Acute respiratory infections among refugees

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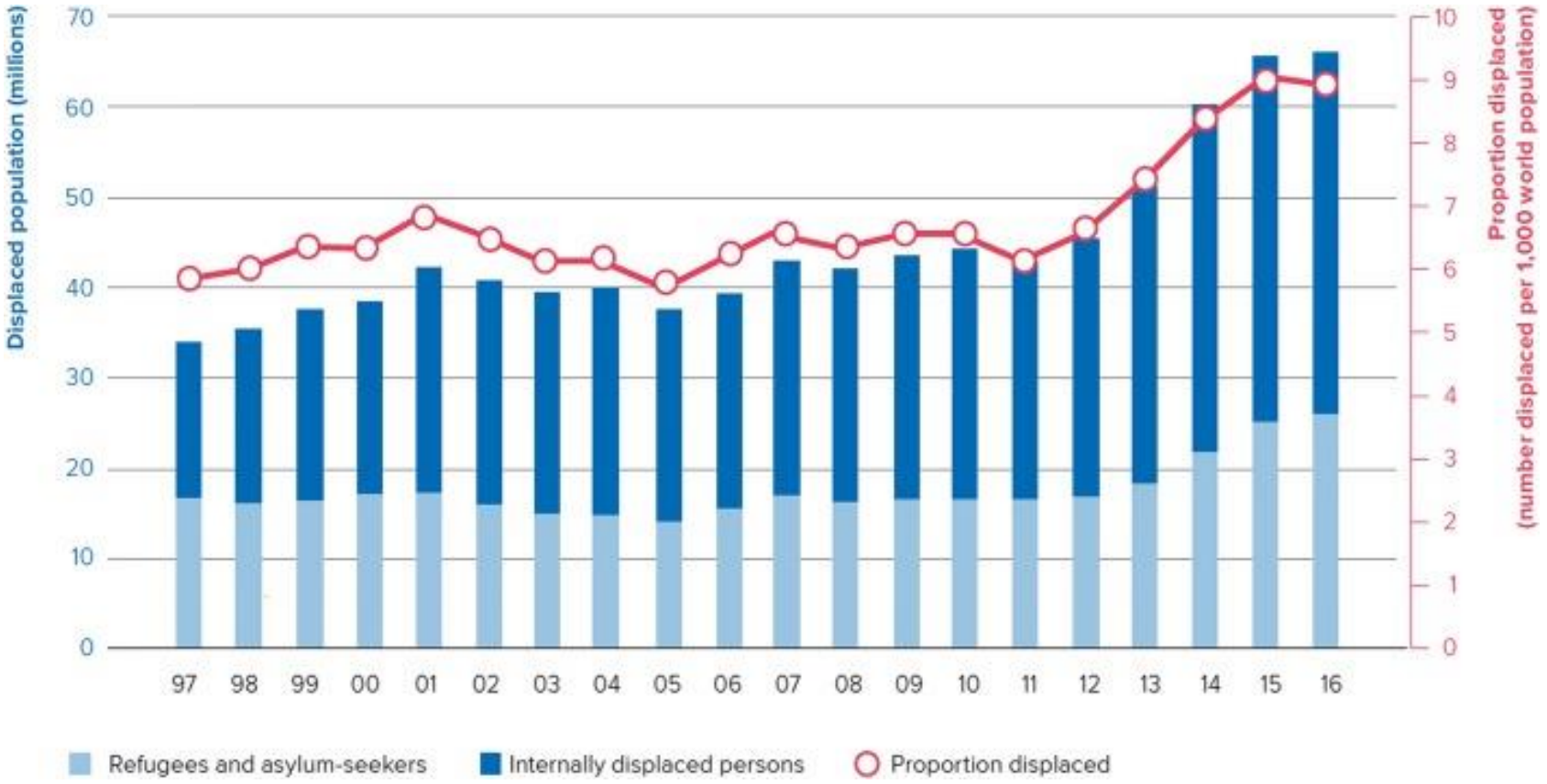
Main focus: on developing countries & vulnerable populations

Objective 1: Strengthening laboratory capacity and quality of clinical laboratory platforms in developing countries integrated within in national healthcare systems

Objective 2: Enhance local research capabilities and competencies by training young researchers, develop collaborative research and training programs

Displaced persons (millions)
1997 - 2016



Forcibly displaced individuals
worldwide

68.5 million (40 million internally displaced)

approximate equivalent to the entire population of France.

2/3 of refugees come from just five countries: Syria, South Sudan, Somalia, Afghanistan, Myanmar

unhcr

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Forcibly displaced individuals
worldwide

- The Syrian refugees constitute the largest refugee crisis in the world

  (5 million refugees, 12 million internally displaced)

- The Rohingyas refugee crisis is the fasted growing refugee crisis in the world

  (one new refugee every 2 seconds)

unhcr

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Rodolphe Mérieux Laboratories

Global footprint

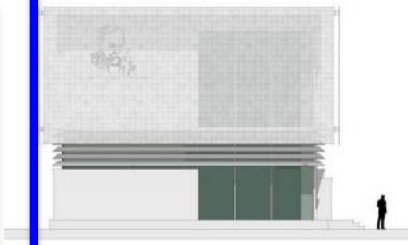
Mali (2005)

Haiti (2009)

Madagascar (2010)

Bangladesh (2015)

Tunisia (2019)



2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018

Cambodia (2005)

Laos (2009)

Lebanon (2011)

Brazil (2016)

