FAMINE & FOOD CRISIS FORECASTING CENTER

HACKATHON #1: YEMEN

Day 1: Introduction and Background

Springboard Grant – Tier 1

Sep 1, 2022 – August 31, 2023

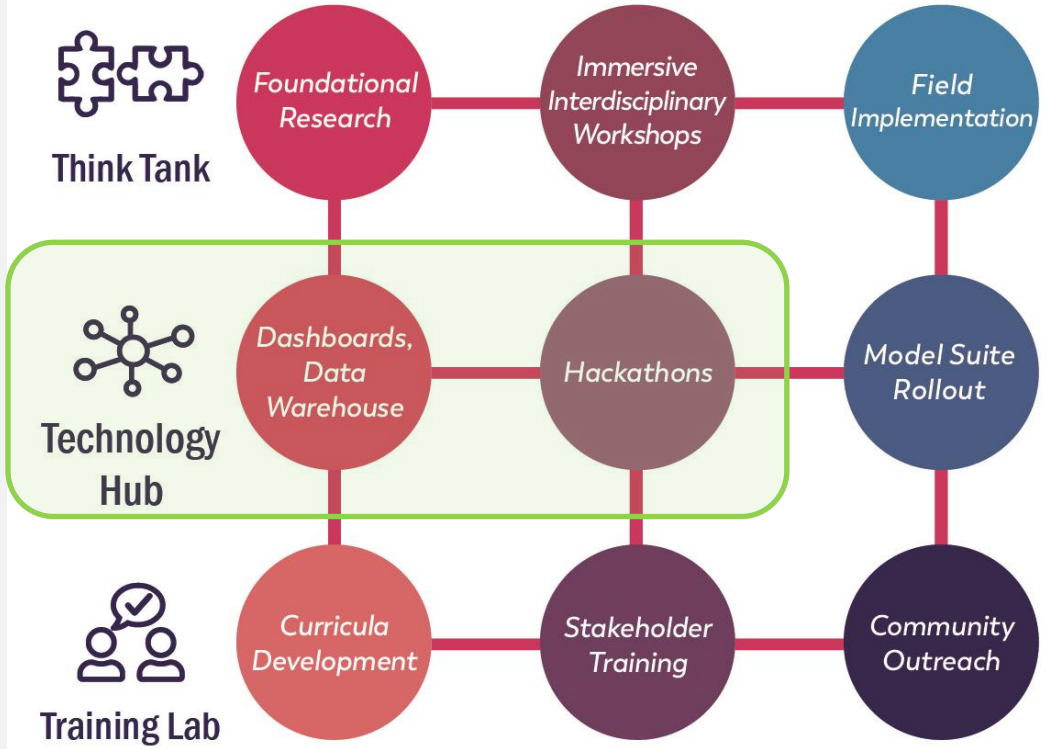
FAMINE & FOOD CRISIS
FORECASTING CENTER

Tufts UNIVERSITY | Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy

WELCOME!

ELENA N. NAUMOVA PROFESSOR, NUTRITION EPIDEMIOLOGY & DATA SCIENCE

Design, Development, Testing, Implementation



TUFTS SCHOOLS

- Tufts University | Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy
- Tufts University | Friedman School of Nutrition Science and Policy | Feinstein International Center
- The Fletcher School of Law and Diplomacy, Tufts University
- DISC — Data Intensive Studies Center at Tufts University
- Tufts University | School of Engineering
- InForMID — *Tufts Initiative for the Forecasting and Modeling of Infectious Diseases*

ACADEMIC PARTNERS

- MIT
- The University of Texas at Austin
- The University of Tennessee, Knoxville
- UC Santa Barbara

OUTREACH PARTNERS

- FAO
- WFP World Food Programme
- Global Network Against Food Crises
- IPC
- IPPNW
- The World Bank
- ICAN
- FEWS NET Famine Early Warning Systems Network

Outreach & Broader Impact

Project Team

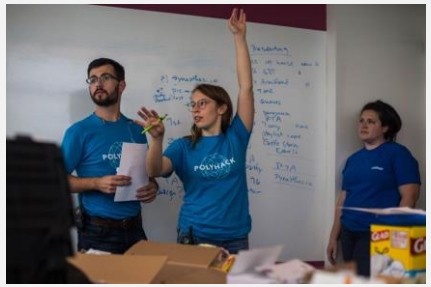
Name (First, Last)	Role	Title Appointment	Dept	School
Elena Naumova	PI	Professor & Chair	NEDS	FSNSP
Paul Howe	PI	PoP & Director	FIC	FSNSP
Daniel Maxwell	Co-I	Prof & Director	FIC	FSNSP
Anastasia Marshak	Co-I	Assist Professor	FIC	FSNSP
Merry Fitzpatrick	Co-I	Assist Professor	FIC	FSNSP
Oxana Shevel	Co-I	Assoc Professor	Pol Sci Dept	A&S
Kyle Monahan	Consultant	Manager, Data Science Services	Tufts Technology Services	A&S
Kristin Lee	Consultant	Data Librarian	Tisch Library	A&S
Elise Warren	Consultant	Graphic Designer		
Bingjie Zhou	Support	PhD student	NEDS	FSNSP
Ash Venkat	Support	PhD student	NEDS/AFE	FSNSP
Design Team Members, Students/RAs, Communication Experts, DISC, Administrative Support				

- Multi-disciplinary:
  - Humanitarian Aid
  - Political Science
  - Data Science
- Multi-cultural
- Multi-generational
- Team Science
  - vTeams
  - Knowledge transfer

Tufts Hackathons

[Hackhackhack](#) - 2013

Generation Citizen: Civic Tech 2015



[Tufts Polyhack 2017](#)

[ID Hack 2018](#)

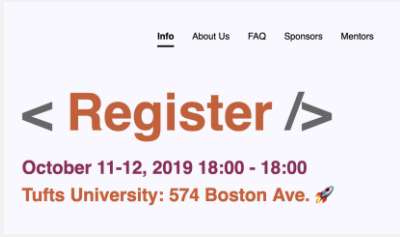
[Polyhack 2020](#)

2015 2016 2017 2018 2019 2020 2021 2023

[Polyhack](#) 2015

[Nurse Innovation Hackathon](#) 2016

[Dental Hack (ADEA)](#)



[Tufts Polyhack](#) 2019

[Art Datathon](#)

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CODE OF CONDUCT & HOUSEKEEPING

BINGJIE ZHOU — DOCTORAL STUDENT, FRIEDMAN SCHOOL (NEDS)

ANUSHKA SINGH — MS STUDENT, SCHOOL OF ENGINEERING/GORDON INSTITUTE

KYLE MONAHAN — MANAGER DATA SCIENCE SERVICES, TUFTS

Website Overview

Day 1: Introduction and Background

- 2-3 pm: Introductions (Auditorium/Urdang 207)
- 3-4 pm: Background on famine dynamics and forecasting (Auditorium/Urdang 207)
  - Presentation Slides
- 4-5 pm: Team-building and report back (Rooms 160, 280, 302, 502)
  - Upload one slide per team to Day 1 presentation deck

Day 2: Understanding Crisis Data

- 8:30-9 am: Coffee and hellos (Auditorium/Urdang 207)
- 9-10 am: Panel on hackathon preparation and data collection in emergencies (Auditorium/Urdang 207)
- 10 am-12 pm: Hacking groups (Rooms 140, 160, 260, 265)
- 12-1 pm: Report back
- 1-2 pm: Lunch
- 2-5 pm: Task assignments and hacking groups (Rooms 140, 160, 260, 265)
  - Upload one slide per team to Day 2 presentation deck

Day 3: Identify Secondary Data

- 8:30-9 am: Coffee and hellos (Auditorium/Urdang 207)
- 9-10 am: Panel on good data practice (Auditorium/Urdang 207)
- 10 am-2 pm: Hacking groups and working lunch (Rooms 180, 302)
  - Upload one slide per team to Day 3 presentation deck
- 2-3 pm: Group presentations and closing (Auditorium/Urdang 207)

tuftsfaminehackathon.github.io

Dataset | Glossary

The dataset for Hackathon #1 derives from the UNICEF Nutrition Cluster in Yemen and contains monthly measures of various nutrition indicators. Yemen is one of the few countries with protracted, ongoing food crises for which OCHA publishes routine nutrition monitoring data. Detailed OCHA reports and monthly updates can be viewed here.

The scientific exercises of the hackathon are:

- Develop a timeline of events relevant to team focus and period of the Yemen crisis (2016-present)
- Develop visualizations and summary tables of available and unavailable data in Yemen during the crisis period
- Create a merged dataset with available characteristics
- Perform preliminary quantitative analysis with the data (summary statistics, regression)

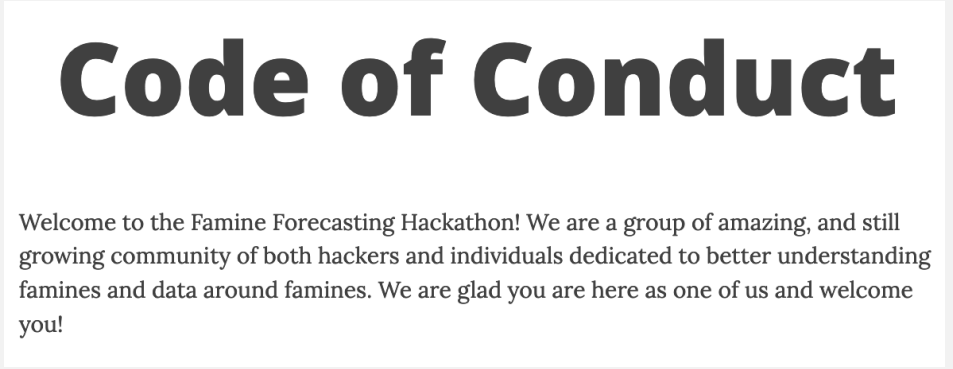
Housekeeping

- Closing time of the JCC
- Access to accommodations
  - Food
  - Water
  - Bathrooms
- Tips for the hackathon
- Questions? Slack!
  - https://go.tufts.edu/tuftshackslack

Code of conduct

Guiding principles:

- No harassment, including personal attacks.
- No use of illegal/pirated content.
- No use of inappropriate imagery or content.
- No racist, sexist, cissexist, agist or otherwise oppressive behaviors or assumptions.
- No discrimination based on level of coding skills or knowledge of the context or content.
- We all have something to contribute.



Basic rules of hackathons

Suggested rules:

- Keep an open mind.
- Allow others to contribute their experiences and background without judgement.
- Get to know your team, actively listen.
- Learn from each other.
- Don’t be afraid to teach others what you know.
- Your teams are multi disciplinary - take advantage of this diversity.

In-person support today

Bingjie Zhou

Kyle Monahan

Anushka Singh

Merry Fitzpatrick

&

Xichen Wang!

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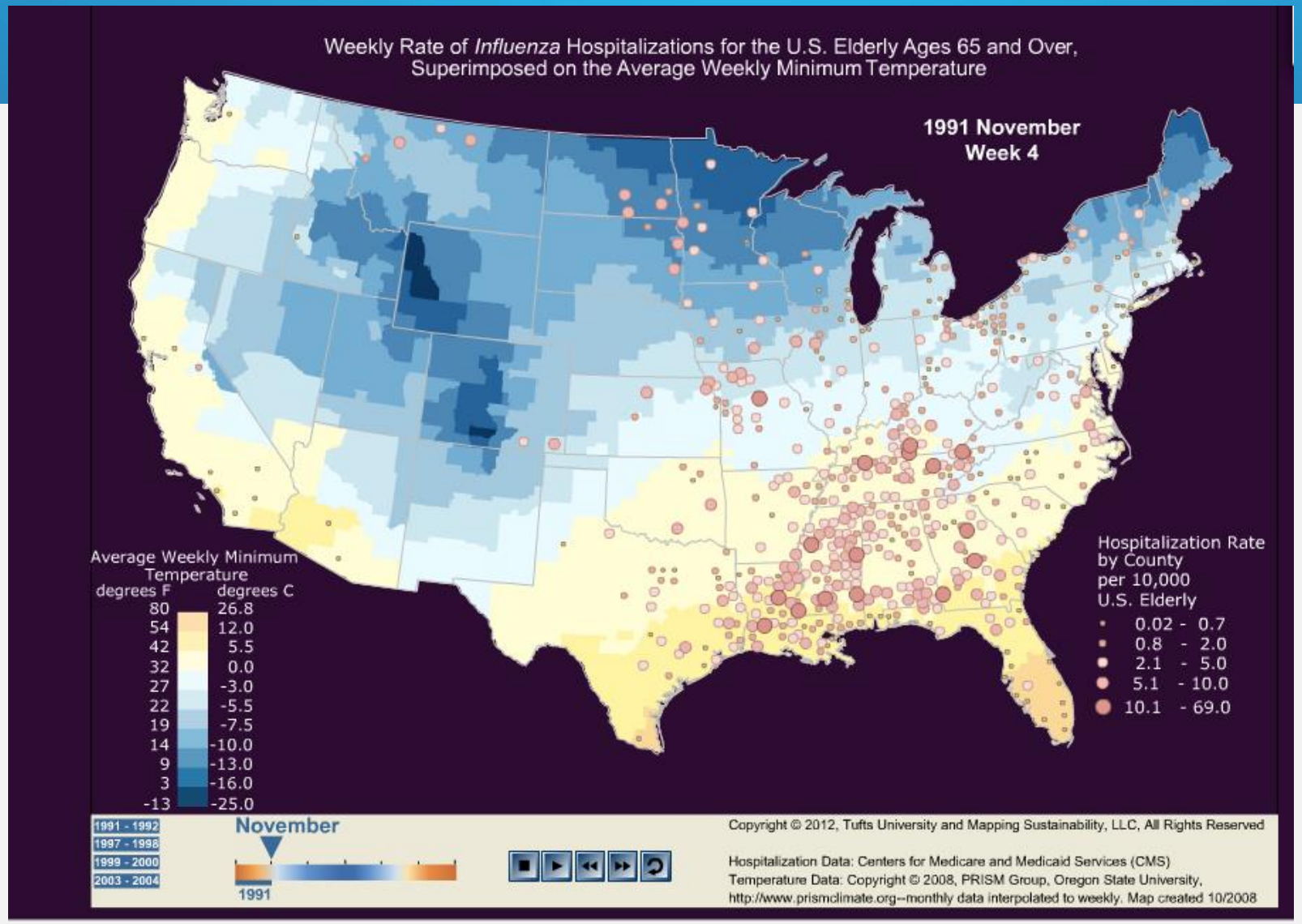
THE VALUE OF DYNAMIC MAPS

