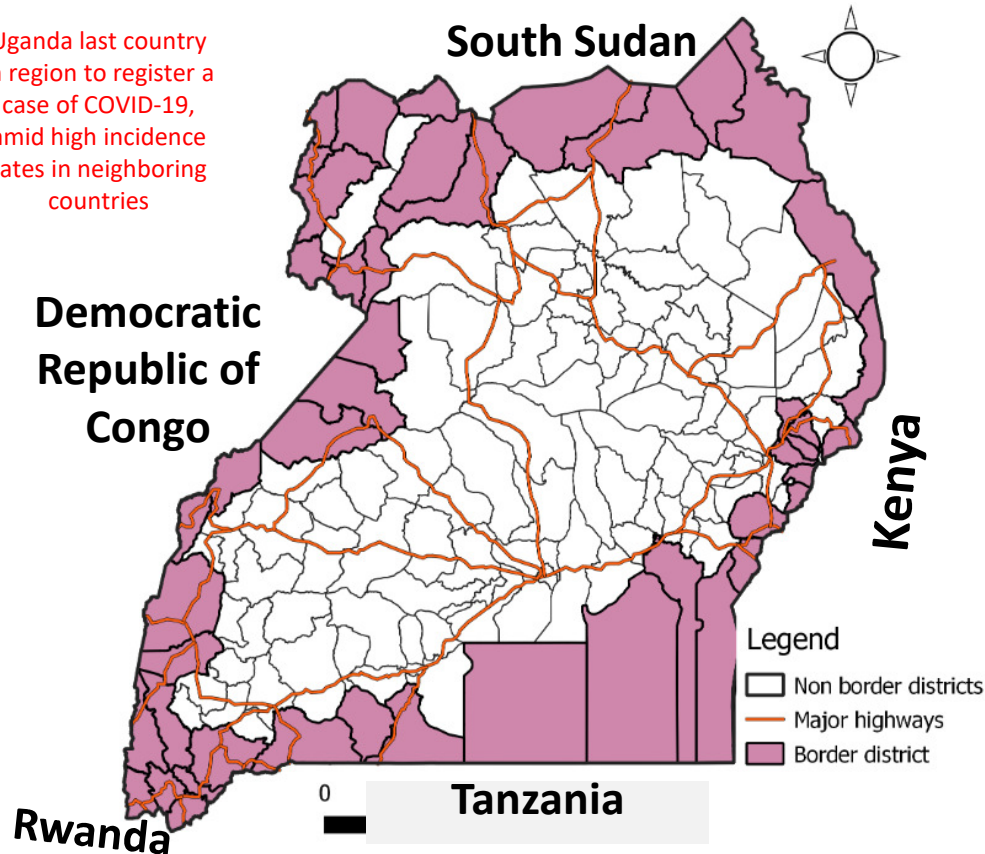
# Epidemic curve of 2,303 confirmed COVID-19 cases in Uganda



Suspended all public gathering & travel ban on returnees from high-risk countries **Mar 18**

**953** Ugandan cases - Surge of cases mostly among cross-border cargo trucker drivers

1st Case **Mar 21**

Lockdown extended for 21 days **April 14**

Ban on public transport & trading of non food items **Mar 25**

14-day nationwide lockdown except cargo planes/trucks **Mar 30**

Lifted ban on public transport except in border districts **May 14**

■ Ugandan ■ Non-national

Date of Confirmation of COVID-19

Data as of July 5, 2020

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# Project goal and objectives

- **Overall**
  - To integrate active surveillance for COVID-19 and acute flaccid paralysis (AFP) in high risk districts.
- **Specifically**
  - To strengthen district capacity for detection and response to COVID-19.
  - To strengthen district capacity for detection of AFP.
  - To establish and implement a schedule of active surveillance visits to priority health facilities and communities located close to Points of Entry (PoEs).