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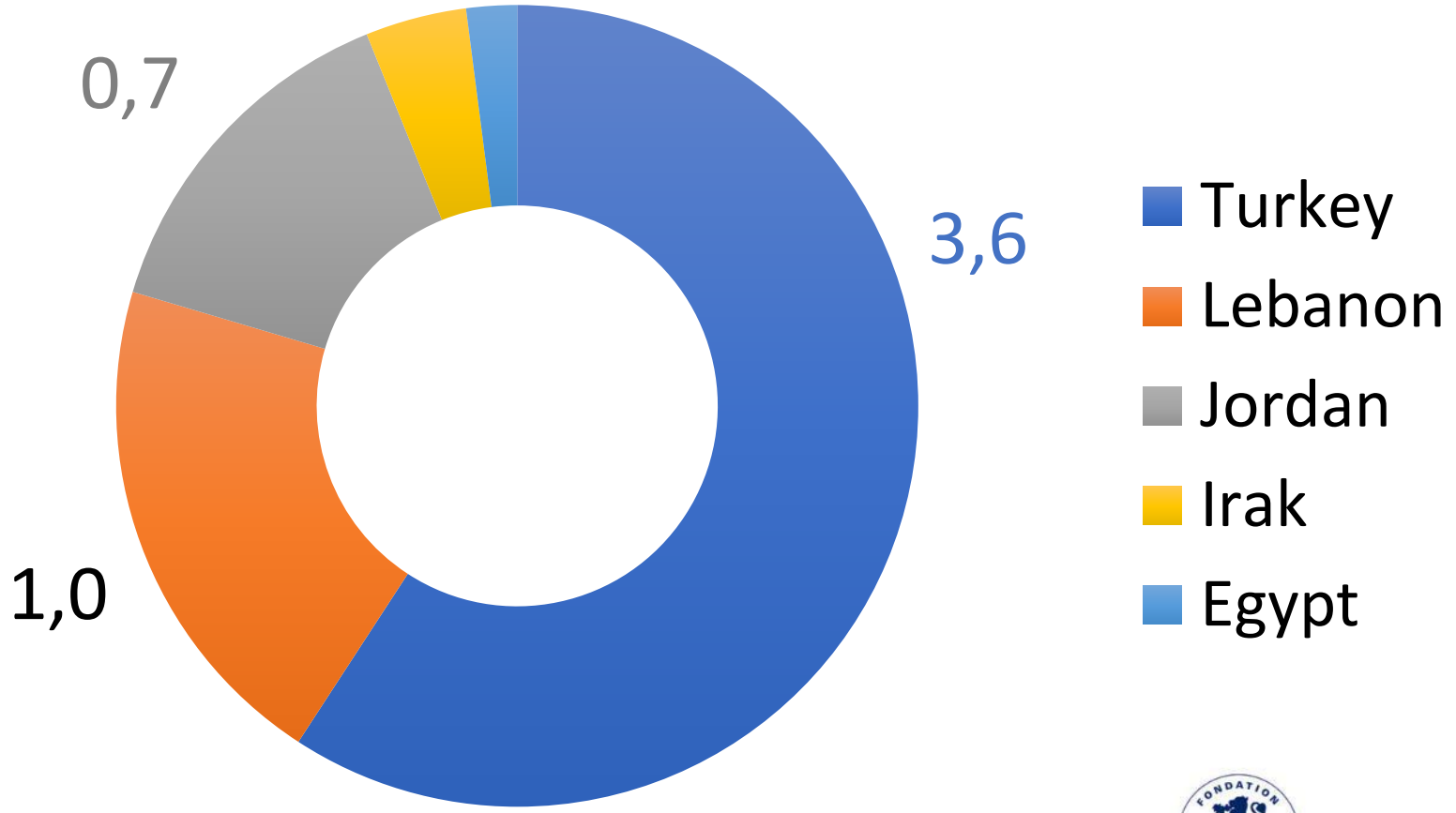
Bekaa valley, Lebanon 2015; Informal tented settlements (n=4000)

Syrian refugees in the Middle East

(millions)



Health care access among refugees

Turkey

In 2014 refugees were granted secure legal status and access to national health care insurance system covered under the general health insurance system and paid for by the government.