ELENA N. NAUMOVA PROFESSOR, NUTRITION EPIDEMIOLOGY & DATA SCIENCE

Dynamic Disease Mapping



Famine & Food Crisis Forecasting Center

Data Volume:

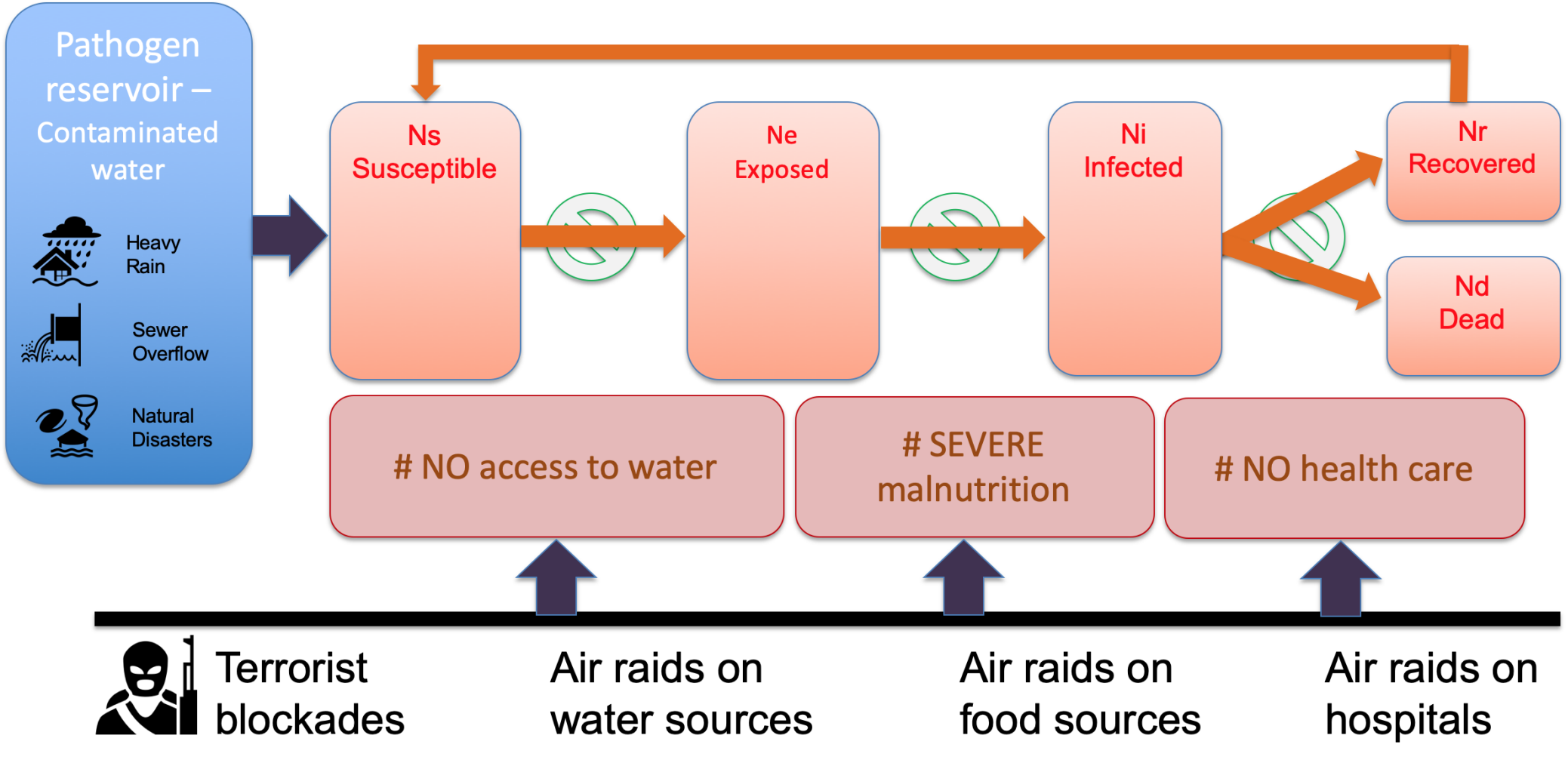
300,000,000+ records of hospitalizations in US adults 65+ y.o.
120,000+ cases of Influenza
converted into weekly rates at county-level

9000+ ground meteorological stations for hourly temperature measurements from 1991-2009

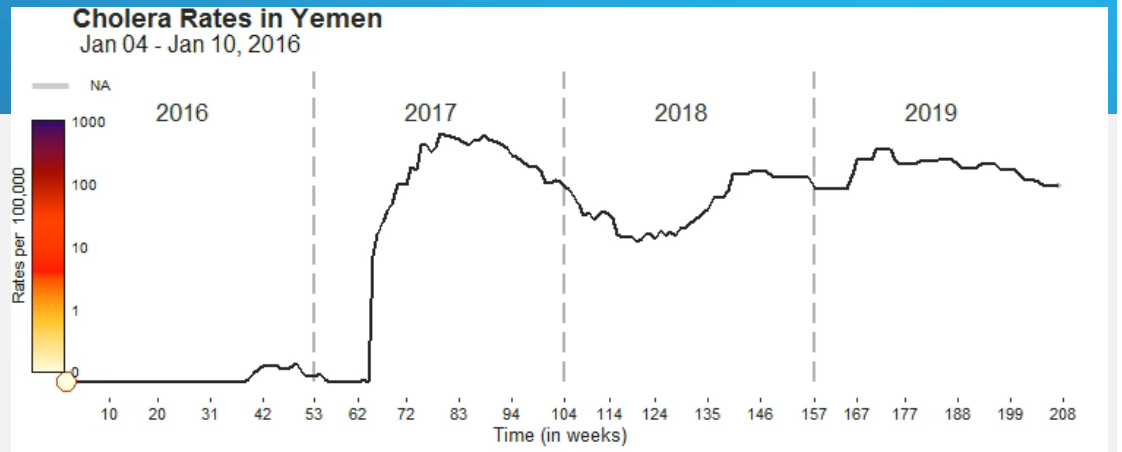
Moorthy et al. Deviations in influenza seasonality: odd coincidence or obscure consequence? Clinical Microbiology and Infection. 2012 Oct;18(10):955-62.

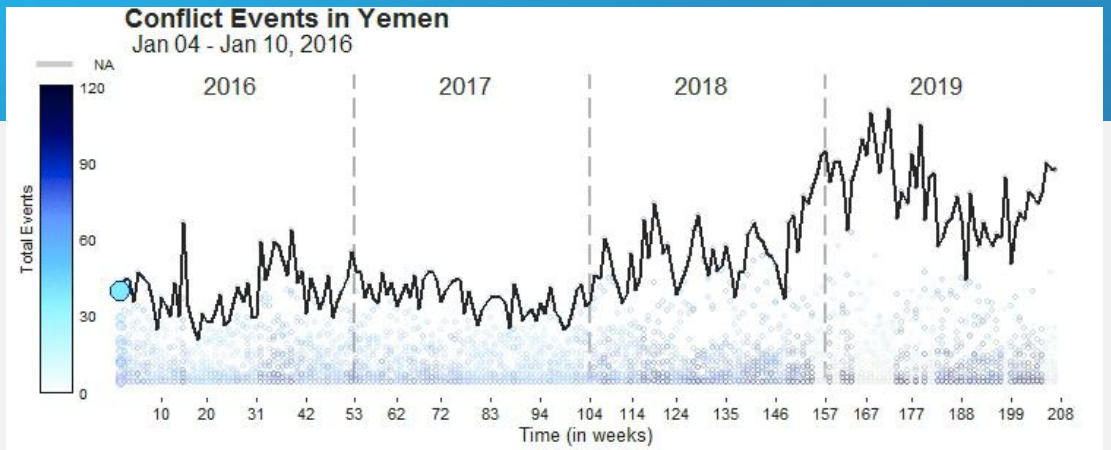
Aggravating factors

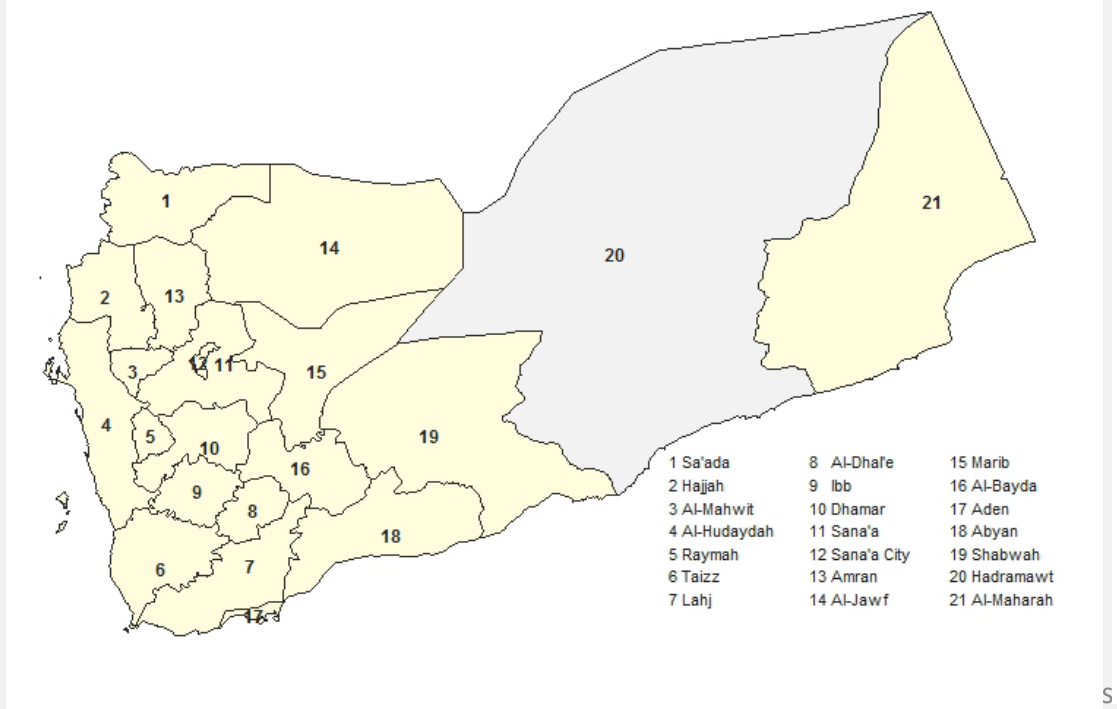
Amplifying Risks of Cholera Transmission, Mortality and Morbidity:
intentionally broken barriers = wiping out 100 years of efforts