# Methods I
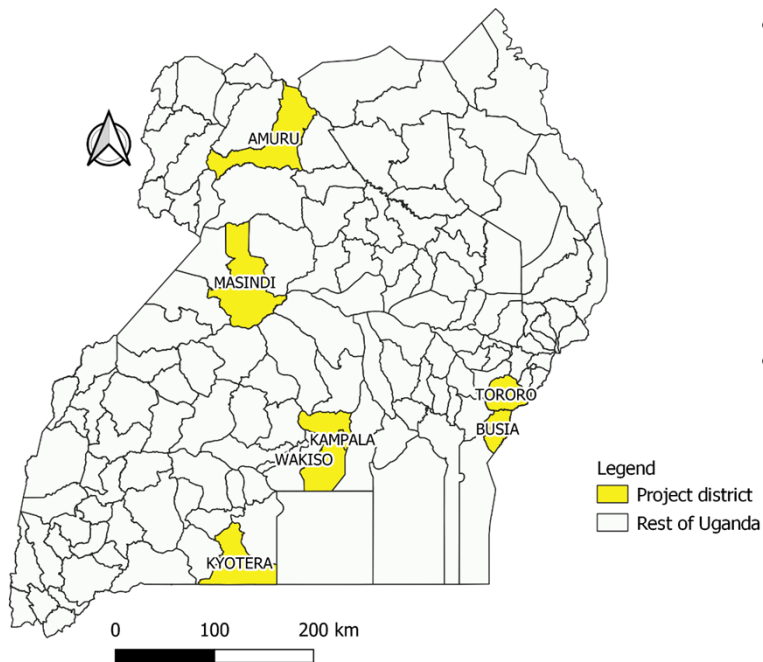


- **Trained Field Epidemiology Training Program (FETP) and National Stop Transmission of Polio (NSTOP) field teams in COVID-19 and AFP surveillance – May 29, 2020**

- **Deployed teams (Epi, lab, central supervisor) to 7 districts for 10 days starting June 1**

# Methods II

- **Training/Sensitization:**
- We sensitized health workers at health facilities and village health team members (VHTs) on COVID-19 & AFP surveillance.
- **Visits to health facilities:**
- Documented active search visits to the facility in 3 months prior to our visit.
- **Review of AFP/COVID-19 surveillance practices**
- Reviewed AFP & suspect COVID-19 cases in registers against those reported in the monthly report form for the 3 months prior to our visit.
- Line-listed missed COVID-19 suspect cases (SARI, pneumonia/severe pneumonia) and AFP cases within 3 months to our visit.
- Suspect COVID 19 specimens were only collected from suspects who presented to the health facility within a 14 days prior to our visit.
- PCR testing for SARS-CoV2 was performed on all suspect COVID 19 specimens

# Sensitization of COVID-19 / AFP surveillance

| District | Number sensitized | |
|---|---|---|
| | Health workers | Village Health Team members (VHTs) |
| Amuru | 92 | 53 |
| Busia | 61 | 40 |
| Kampala | 68 | 45 |
| Kyotera | 120 | 48 |
| Masindi | 51 | 38 |
| Tororo | 124 | 30 |
| Wakiso | 40 | 30 |
| Totals | 556 | 284 |



Health workers sensitization session



VHT sensitization session

# Health facility (HF) visits by district

| District | AMURU | BUSIA | KAMPALA | KYOTERA | MASINDI | TORORO | WAKISO | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Number planned | 34 | 32 | 42 | 40 | 45 | 40 | 29 | 262 |
| Number visited | 19 | 18 | 31 | 40 | 23 | 18 | 21 | 170 |
| % Visited | 56% | 56% | 74% | 100% | 51% | 45% | 72% | 65% |

Delay while filling the electronic data collection forms,
Distant facilities were reasons for not reaching all HFs

# AFP & COVID-19 surveillance practices in health facilities

| Month in 2020 | AFP surveillance | | | | | COVID-19 surveillance | | | |
|---|---|---|---|---|---|---|---|---|---|
| | AFP cases identified in OPD register | AFP cases reported in monthly HMIS 105 | AFP cases investigated by health facilities for Polio | AFP cases NOT reported | % facilities visited by *DSFP for Active search | SARI or Pneumonia cases identified in OPD register | SARI or Pneumonia cases reported in monthly HMIS 105 | SARI or Pneumonia cases NOT reported | SARI or Pneumonia cases investigated for COVID19 |
| March | 3 | 3 | 1 | 0 | 17% | 3281 | 2625 | 656 | 0 |
| April | 2 | 1 | 1 | 1 | 17% | 2088 | 1956 | 132 | 0 |
| May | 1 | 0 | 0 | 1 | 20% | 1871 | 1613 | 258 | 0 |
| Totals | 6 | 4 | 2 | 2 | | 7240 | 6194 | 1046 | 0 |

*DSFP =District Surveillance Focal Person

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African Field Epidemiology Network
*A healthier Africa*