Estimates of number of refugees in Lebanon

1.0 million Vulnerable Lebanese

1.5 million Displaced Syrians

> 50% are Women and Children

310.000 Palestinian refugees

including 31.500 Palestinians from Syria

52% of displaced Syrians live on < 2.5 US $ per day

10% of Lebanese live on < 2.5 US $ per day

UN & GOL 2017

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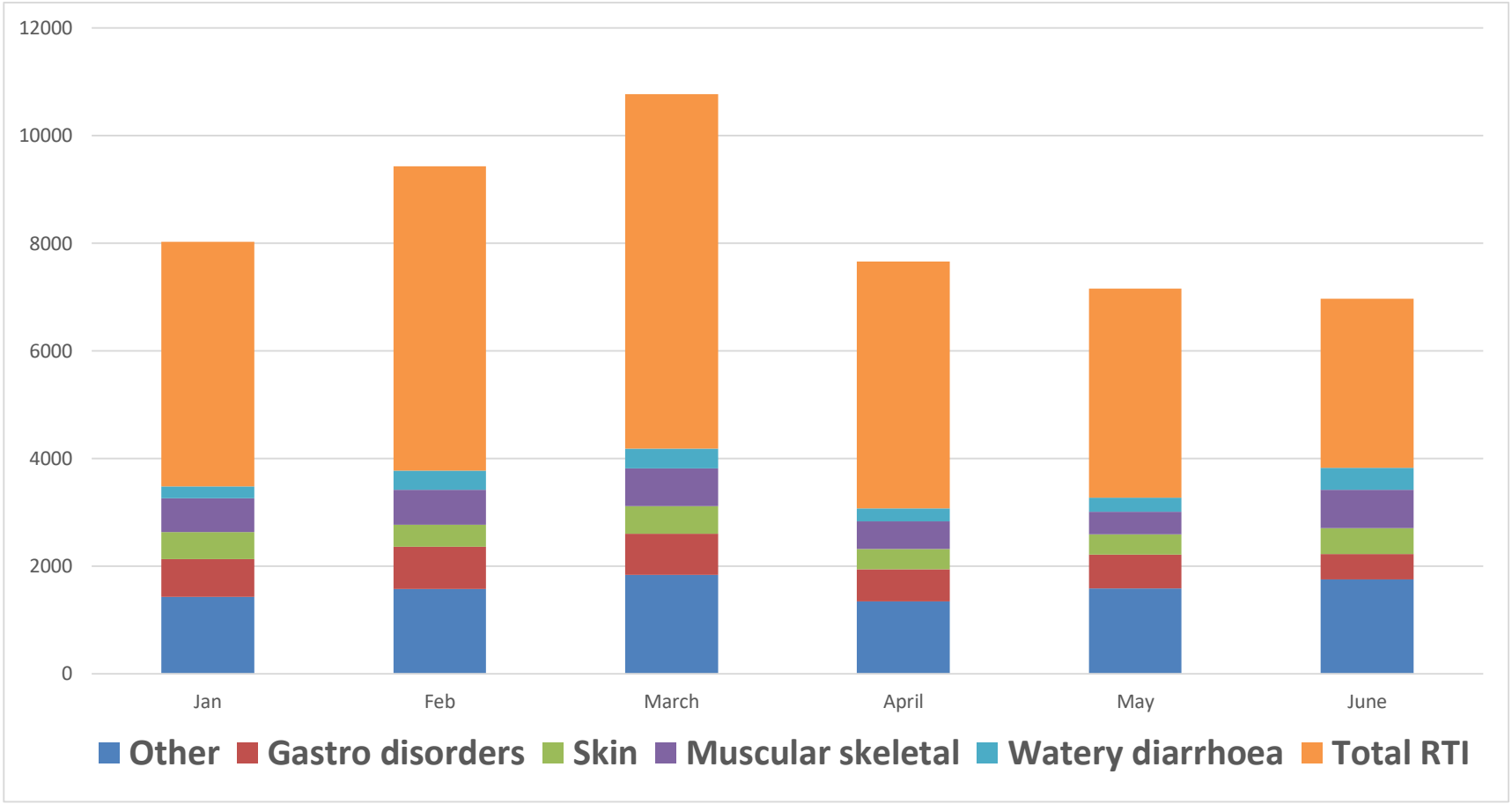
ALRI among in DC and refugees

- The cause nearly 4 million deaths per year
- 60 deaths per 100.000 population
- In DC among <5y 10-25% deaths are due to pneumonia
- UNHCR: ALRI main cause of mortality and morbidity among refugees
- Among refugees in Kenia:
  - in <5y ARI responsible for 30-40% of death and 45% of morbidity
  - RSV associated with high rates of illness

Main risk factors for adverse events in ALRI among refugees

- Malnutrition
- Low vaccination status
- Poor shelter conditions
- Extreme weather conditions
- Crowding
- Co-morbidity
- Poor access of adequate health care

Main morbidities among Syrian refugees Jan-June 2015, Bekaa Valley



Data MSF

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Reports from Lebanon

- High morbidity and mortality due to respiratory tract infections among 1.5 M Syrian refugees
- Low access to laboratory and other diagnostics

Pneumonia etiology study
among Syrian refugees & vulnerable Lebanese

- **Design:** case-control study
- **Sample size:** 1200 (600 cases 600 controls)
- **Study Population:** Syrian refugees & Lebanese
- **Study sites:** Bekaa valley and Akkar
- **Audits and training:** start September 2016
- **First inclusion:** Nov 2016
- **Last inclusion:** March 2018