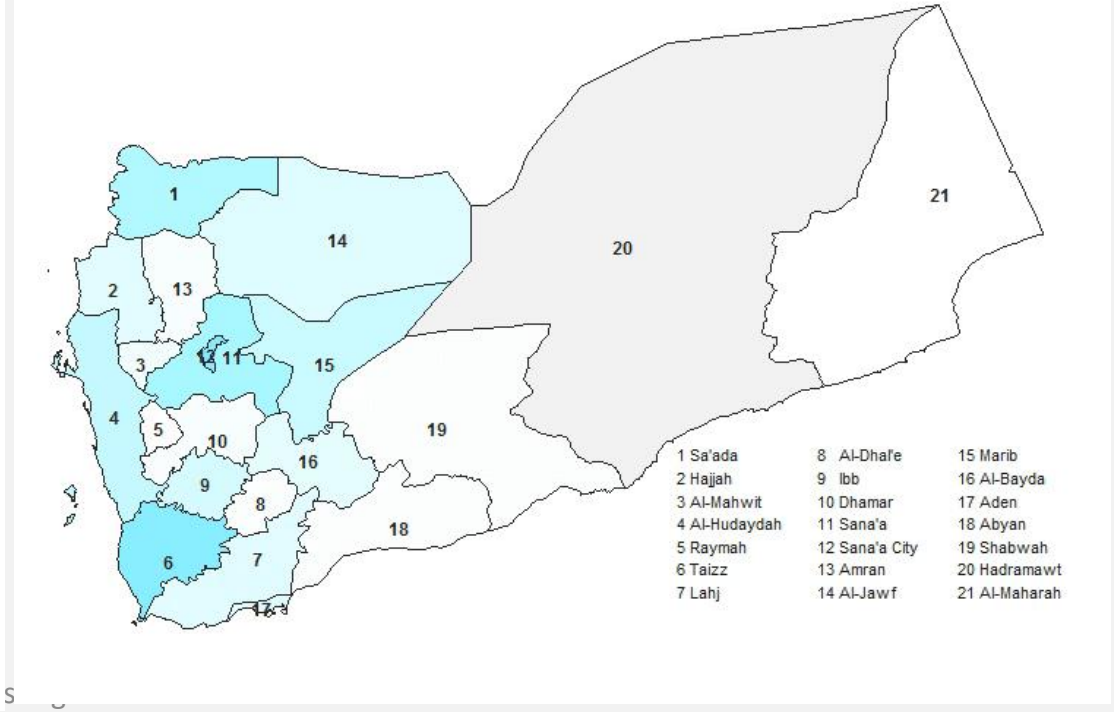


Dynamic Mapping: Cholera and Conflict





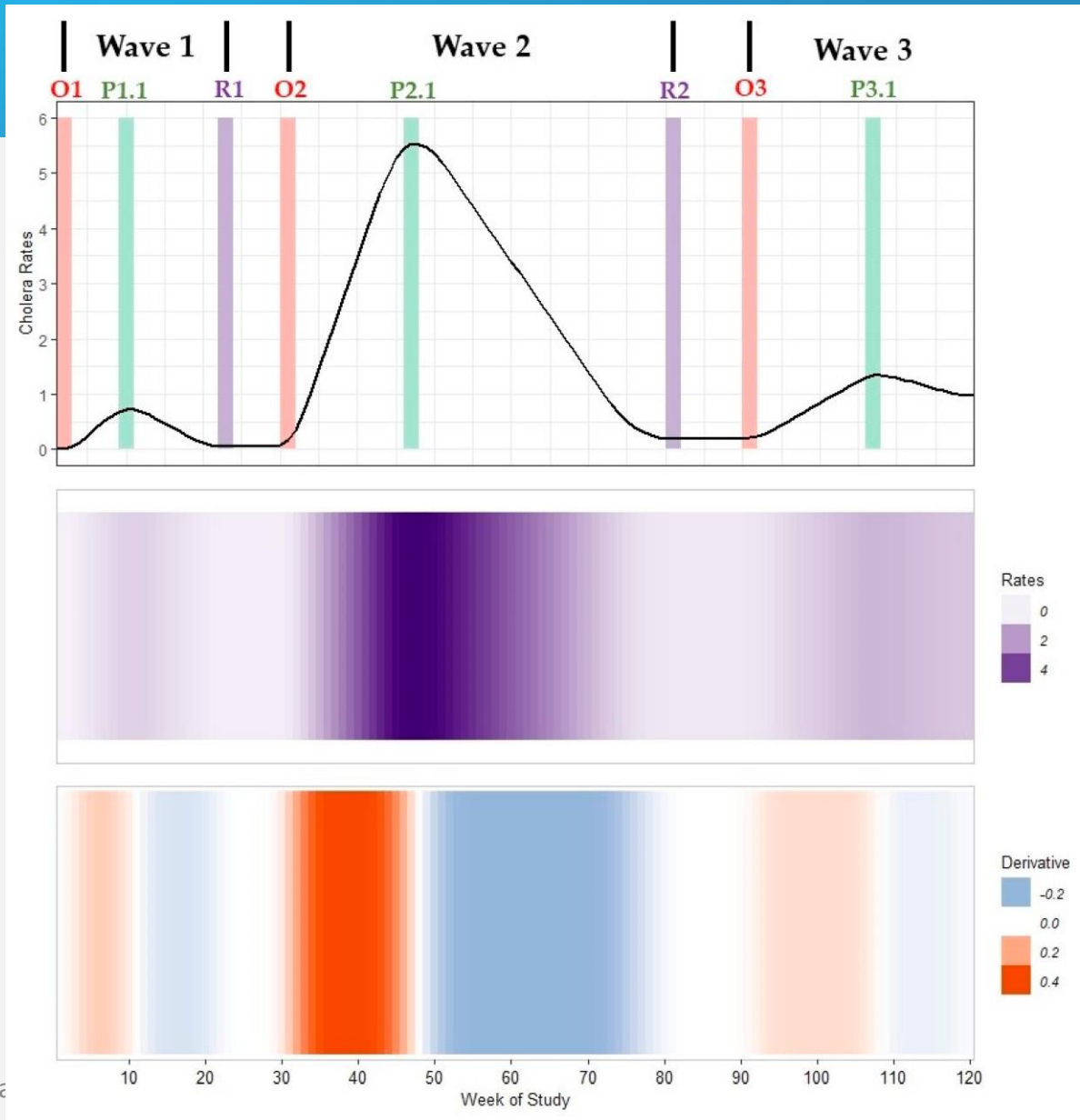




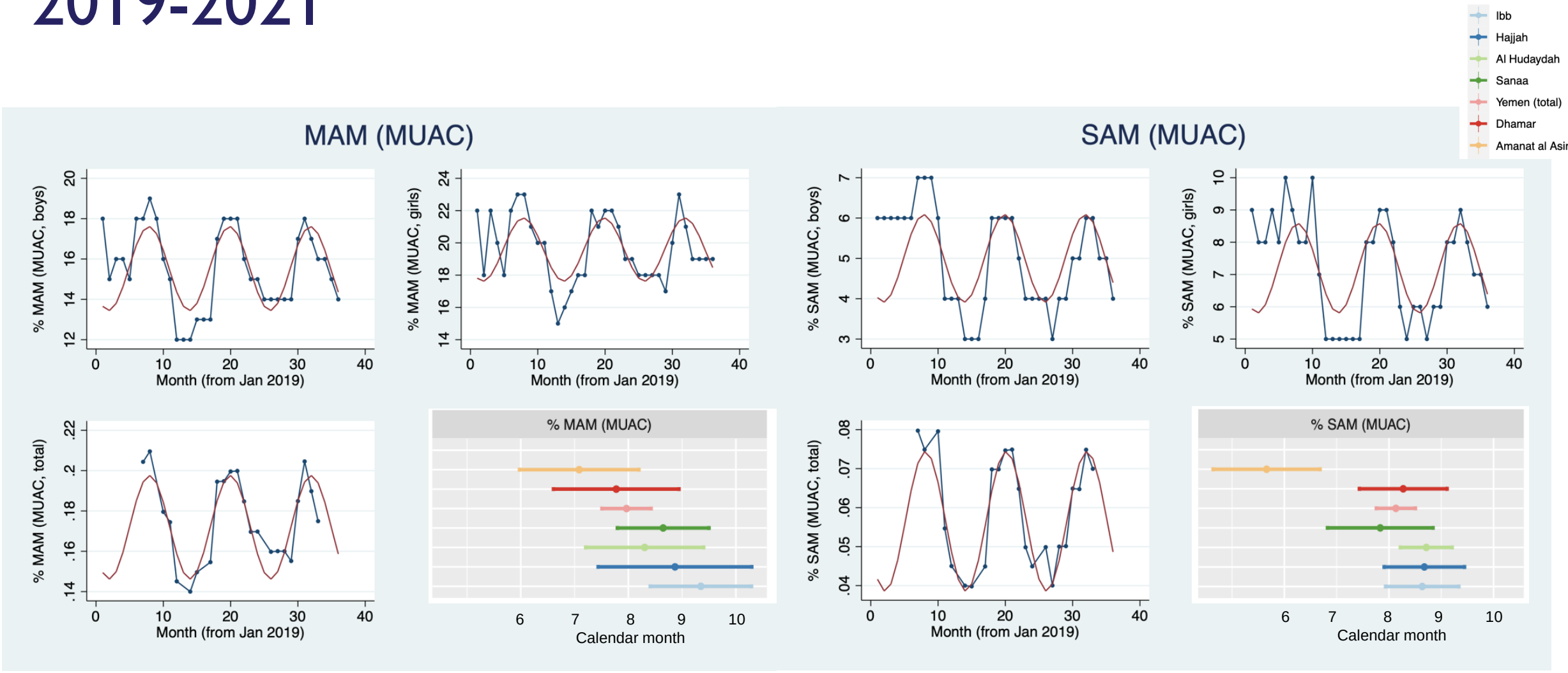
Cholera in Yemen, 2016-2019

Dataset

Feature	Cholera Infections
Database	Eastern Mediterranean Regional Office (EMRO) Epidemiological Bulletins
Host	World Health Organization (WHO)
Case Definition	Laboratory confirmed cholera cases
Location	21 of 22 governorates in Yemen
Time Period	04 January 2016 – 29 December 2019
Timeliness	Weekly (Monday – Sunday)



Seasonality in Malnutrition Outcomes in Yemen, 2019-2021



OCHA: The Humanitarian Data Exchange

Service provided by

OCHA

OCHA coordinates the global emergency response to save lives and protect people in humanitarian crises. We advocate for effective and principled humanitarian action by all, for all.

YEMEN NUTRITON CLUSTER

Yemen | Nutrition Cluster Dashboard

January to December 2020

7,380,231	3,588,517	5,498,586
People in Need	Overall Target	Reach(75% PIN,153% Target)

Achievement in 12 months towards Cluster targets in 12 months

Activity	Progress	Taget	Need
268,276 Children treated for severe acute malnutrition Without Complication	93%	289,402	321,558
17,638 Children treated for severe acute malnutrition with Complication	71%	25,010	35,729
722,898 Children treated for moderate acute malnutrition	73%	996,128	1,570,026
752,264 Pregnant or Lactating Women treated for acute malnutrition	146%	514,808	1,140,532
867,089 Children received micronutrient supplementation	46%	1,903,680	3,966,000
1,115,069 Children 6-59 months received Vitamin A supplementation	62%	1,811,353	4,766,718
714,087 Children under 6-24 months at risk of malnutrition reached with BSFP support	106%	673,318	800,719
520,389 Pregnant or Lactating Women at risk of malnutrition reached with BSFP support	83%	630,288	1,211,146
1,572,642 Pregnant or Lactating Women received Iron folate supplementation	164%	958,931	1,712,378
2,824,231 Mothers/Caregivers received IYCF Counselling	168%	1,682,336	2,403,337

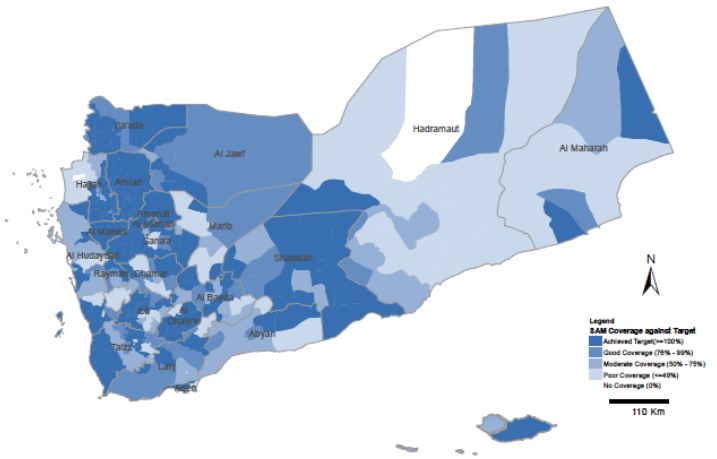
Individuals Reached

Girls	1,089,550	(20%)
Boys	1,046,822	(19%)
Women	3,362,214	(61%)

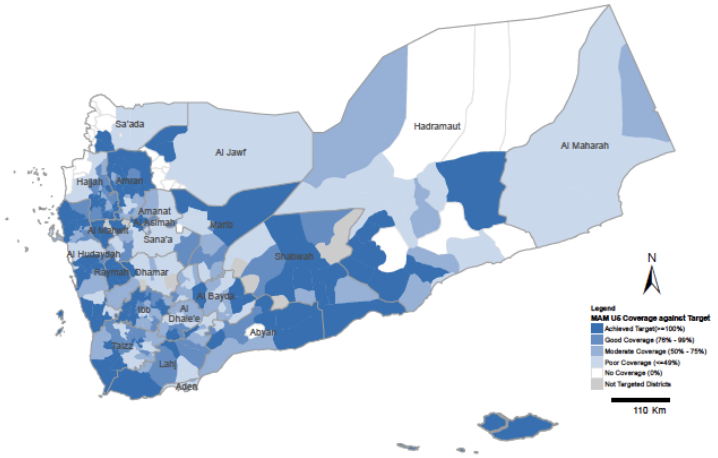
Partners

ACF,ADD,ADO,ADRA,BFD,Concern,CSSW,FHD,FHI360, FMF,HADO,HA,IMC,INTERSOS,IRC,IRY,IYCY,MC,Medair, MMF,MoPHP,MSF,NFDHR,PU-AMI,QRCS,RDP,RI,SAW-T,SCI,SHS,SML,SOUL,TFD,TYF,UNHCR,UNICEF, VHI,WFP,WHO,YDN,YFCA,ZOA

SAM Achievement in 12 months towards Cluster targets in 12 months



MAM Achievement in 12 months towards Cluster targets in 12 months



Contact

Isaack Manyama
Cluster Coordinator
imanyama@unicef.org

Abdulkawi Moharram
Cluster IMO
amoharram@unicef.org

Creation Date : 4th Feb , 2021

https://www.humanitarianresponse.info/en/operations/yemen/nutrition

- Inconsistent data reporting between governorate and national level makes comparisons difficult
- Seasonality is present for the majority of outcomes for each geographic location
- Differences in peak and nadir timings highlights importance of targeted interventions

https://www.humanitarianresponse.info/en/operations/yemen/nutrition

Data harmonization challenge

Media centre

The Ministry of Public Health and Population announces cholera cases in Yemen

Sana'a, 7 October 2016— Yemen's Ministry of Public Health and Population has officially announced the occurrence of 8 cholera cases among population in one of the areas of Sana'a city. The stool samples of these cases were tested positive for *Vibrio cholerae*. The cases were admitted to Al-Sabeen Hospital in Sana'a in the first week of October and are currently receiving treatment for acute dehydration in an isolated section of the hospital.