# Test Results

| Disease | Suspect Cases | Specimens collected | Positive |
|---------|---------------|---------------------|----------|
| COVID-19 | 363 | 363 | 0 |
| AFP | 2 | 0 | NA |

Loss to follow up of 2 AFP cases
No Specimens picked

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# Risk factors among 312 suspect COVID-19 cases

| Risk factor | Number and percentage |
|---|---|
| Suspect case travelled any where in with ongoing transmission in last 14 days | 52 (17%) |
| Suspect case was a close contact | 69 (22%) |
| Suspect case visited health facility with symptoms | 85 (27%) |
| Health worker | 74 (24%) |

# Reasons for non-investigation of suspect cases

- **Acute flaccid paralysis (AFP)**
- AFP cases were not investigated due to transport difficulties following the lockdown.
- **COVID-19**
- Health workers not knowledgeable of the suspect COVID19 case definition
- Health workers not trained in COVID-19 surveillance.
- Health workers have limited access to testing supplies.
- Active search for COVID-19 not fully rolled out in Uganda as a strategy.
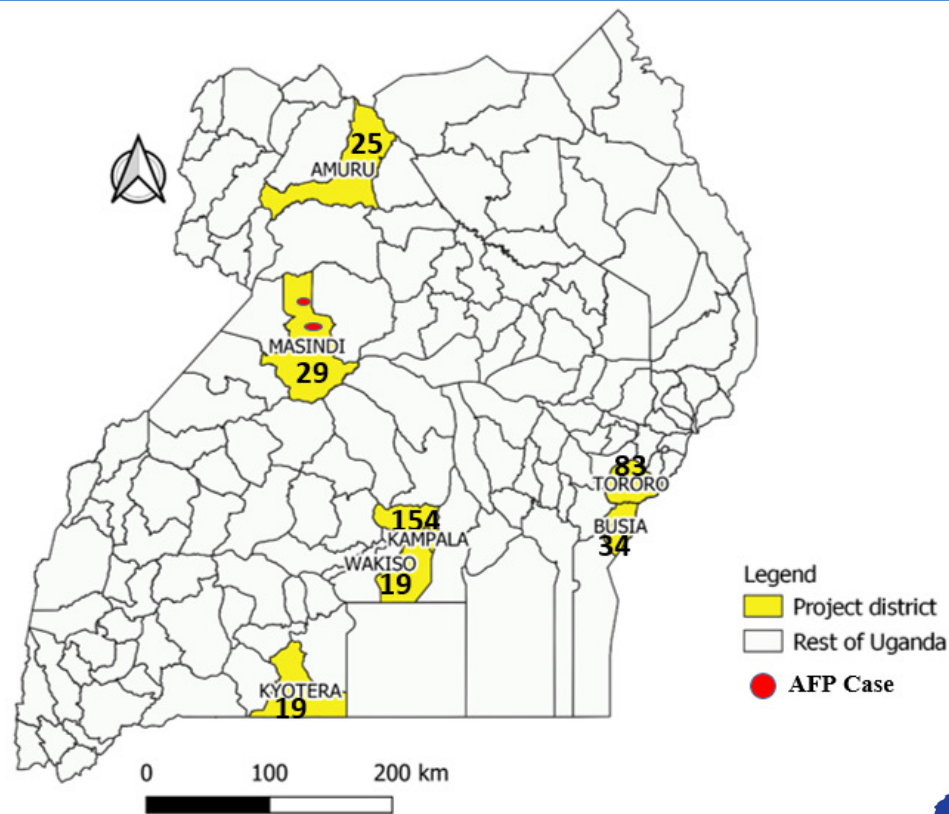
# Good IPC practices observed



Review of records outdoors

Outdoor sensitization meetings & social distancing

Sample Collection: PPE used, done in spacious room

Hand washing facilities observed at health facilities entrance

# Learned lessons & limitations

- **Lessons learned:**

- Active search for COVID-19 can be implemented using similar strategies as traditionally used for AFP active surveillance. It is feasible to simultaneously implement active search for the two diseases.

   **Limitations:**

- We did not sample all the health facilities, thus collected suboptimal data to allow for generalization of findings.

- We did not assess time from exposure to testing for suspect cases that tested negative.

# Acknowledgements

**Ministry of Health Uganda**

**CDC/GID/PEB**

**District Health teams – Project districts**

**Questions?**

**CDC COVID-19 International Task Force:**
**eocevent223@cdc.gov**

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY:  1-888-232-6348    www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.