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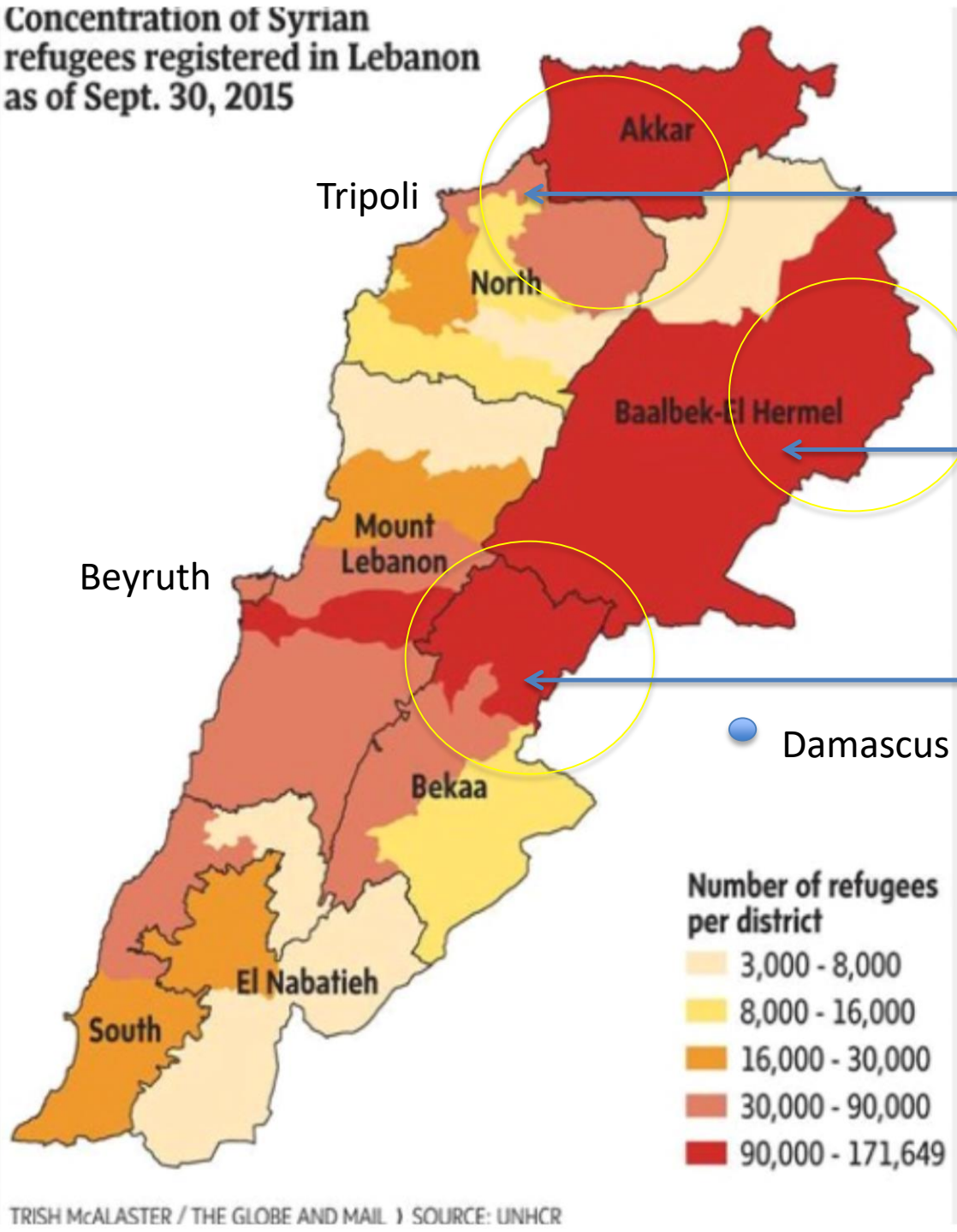


Al Bashaer

Baalbek El Ain

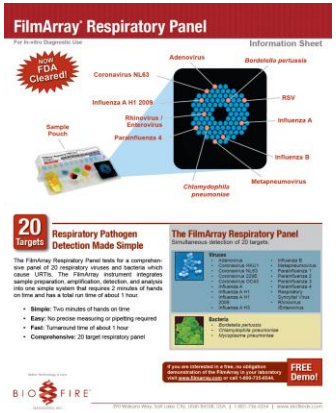
Machgara
Kamed el Loz

Damascus

- Université St Joseph + LRM, Beyrouth
- Université Libanaise, Tripoli
- El Bashaer (NGO) Tripoli
- AMEL (NGO), Bekaa
- Chtaura Hospital, Zahlé
- Fondation Mérieux, Lyon et Beyrouth
- Bioteck, Beyrouth
- External consultants:
  - Philippe Vanhems (Lyon 1)
  - Ranna Hajjeh (EMRO)
  - Abdullah Brooks (Hopkins)

Objectives

- **Primary Objective**: to estimate the proportion of Community Acquired Pneumonia attributable to specific viral and bacterial pathogens.
- **Secondary Objective**: to assess the feasibility and performance of rapid, film array Point-of-Care diagnostic tests in a humanitarian crisis.



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Case definition & selection criteria pneumonia

- Patients > 2 year
- Onset of symptoms less than 14 days
- Written informed consent

- Cough OR dyspnea
  AND
- Lower chest wall indrawing (≤3 years old only)
  OR
- Tachypnea (breathing rate > 40 breaths/min)
  AND
- Absence of wheezing