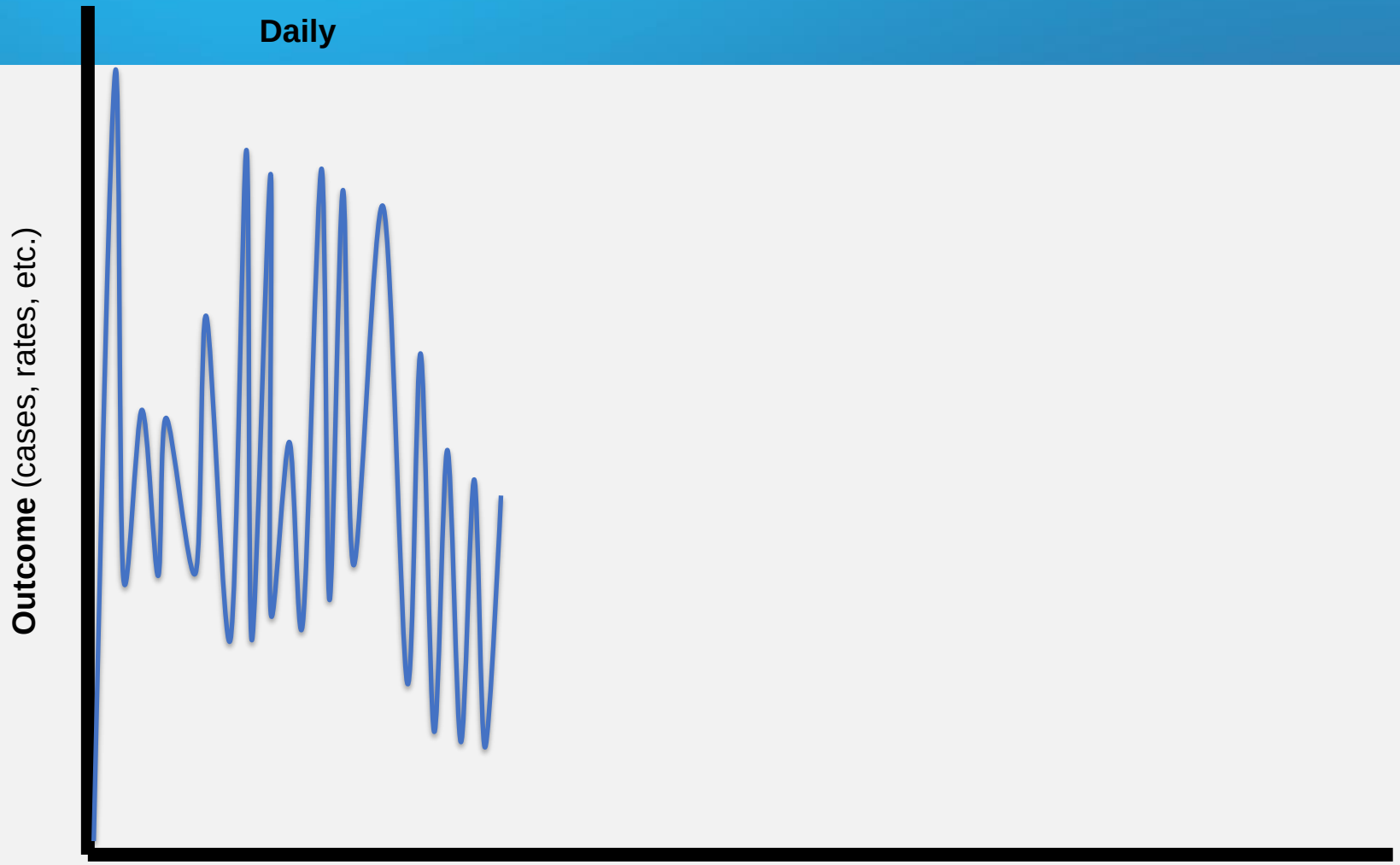
A team from surveillance programme of the Ministry was dispatched with a WHO-supported rapid response team to Al-Nasr neighbourhood of the Sho'ob district, where the patients (mainly children) were living, to investigate the source of cholera cases, test the water sources in the area and raise awareness about cholera among the community. Visits were also paid to the nearby schools and health centres to conduct an active case finding for suspected cases in the area.

To support the management of these cases by the Ministry of Public Health and Population facilities, WHO has provided sufficient quantities of intravenous fluids and oral rehydration salts to the hospital. Furthermore, WHO is working with the Ministry to support enhancing active surveillance, improve case management, establish a joint operations room for coordination of response measures and information sharing, and establish a task force to enhance the coordination response between health partners.

While response, investigation and preventive measures are ongoing, a joint Health/WASH Cholera Task Force, comprising WHO, UNICEF, Health and WASH partners has been established to coordinate the daily work and provide support to the Ministry and the concerned authorities on an integrated cholera response plan. The response plan requires urgent funding for establishment of a cholera treatment centre in inaccessible areas, diarrhoeal disease kit distribution, training, strengthening surveillance system, environmental interventions and community awareness.

"The current situation is yet another alarming indicator of the escalating humanitarian conflict-related crisis in Yemen and should alert the international community to support Yemen public health system and provide health partners with the necessary resources to contain the current transmission and prevent further spread of *Vibrio cholerae* to other high-risk areas in the country," said Dr Ahmed Shadoul, the WHO Representative in Yemen.

The scarcity of clean, safe drinking-water has exacerbated the already deteriorating health situation in Yemen, causing a significant increase in acute watery diarrhoea cases, especially among internally displaced persons, now exceeding more than 3 million people across the county.



Data harmonization challenge

جدول (1) خلاصة بالمؤشرات الرئيسية بالنسبة للمحافظات

Table 1 | Summary of key cholera indicators by Governorate

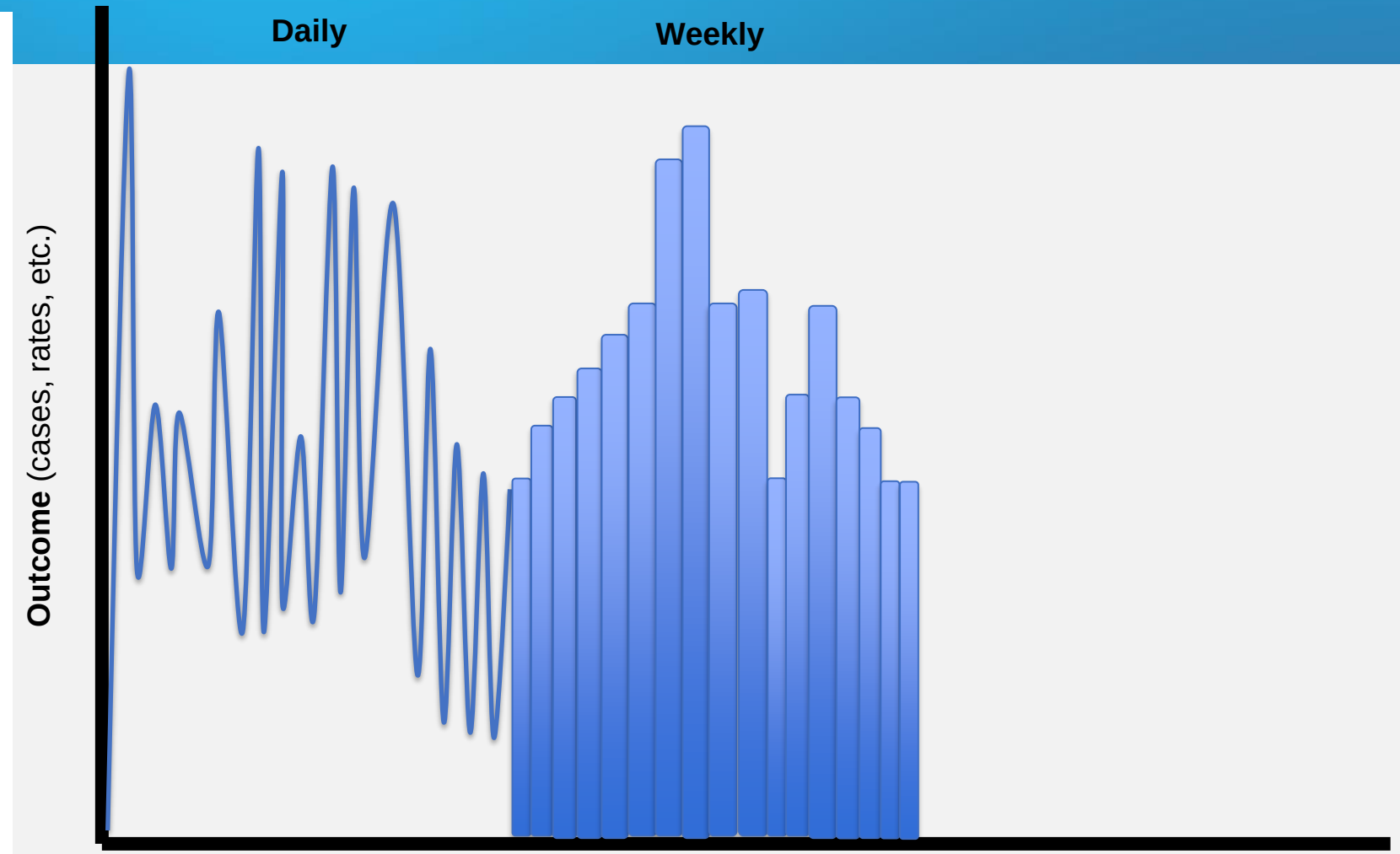
المحافظة Governorate	تراكمي Cumulative (27/04/2017 to 13/5/2018)					الاتجاه 3 أسابيع 3 week trend				
	حالات الاشتباه Cases	الوفيات Deaths	معدل الاماته CFR[1]	السكان Population	معدل الإصابة AR[2]	أسابيع 3= 3W	أسابيع 2= 2W	أسابيع 1= 1W	الأسبوع الحالي W	الجاه Trend[3]
Amran عمران	106,448	183	0.17%	1,165,044	913.68	197	254	244	263	▶ 5%
Al Mahwit المحويت	65,571	152	0.23%	737,037	889.66	106	175	194	153	▲ +23%
Al Dhale'e الضالع	47,190	82	0.17%	739,093	638.49	6	7	8	4	▲ +14%
Dhamar ذمار	108,480	163	0.15%	2,030,321	534.30	176	322	593	370	▲ +63%
Sana'a صنعاء	78,852	123	0.16%	1,479,715	532.89	120	128	185	279	▲ +28%
Hajjah حجة	121,406	424	0.35%	2,368,714	512.54	6	12	19	18	▲ +54%
Al Hudaydah الحديدة	161,412	285	0.18%	3,265,011	494.37	419	347	363	375	▶ -4%
Abyan أبين	28,243	35	0.12%	575,120	491.08	0	0	0	0	■ Interrupt
Al Bayda البيضاء	34,679	38	0.11%	763,178	454.40	279	237	200	175	▼ -16%
Amanat Al Asimah أمانة العاصمة	108,385	72	0.07%	2,874,899	377.00	255	262	223	148	▼ -10%
Raymah ريمة	18,762	123	0.66%	612,072	306.53	32	24	44	44	▲ +32%
Al Jawf الجوف	16,197	22	0.14%	582,293	278.16	0	12	6	18	▶ 0%
Lahj لحج	24,345	22	0.09%	1,015,515	239.73	0	0	0	1	■ Interrupt
Ibb إب	70,203	294	0.42%	2,977,819	235.75	82	66	135	137	▲ +43%
Aden عدن	20,993	62	0.30%	934,060	224.75	0	0	0	0	■ Interrupt
Taizz تعز	66,402	190	0.29%	3,018,310	220.00	110	77	106	122	▶ 9%
Marib مأرب	7,296	7	0.10%	362,021	201.54	0	0	0	0	■ Interrupt
Sa'ada صعدة	10,713	5	0.05%	922,202	116.17	0	0	1	0	▲ +200%
Al Maharah المهرة	1,169	1	0.09%	150,516	77.67	0	0	0	0	■ Interrupt
Shabwah شبوة	1,399	3	0.21%	608,811	22.98	0	0	0	0	■ Interrupt
Moklla المكلا	568	2	0.35%	445,001	12.76	0	0	0	0	■ Interrupt
Say'on سيئون	24	0	0.00%	379,828	0.63	0	0	0	0	■ Interrupt
Yemen اليمن	**1,098,737**	**2,288**	**0.21%**	**28,006,579**	**392.31**	**1,788**	**1,923**	**2,321**	**2,107**	▲ +15%

[1] معدل الاماته بين الحالات
[2] معدل الاصابة لكل 10,000 من السكان
[3] تم حساب المنحنى بناء على متوسط عدد الحالات خلال ثلاثة أسابيع سابقة (تم بتضمين الاسبوع الحالي في حساب المنحنى بسبب عدم اكتمال البيانات)