Lebanon 2015; Mothers and children

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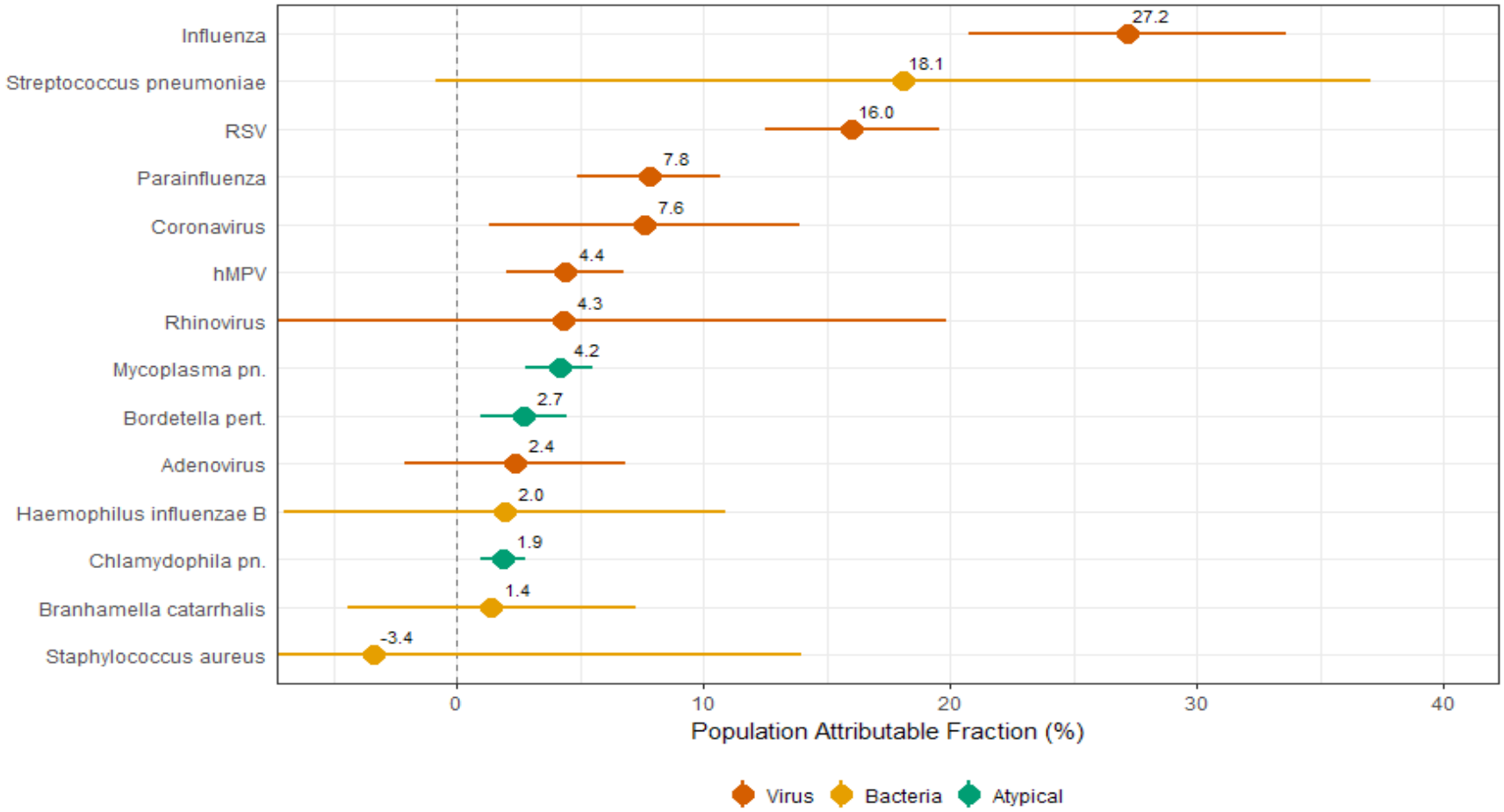
Population Attributal Fraction (%)

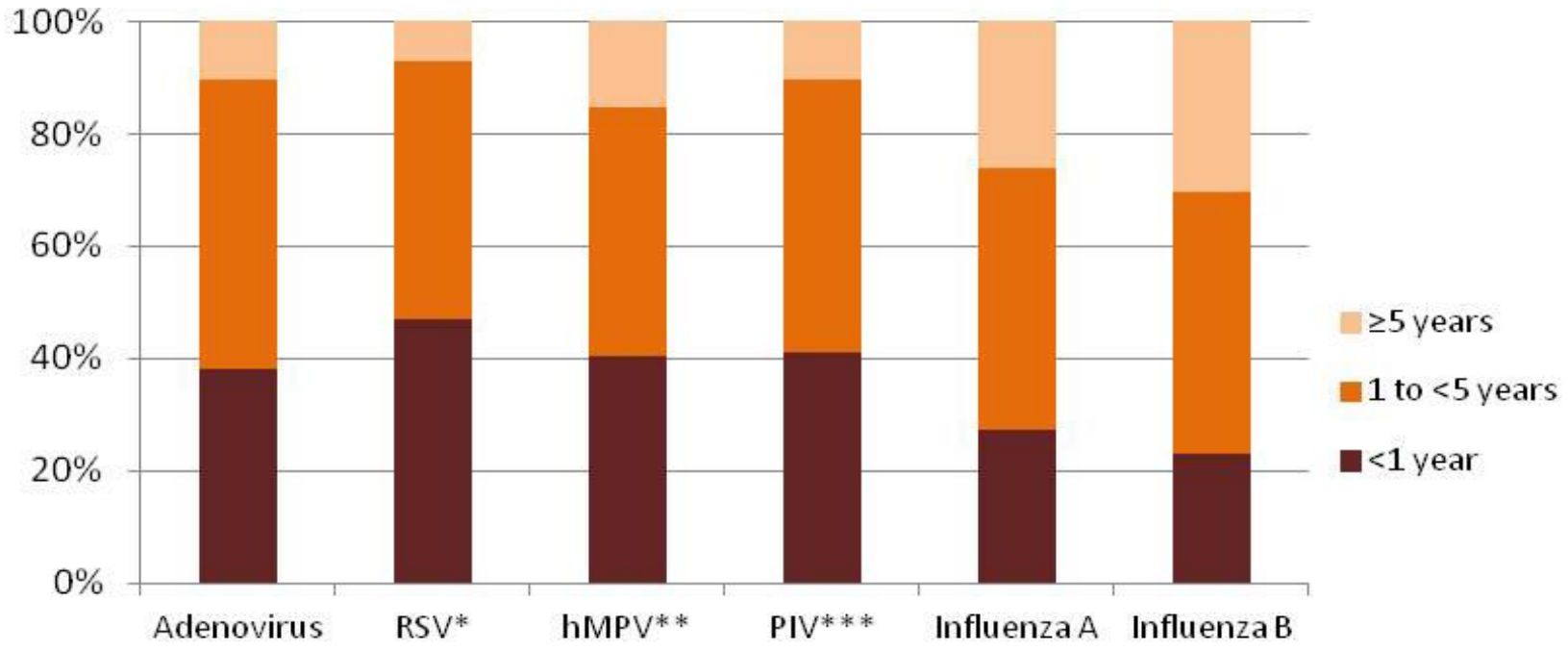


Population Attributal fraction (%) per age group

Rank	All		Children under 5		Children above 5		Adults	
1	Influenza	29.6	RSV	30.4	Influenza	25.6	Influenza	36.4
2	RSV	16.1	Rhinovirus	23.0	S. aureus	20.8	Coronavirus	17.1
3	Rhinovirus	11.9	Parainfluenza	18.6	RSV	15.0	Rhinovirus	14.8
4	Parainfluenza	9.2	Adenovirus	10.6	Atypical bacteria	13.3	S. pneumoniae	11.2
5	Atypical bacteria	8.8	H. influenzae b	7.4	Parainfluenza	12.6	RSV	7.3
6	Coronavirus	7.7	Atypical bacteria	4.6	hMPV	7.1	Atypical bacteria	6.0
7	S. pneumoniae	5.0	Influenza	4.3	H. influenzae b	3.6	Adenovirus	3.4
8	H. influenzae b	4.7	hMPV	1.1	S. pneumoniae	2.0	hMPV	3.0
9	hMPV	4.0	Coronavirus	-2.2	Adenovirus	-1.0	H. influenzae b	0.8
10	Adenovirus	3.0	S. aureus	-20.4	Rhinovirus	-1.6	Parainfluenza	0.0
11	S. aureus	-5.0	S. pneumoniae	-20.6	Coronavirus	-2.3	S. aureus	-20.7

Virus isolation by age group in SARI among refugees in Kenia

2010



*Respiratory syncytial virus,
**Human metapneumovirus
***Parainfluenza viruses

Ahmed et al B 2012 BMJ Infectious Diseases

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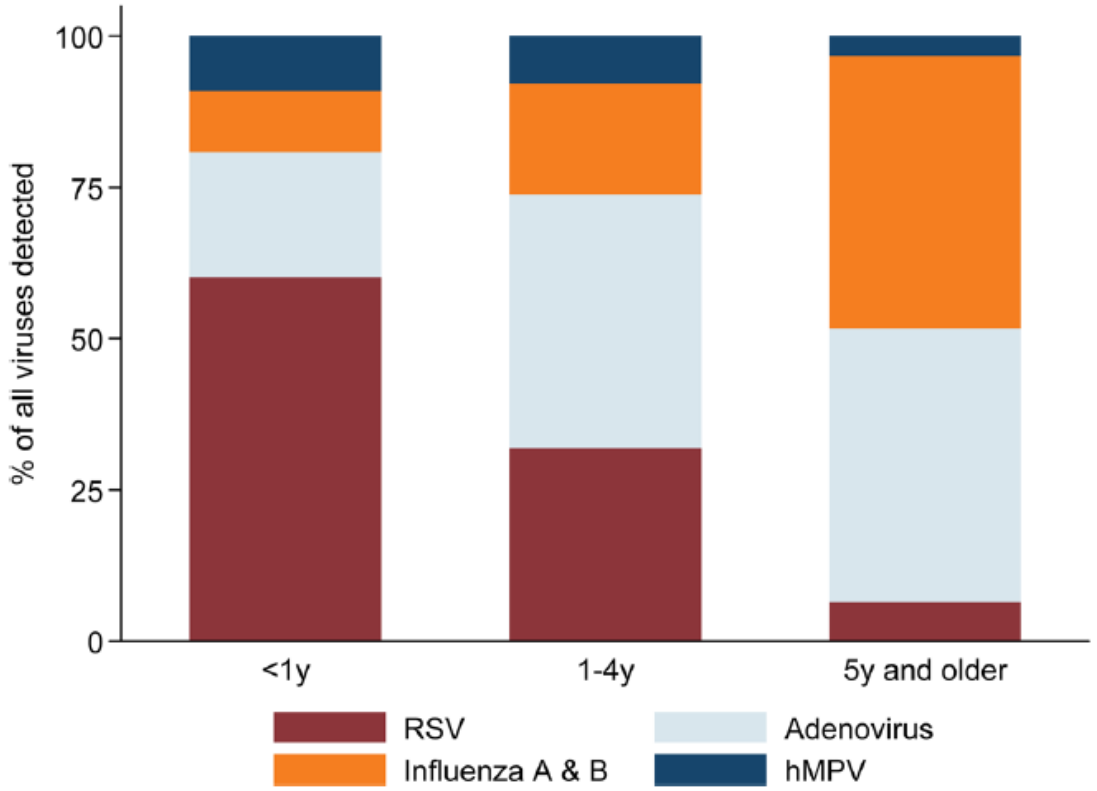
Viral detection by age group