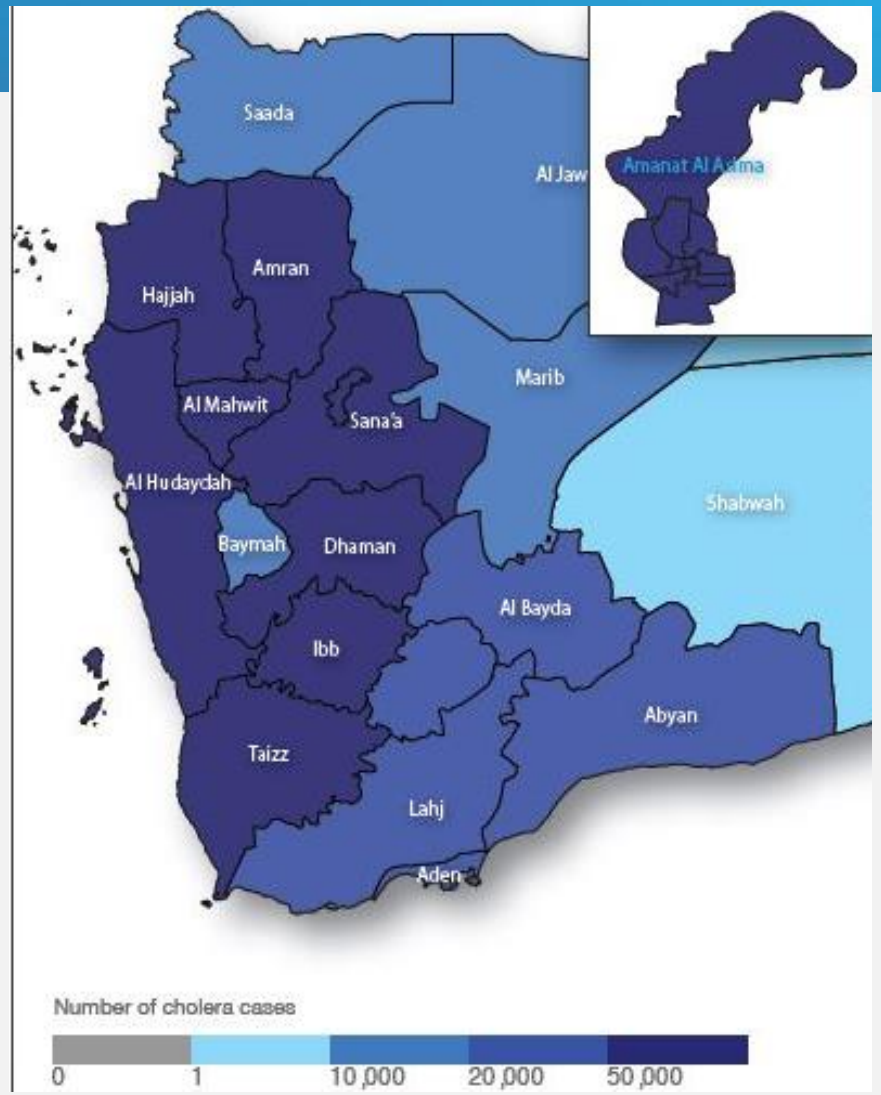
▲ منحنى مرتفع	غير بمعدل ≥ +10%
▶ منحنى مستقر	غير بمعدل > -10% to < +10%
▼ منحنى منخفض	غير بمعدل ≤ -10%
■ انقطاع في الارسال	عدد 0 حالة خلال 3 أسابيع متتالية

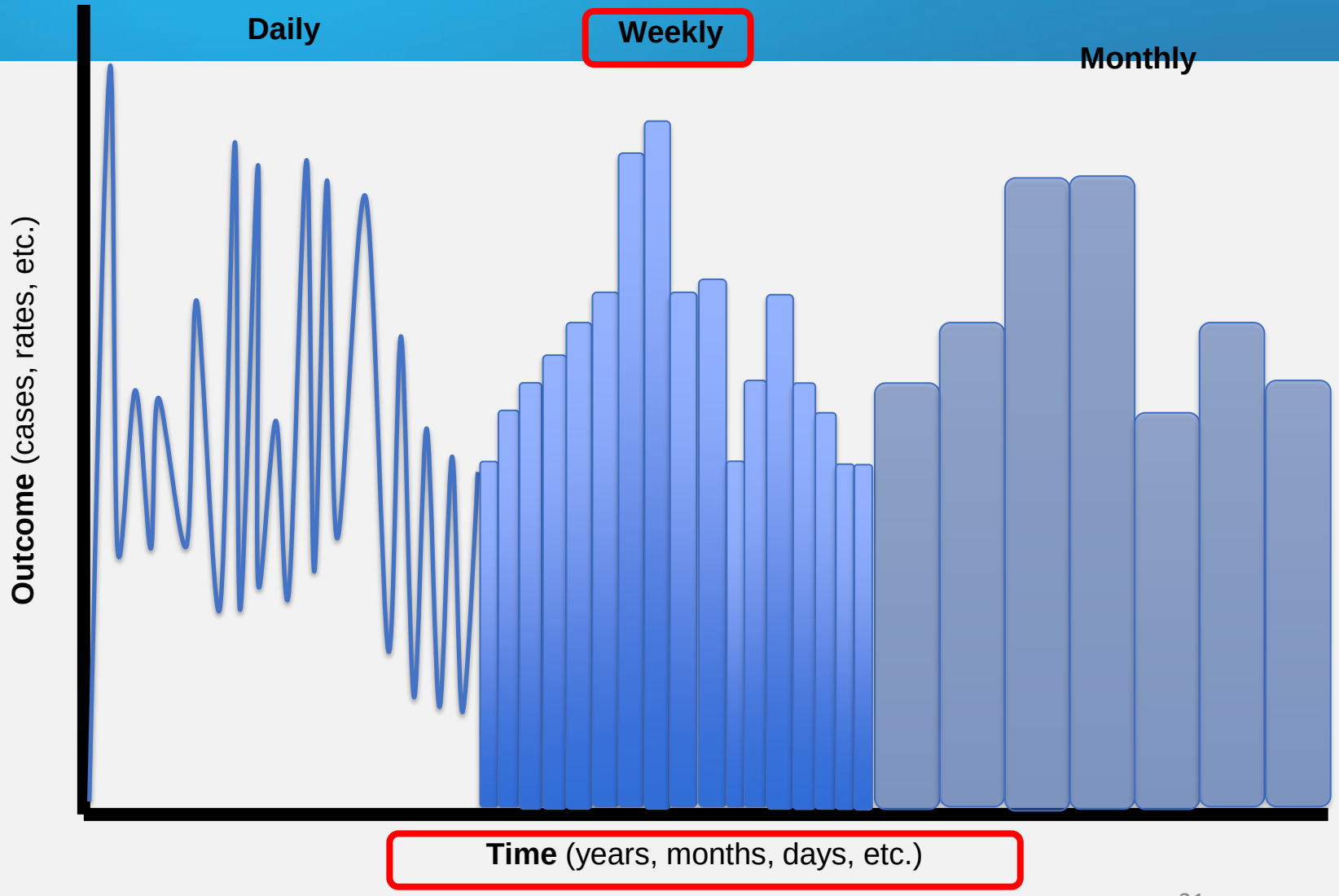
[1] Case Fatality Rate
[2] Attack Rate (/10,000 population)
[3] Trend based on average number of cases in previous 3 weeks (current week excluded due to incomplete data)

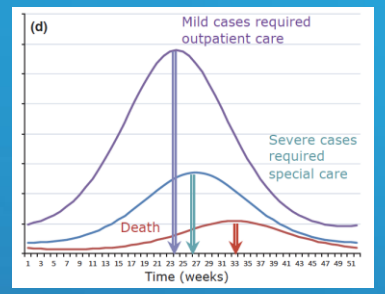
▲ Increased trend	≥ +10% change
▶ Stable trend	> -10% to < +10% change
▼ Decreased trend	≤ -10% change
■ Interruption in transmission	0 cases for 3 consecutive weeks



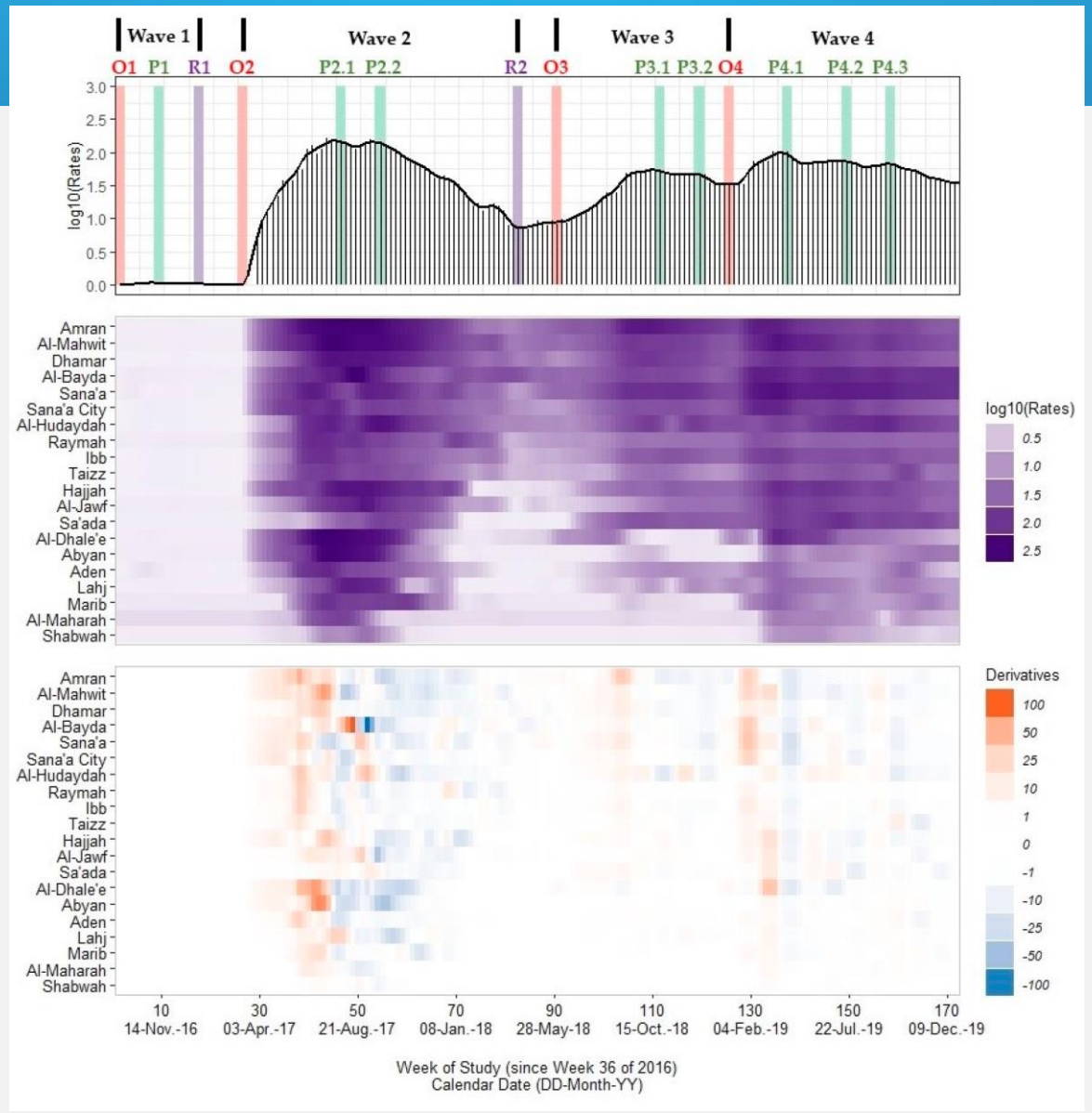
Data harmonization challenge

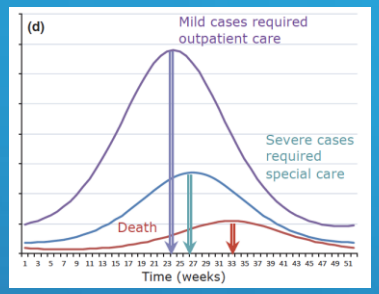




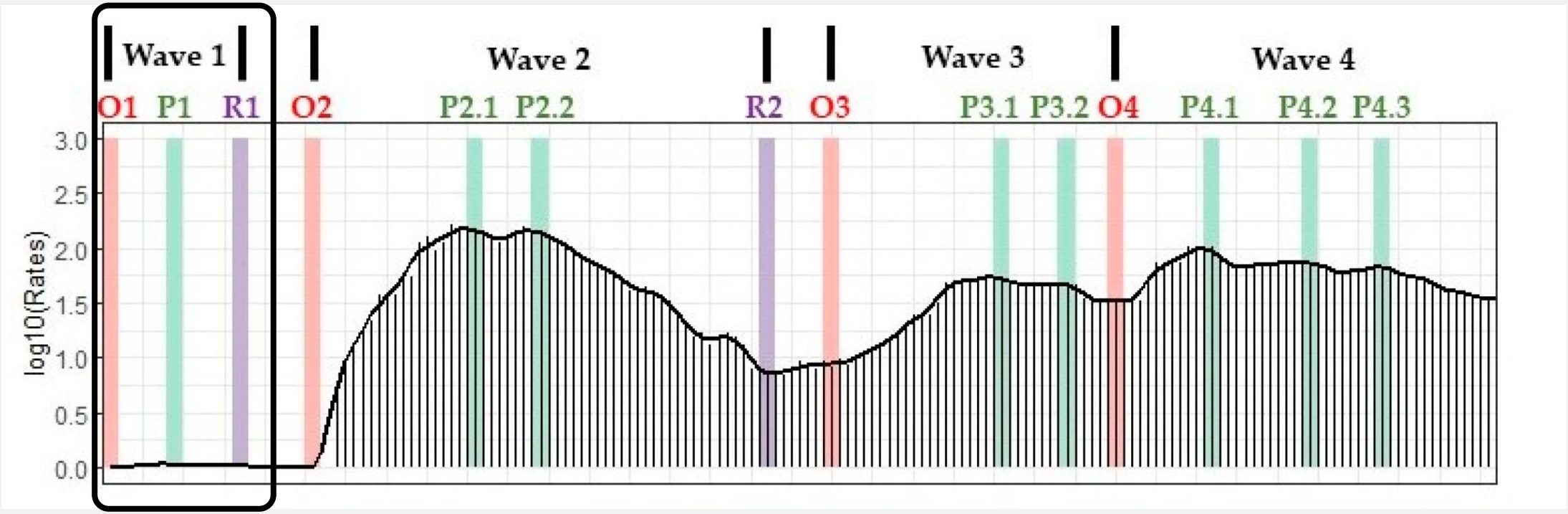


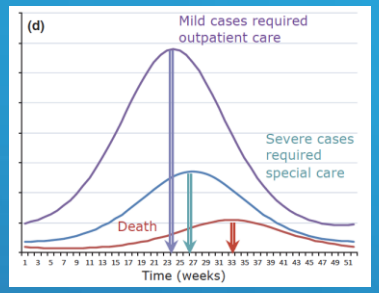
Outbreak Signature Decomposition: applicability for humanitarian emergencies



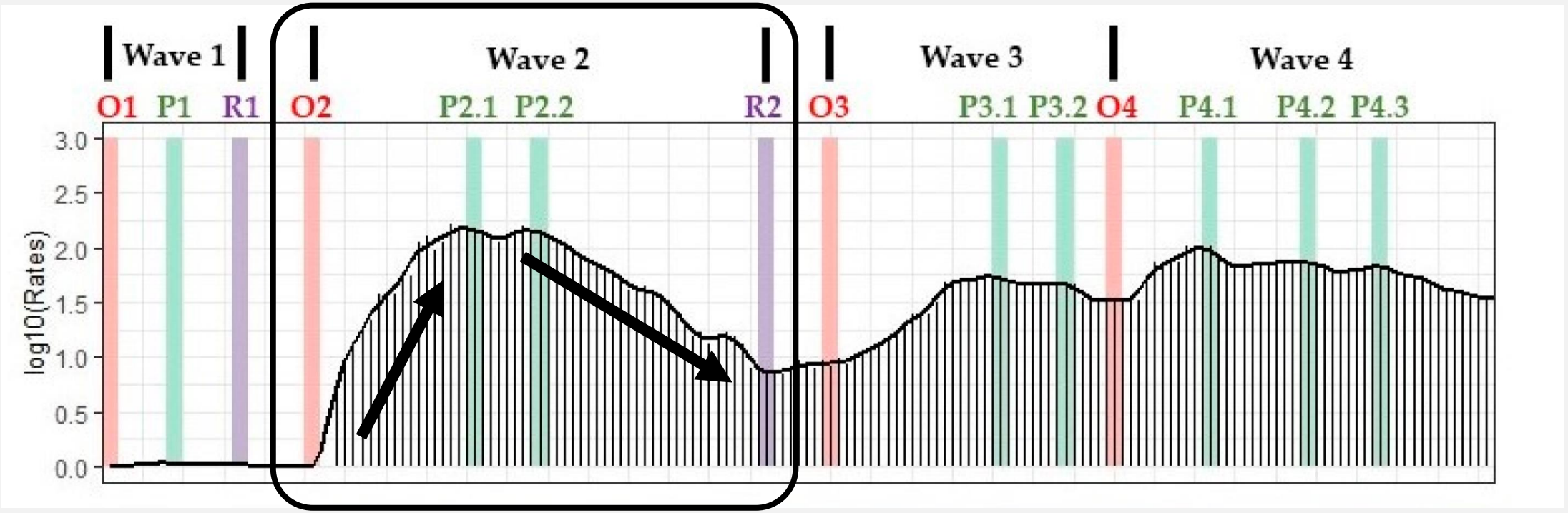


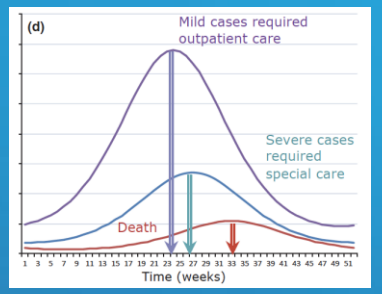
Outbreak Signature Decomposition: applicability for humanitarian emergencies





Outbreak Signature Decomposition: applicability for humanitarian emergencies





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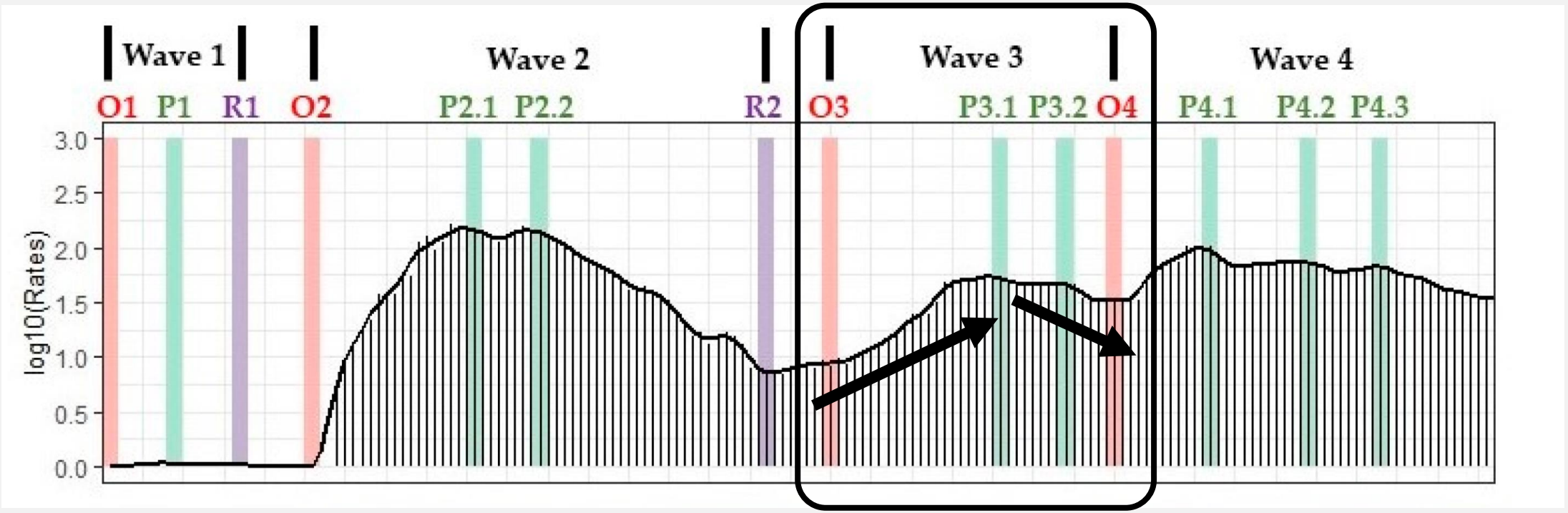

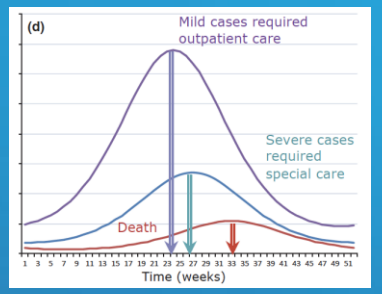

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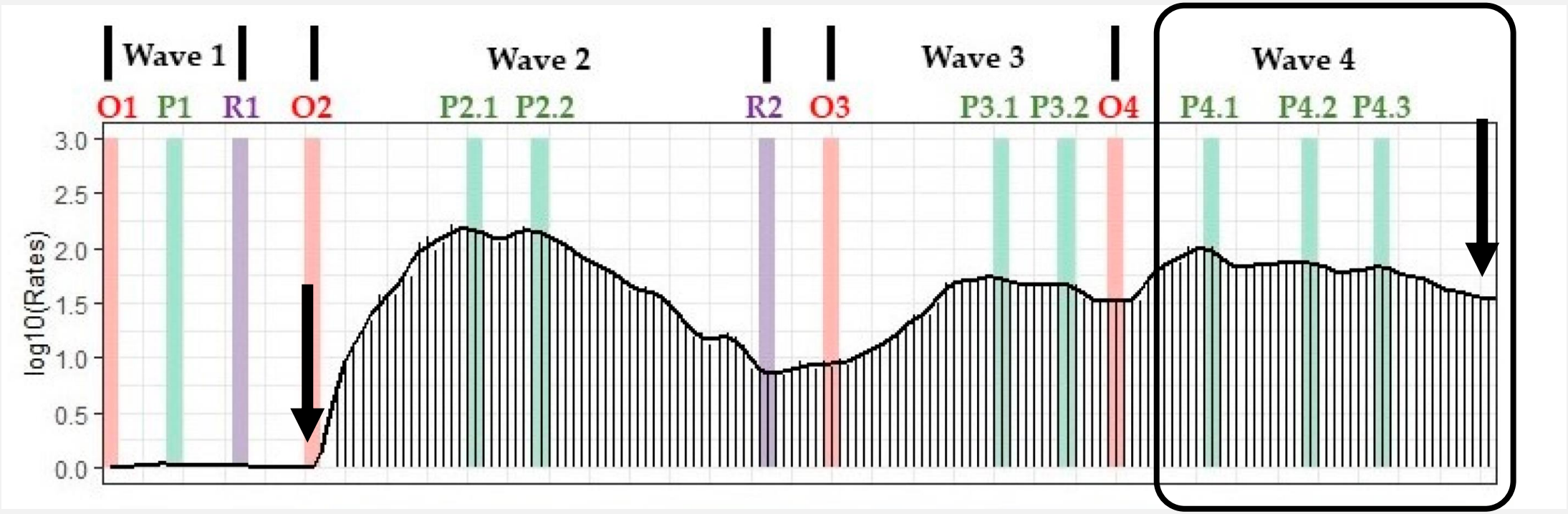

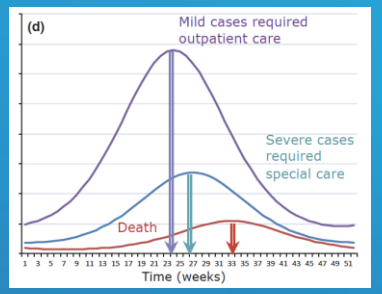

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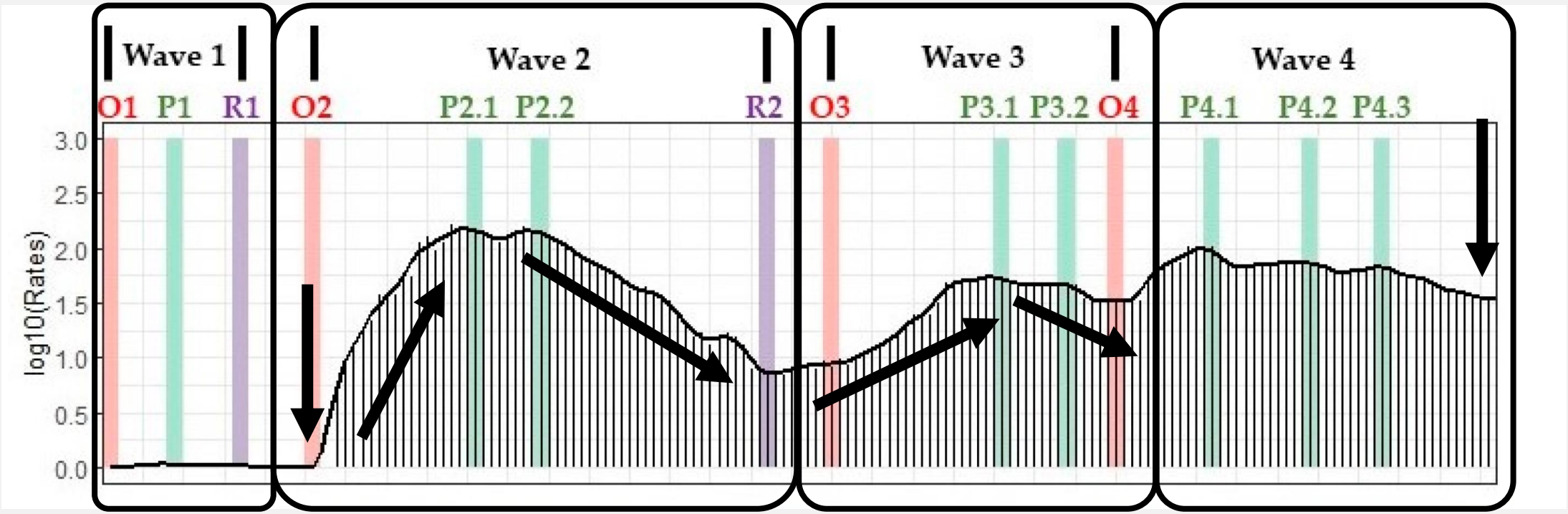
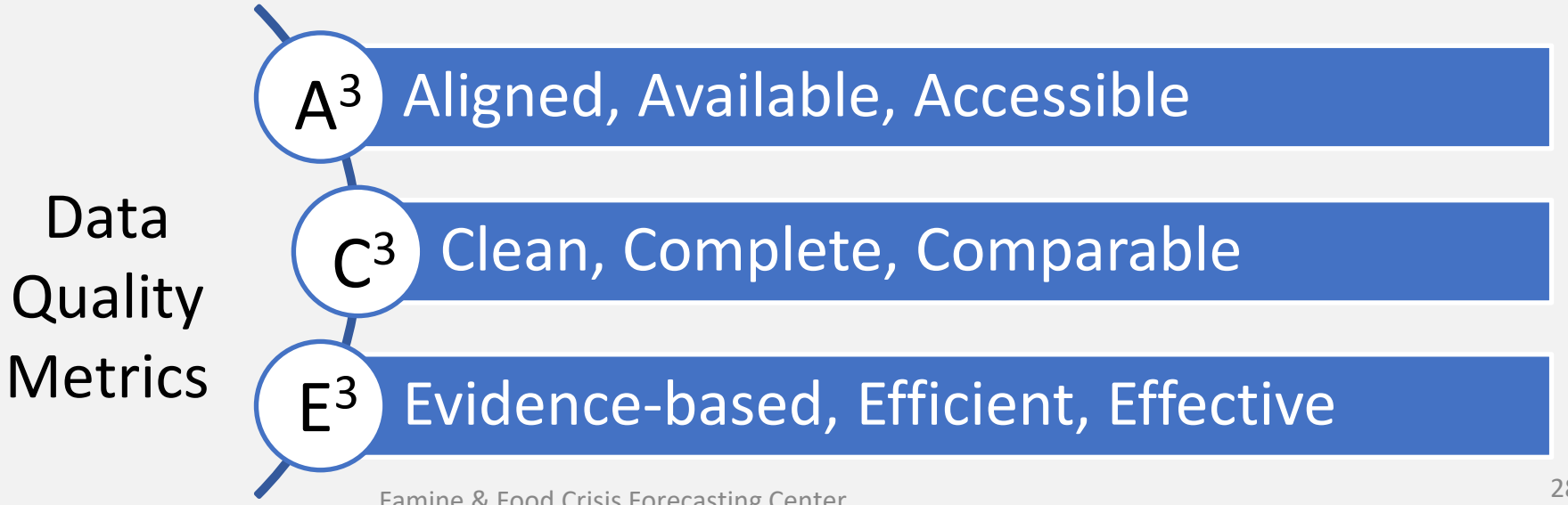