pneumonia among refugees Thai-Myanmar border



Paul Turner et al. BMC Infect Dis 2013

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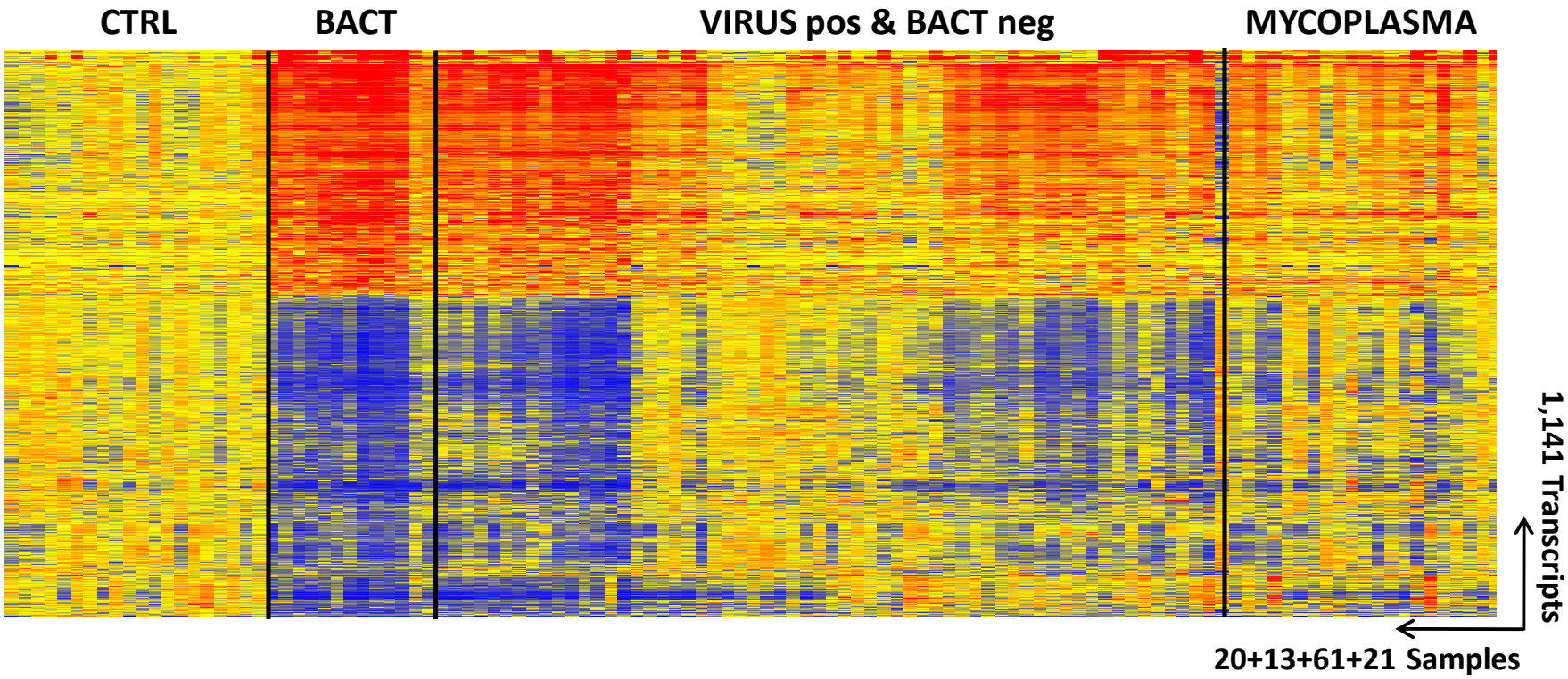
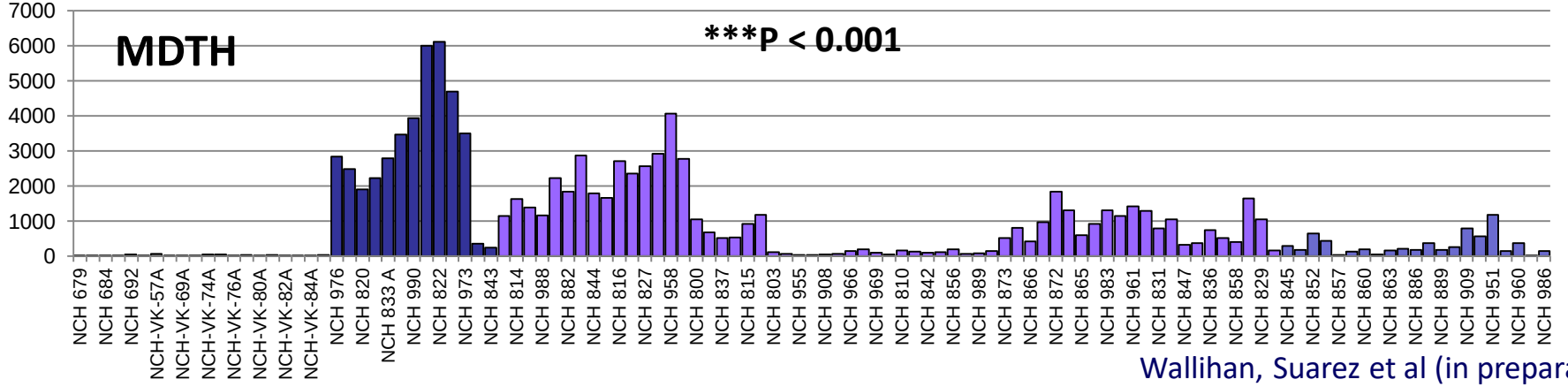
mRNA profyles of human leukocytes in children hospitalized with pneumonia





Wallihan, Suarez et al (in preparation)


brac


We never return
Widhout our citizenship
and our rights.