Redefine criteria for data quality and credibility

Data Quality: an inherent feature or property of the data; a characteristic that describes the essential nature of the data

- Accuracy + Precision = Reliability

Data Credibility: the quality of inspiring belief in reported data = $f(A^3, C^3, E^3)$



Dynamic Mapping Requirements

- Temporal resolution (from coarse to refined):
  - Year, Quarter, Month, Decal, Week, Day, Hour
- Spatial resolution (from coarse to refined – to be harmonized across locations and time!):
  - Country, Region, County, City, Town, Postal Code, Long/Latitude
- Outcomes of interest (from coarse to refined – to be harmonized across locations and time!):
  - Health: from various stages of malnutrition to death (all cause)
  - Food security:
  - Economic indicators:
  - Climate indicators:
  - Social and political indicators:

Call for harmonization of data, models, terms

Suggested terminology to describe seasonality in conducting research and policy analysis

Term	Definition
Time Series Data	A set or a sample of time-referenced observations or records with an identified time period, time cycle, and time unit recorded by a timestamp.
Timestamp	Information on day, week, month in a conventional format (e.g. YYYY:MM:DD or YYYY:MM:DD:HH:mm) of data collection or processing.
Time Series Plot	A graph illustrating time series data by dot, line, or needle plots with axes reflecting time and an outcome(s) of interest.
Distribution of Time Series Data	A general summary of frequencies in time-referenced data – i.e., how often an outcome of interest reaches a certain level with respect to time units.
Distribution Plot of Time Series Data	Often illustrated with histograms and density plots.
Time Series Analyses	A collection of methods to describe, explain, and predict temporal processes with time-referenced data for an outcome of interest.
Trend	General temporal behavior in an outcome of interest that can exhibit steady incremental changes (linear) or varying incremental changes (non-linear) over time.
Season	An interval of time within one time cycle (typically one calendar year) defined by a specific biological, environmental, physical, physiological, or other property or feature in a biological or non-biological system [ref].
Seasonal Pattern	A recurrence of periods in an outcome of interest with alternating values (e.g., high and low) over the course of a time cycle, commonly one calendar year.
Seasonality	A systematic periodic fluctuation in an outcome of interest over the course of one cycle (typically one calendar year) as an observable property of a biological or non-biological system.
Seasonal Curve	An analytical representation of seasonal periodic fluctuations in an outcome of interest within one time cycle (typically one calendar year).
Seasonality Features	A set of measurable characteristics to describe seasonality and a seasonal curve within one year, including seasonal peak, nadir, intensity, duration, speed at which a seasonal curve reaches its peak, and speed at which a seasonal curve declines to its nadir [Naumova, 2006].
Peak or Nadir Timing	A seasonality feature that represents times when a seasonal curve of an outcome reaches its maximum or minimum [Naumova, 2006].
Amplitude or Intensity	A seasonality feature that represents the difference between seasonal peaks and nadirs [Naumova, 2006].
Duration	A seasonality feature that represents the time interval when incidence rises above a specified threshold [Naumova, 2006].

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Feinstein International Center

HARMONIZING TERMS & CONCEPTS

MERRY FITZPATRICK ASSISTANT PROFESSOR, FEINSTEIN INTERNATIONAL CENTER

Standardization of Terms

- Precise communication is important
  - To make sure we are all talking about the same thing
  - So you understand the meaning of the data you are working with

- Glossary available in the folder
  - Acronyms and terms used in the data
  - Acronyms and terms related to nutrition and food security you are likely to encounter when searching for additional information
  - Additional terms (less likely to encounter, but important)
  - Terms related specifically to the theory of famines used as a framework for the eventual famine systems modeling

Some basic data acronyms explained

- WHZ vs MUAC, HAZ
  - Anthropometric measures of malnutrition
- MAM / SAM / GAM (combined) (complicated), Stunting
  - Prevalence of different levels/types of malnutrition
- VITA, MNP, IYCF (nutrition education), BFSP
  - Interventions
- PLW, IDP, Resident, U2, U5
  - Classifications of people
- IPC (AMN, AFI)
- PIN

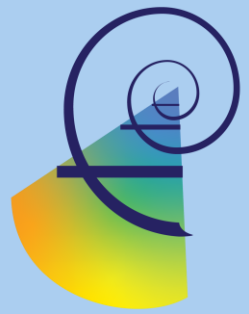
Other important indicators

- Food security
  - HDDS, FCS,
  - HFIAS, HHS, FIES,
  - CSI, rCSI

- Mortality
  - CMR vs CDR
  - Total mortality vs excess mortality

Humanitarian terms

- Food Security
- Shock, Vulnerability, Resilience
- Early Warning System
- Livelihood group
- Intervention
- Response
- Terms of Trade
- WASH – Water, Sanitation and Hygiene
- Analogue year



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FAMINE DYNAMICS

PAUL HOWE DIRECTOR, FEINSTEIN INTERNATIONAL CENTER

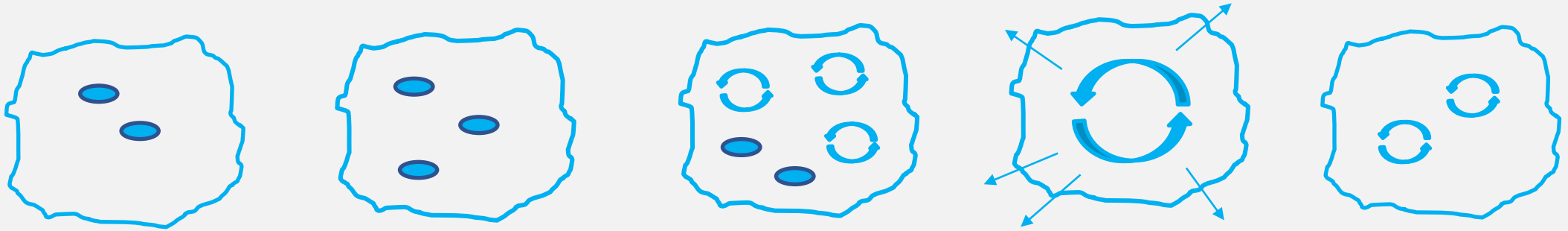
Famine: an event or a process ?

- Event: Early descriptions suggested famines were sudden events
- Process: In the 1980s and 1990s, there was a growing understanding of the process involved
- Process and event: In the 2000s, researchers argued processes led to events

Source: Paul Howe (2022)

Famine as a system

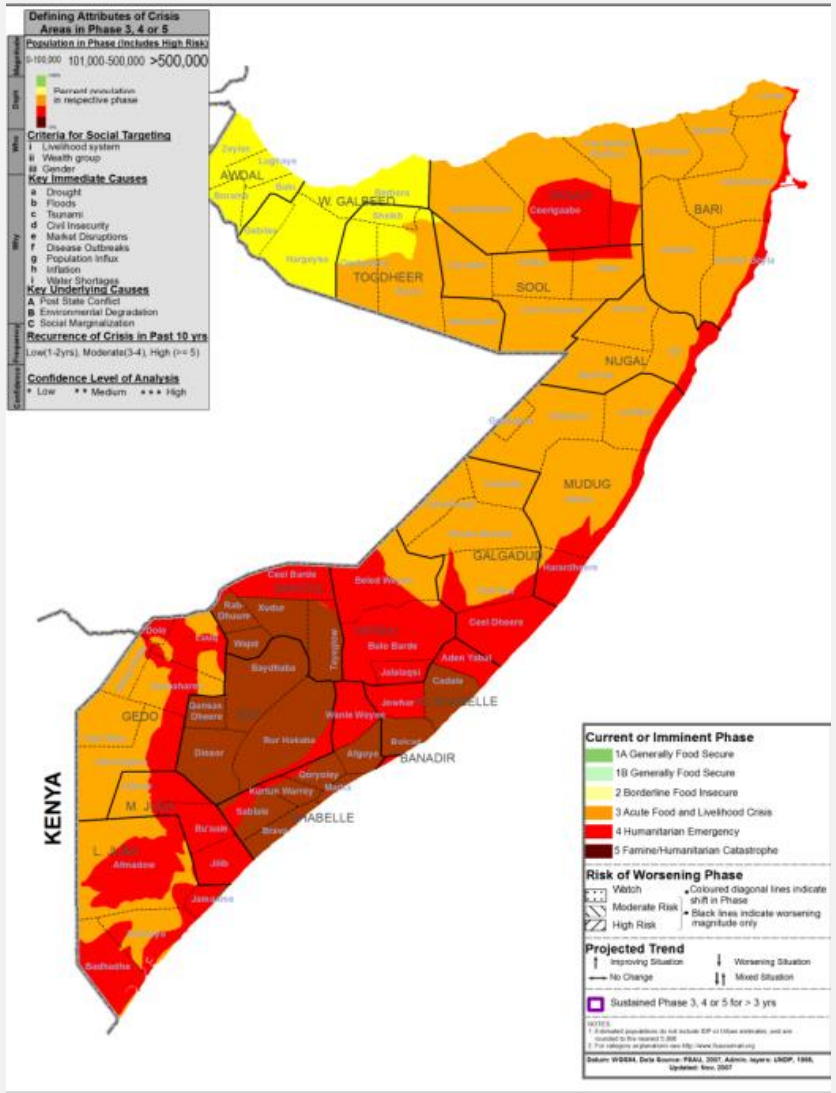
- A famine occurs when pressure on a community, kept in place by a hold, leads to self-reinforcing dynamics that tip over into a famine system until there is a rebalancing.



Pressure | **Hold** | **Self-reinforcing dynamics** | **Famine system** | **Rebalancing**

Source: Paul Howe (2018)

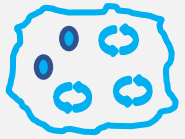
Famine as a system



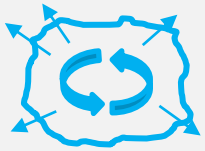
Example: Somalia, 2011-2012

Pressure: Drought, food price rises, conflict

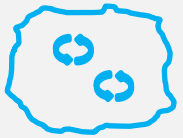
Hold: *Al Shabaab* controlled areas, counter-terrorism laws



Self-reinforcing dynamics: Rapid deterioration of terms of trade, increased migration



Famine system: Steep rise in mortality

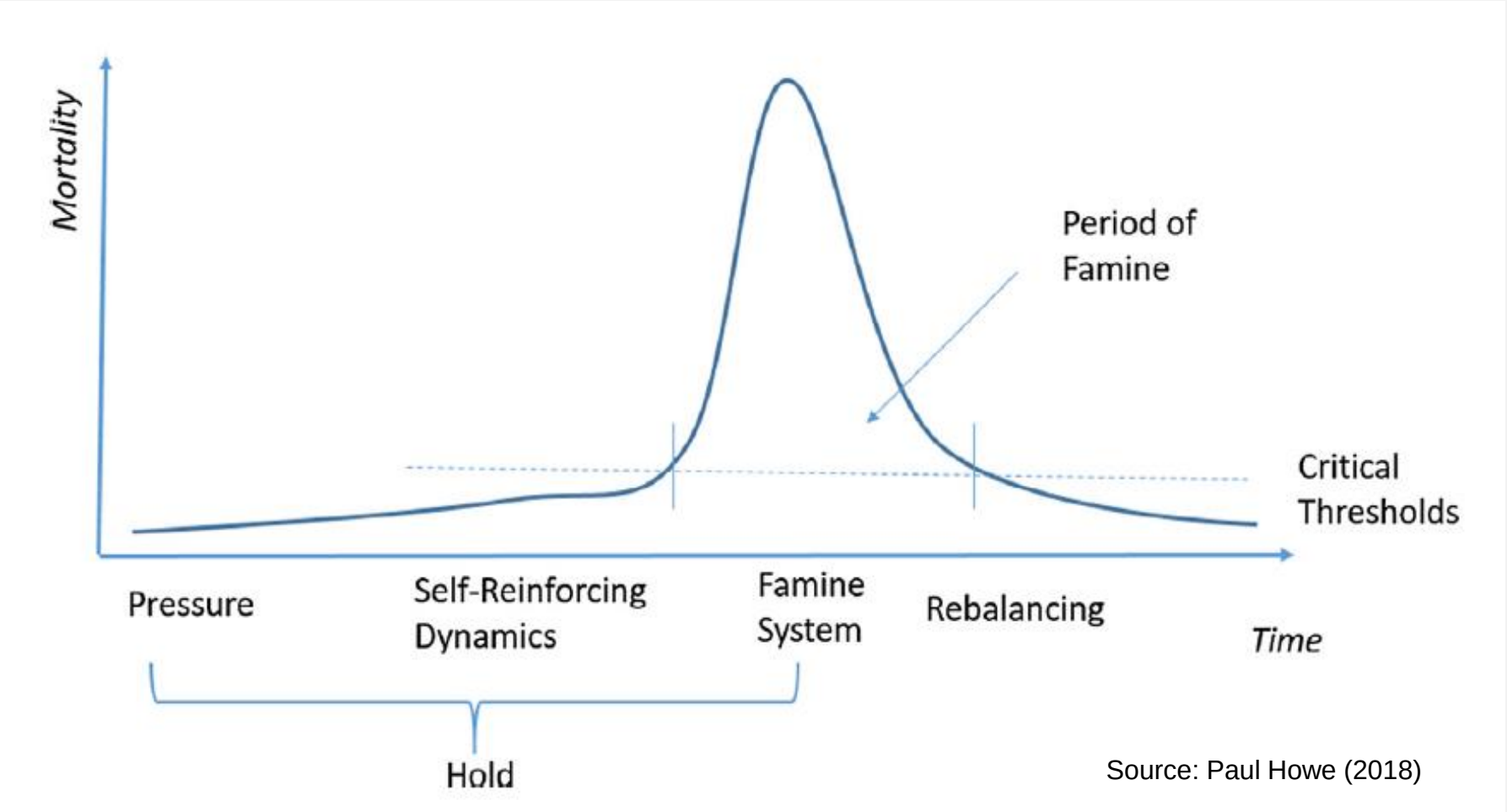


Rebalancing: Increased assistance, new harvest, food price decline

Famine & Food Crisis Forecasting Center

Source: Paul Howe (2018)

Famine as a system



Source: Paul Howe (2018)

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FAMINE EARLY WARNING

DANIEL MAXWELL PROFESSOR, FEINSTEIN INTERNATIONAL CENTER

Famine Early Warning

- Origins
- Evolution
  - Famine as an "event"
  - Famine as a "process"
  - (or as an event resulting from a process)
- Main methods

IPC
Integrated Food Security Phase Classification

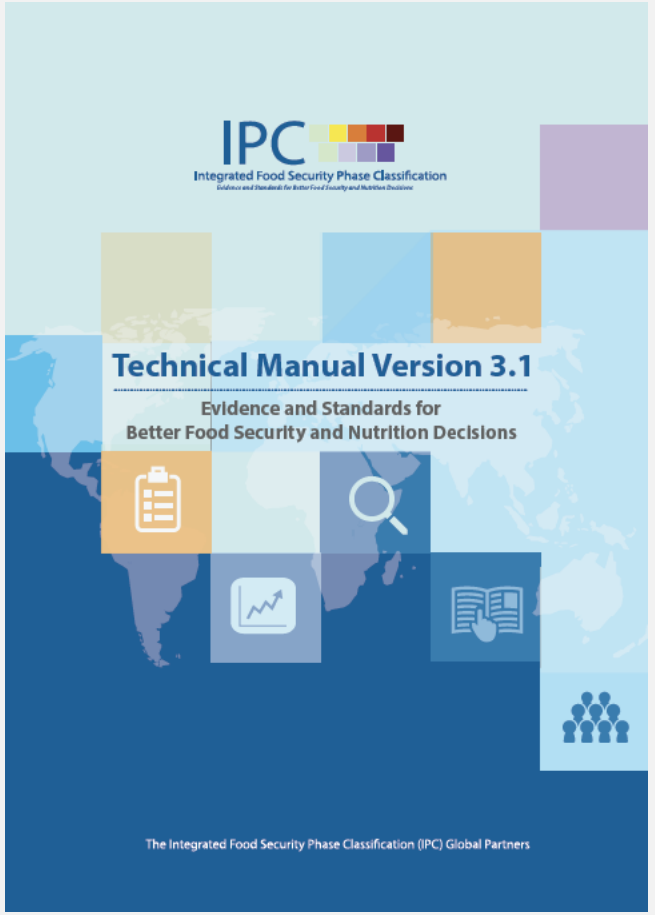
FEWS NET
FAMINE EARLY WARNING SYSTEMS NETWORK

Famine Definition and Thresholds

- Famine Definition:

  Famine is a state of extreme deprivation of food. Starvation, death, destitution and extremely critical levels of acute malnutrition are or will likely be evident

- Famine Thresholds:
  - *Even with any humanitarian assistance at least 20% of households in the area have an extreme lack of food;* and
  - At least 30% of children under five years are wasted (low weight for height of GAM)
  - Crude Death Rate of at least 2/10,000/day



The IPC Phase Classification Reference Table

IPC
Integrated Food Security Phase Classification

Phase name and description	Phase 1 None/Minimal	Phase 2 Stressed	Phase 3 Crisis	Phase 4 Emergency	Phase 5 Catastrophe/ Famine
	Households are able to meet essential food and non-food needs without engaging in atypical and unsustainable strategies to access food and income.	Households have minimally adequate food consumption but are unable to afford some essential non-food expenditures without engaging in stress-coping strategies.	Households either: • Have food consumption gaps that are reflected by high or above-usual acute malnutrition; or • Are marginally able to meet minimum food needs but only by depleting essential livelihood assets or through crisis-coping strategies.	Households either: • Have large food consumption gaps which are reflected in very high acute malnutrition and excess mortality; or • Are able to mitigate large food consumption gaps but only by employing emergency livelihood strategies and asset liquidation.	Households have an extreme lack of food and/or other basic needs even after full employment of coping strategies. Starvation, death, destitution and extremely critical acute malnutrition levels are evident. (For Famine Classification, an area needs to have extreme critical levels of acute malnutrition and mortality.)
Priority response objectives	Action required to build resilience and for disaster risk reduction	Action required for disaster risk reduction and to protect livelihoods	**Urgent action required to:** Protect livelihoods and reduce food consumption gaps	Save lives and livelihoods	Revert/prevent widespread death and total collapse of livelihoods

FEWS NET's Eight-Step Scenario Development Process

STEP 1: Set scenario parameters

STEP 2: Describe and classify current food security

STEP 3: Develop key assumptions

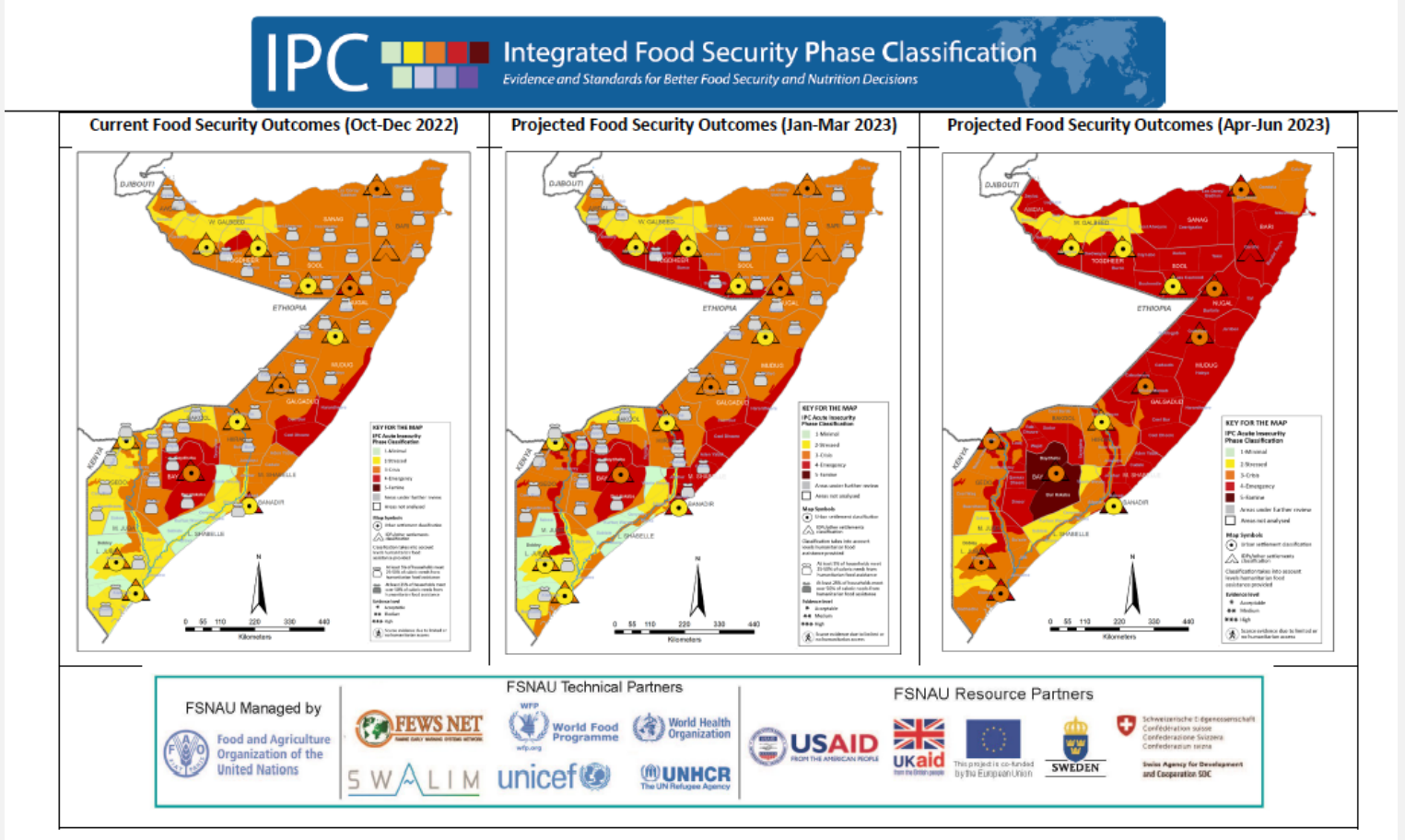
STEP 4: Describe impacts on HH income sources

STEP 5: Describe impacts on HH food sources

STEP 6: Describe and classify projected HH food security

STEP 7: Describe and classify projected area food security

STEP 8: Identify events which could change the scenario



Components of Famine Prediction

- Have to know historic trends (what has the population experienced?)
- Have to know current status (Food security status, nutritional and health status, mortality rates, water access, etc.)
- Have to know status of livelihoods and destitution
- Understand drivers (conflict, climate, markets, epidemics, etc.)
- Understand mitigating factors (coping capacity, assistance, etc.)
- Assumptions about how those will combine over a period of time (3-4 months, 6 months, etc.)
- Based on that: predictions about what level of outcomes will result?
- Identify factors to monitor to determine if assumptions are panning out (are predictions coming true?)

Alternative Perspectives

Alex de Waal (1989/2005). *Famine That Kills.*

- Famine is about destitution, not just about hunger or even mortality
- "If you die, that is in the hands of God."

Maxwell and Majid (2016) "*Facing Famine*"

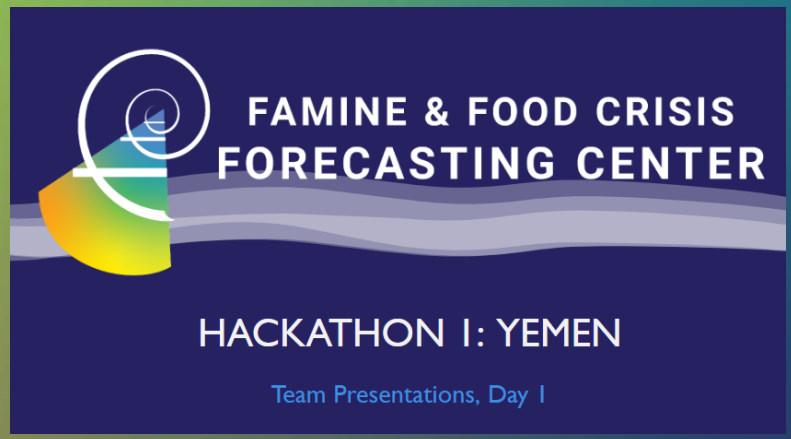
- *Famine as the breakdown of social relations (collapse of ability of social groups to protect one another)*
- *"3rd circle of social connectedness"*

Importance of recognizing multiple and local definitions of famine

TEAM BUILDING

- Introductions
  - Country of origin
  - Native Language
  - Professional Interests
  - Major
  - Goals for Hackathon
- Assign rotating roles: reporter, timekeeper, moderator, ‘experts’
- Name your team!

- Identify target product/output of hackathon and any needs
- Create Gantt Chart of tasks
- Complete slide about your team!



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HACKATHON #1: YEMEN

Team Presentations, Day 1