Food and waterborne and other diseases in crises settings

- Cholera & acute watery diarrhea
- Bloody diarrhea
- Typhoid fever
- Hepatitis A and E (HEV outbreak Chittagong)
- Measles
- Malaria
- Dengue, Chikungunya
- Acute respiratory diseases
  - Main cause of death in children <5

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Diphtheria outbreak Rohingyas 2017-2018

as per September: 5208 suspected, 2700 probable cases
277 confirmed and 44 deaths

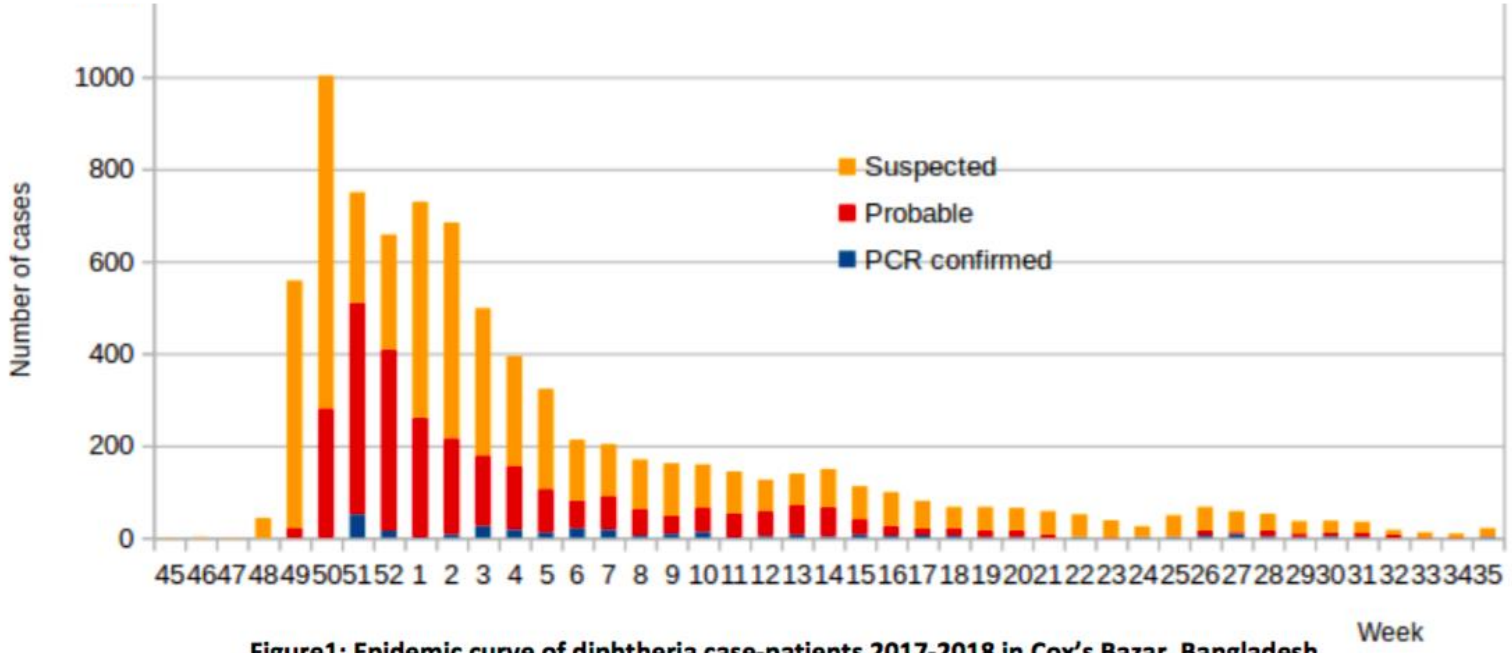
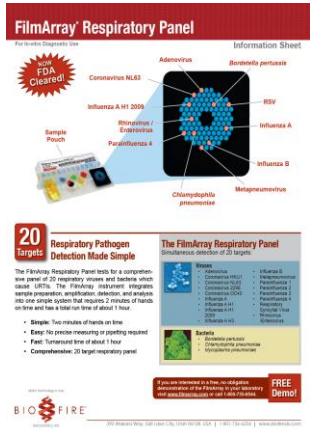


Figure1: Epidemic curve of diphtheria case-patients 2017-2018 in Cox's Bazar, Bangladesh

Projets Rohingyas
Infections respiratoires aiguë
étiologie et impact diagnostic rapide

- **Conception: É**tudes cas-témoins + controlée randomisée
- **Échantillion:** 1200 (600 cases 600 controls)
- **Population:** Réfugiés Rohingyas
- **Géographie:** Ukhiya, Cox's Bazar, Bangladesh
- **Sites d'étude:** GoB, PHC centres
- **Consortium:** GoB, IdeSHi, BITID, FMX (PI)
- **Audits and training:** 1 avril 2018
- **Premier inclusion:** 1 juillet 2018
- **Dernier inclusion:** 30 juin 2019



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Better health in humanitarian crises future needs

- managing and addressing health risks
- reducing vulnerability
- better characterize epidemiology and etiology of ARI
- rationalize disease priorities
- improved diagnostics
- optimize treatment algorithms
- make the best use new vaccines against Hib, pneumococcus, measles and pertussis.
- measure effectiveness of interventions

Our Global Footprint