Hunting black swans in Global health

Ebola - a well prepared disaster

Morten Sodemann, professor of global health
Center for Global Health, University of Southern Denmark
Ebola: The epidemic of epidemics

- Epidemic of swing door poverty
- Epidemic of misunderstanding
- Epidemic of orphans
- Epidemic of the unexpected
- Epidemic of mismanagement
- Epidemic of poverty terror
Figure S20. Subjective classification for current outbreak focus or, alternatively, for the indicated...

An epidemic of publications
The human brain is awesome. It functions 24 hours a day from the day we are born.
The human brain is awesome. It functions 24 hours a day from the day we are born and only stops when we are taking an exam.
Willfull blindness
Failing to see patterns & ignoring facts

”Ebola is always a highly localized, short-term, typically rural event”
Ebola is always a highly localized, short-term, typically rural event. All maps from Guiné contradicted this by showed every sign of of epidemic expansion in spite of the overwhelming acts.

“It is unclear to the panel why early warnings, from May through to July 2014, did not result in an effective and adequate response”
“Although WHO drew attention to the ‘unprecedented outbreak’ at a press conference in April 2014, this was not followed by international mobilization and a consistent communication strategy”
Global Health doesn’t have a brain
UN had complete organ failure
Beyond the public narratives and the obviously bad international performance
YOUR MOST UNHAPPY CUSTOMERS ARE YOUR GREATEST SOURCE OF LEARNING.

Bill Gates
I'm not totally useless.

I can be used as a bad example.
A bird thought not to exist........ but did

Nassim Nicolas Taleb’s metaphor for unexpected financial events. Extended the concept to describe high-profile, difficult to predict rare events in history and present
an outlier, as it lies outside the realm of regular expectations
It carries an extreme impact
in spite of its outlier status, human nature makes us invent explanations for its occurrence after the fact, making it explainable and predictable
The narrative of the black swan: a political tool when we fail big time
7 genes that rocked the world
Ebola outbreak was a perfect storm: cross-border epidemic in countries with weak public health systems that had never seen Ebola before.

"For the Ebola outbreak to spiral this far out of control required many institutions to fail. And they did, with tragic and avoidable consequences."

—CHRISTOPHER STOKES | MSF GENERAL DIRECTOR
7 genes did what politicians & media failed

• Revealed countries’ lack of political commitment to global health security

• Destroyed WHO’s credibility

• Highlighted non-compliance with international health law
7 genes stripped global health research naked

Medical research and development model *ill suited* to address the world’s health priorities
7 genes that showed us we need more of what we haven’t got

We wait for biomedicine to fail – *THEN we call in social science*

*Social Pathways for Ebola Virus Disease in Rural Sierra Leone, and some Implications for Containment*

By PLOS Neglected Tropical Diseases
Posted: October 31, 2014
Denial, ignorance or fatal neglect?

The origin of the Ebola outbreak in West Africa has been traced to the likely confluence of a virus, a bat, a two-year-old child and an underequipped rural health centre in Guiné – and fatal global ignorance

Sierra Leone minister of health: ‘We thought health workers were better informed’
Denial, ignorance or fatal neglect?

The outbreak of Ebola in Eastern Sierra Leone in May 2014 is a result of a socioeconomic, religious, cultural, and political accident.
Denial, ignorance or fatal neglect?

The outbreak of Ebola in Eastern Sierra Leone:

Sierra Leonean herbalist went to the Republic of Guinea to dispense herbs to a sick person who turned out to be an Ebola victim and eventually died. The herbalist returned to Sierra Leone and fell sick; she also died and was given an traditional honorable burial. Hundreds of mourners came from nearby towns, which resulted in as many as 365 deaths being linked to the funeral and, triggered the subsequent Ebola epidemic in the country.

Ebola Wrecks havoc in Sierra Leone. Koroma and Lv Infectious Diseases of Poverty 2015, 4:10 http://www.idpjournal.com/content/4/1/10
Demography, patterns of land use and of human-wildlife interaction are all implicated in zoonotic ‘spillover’ events, but cannot be generalised across cases and localities.

http://opendocs.ids.ac.uk/opendocs/handle/123456789/5853#.VWWA8T9EiM8
7 genes that exposed us to structural violence in health

social structures and institutions causing harm by preventing people from meeting their needs and by focusing on low risk groups
7 genes that exposed total global vulnerability

We are only as safe as the most fragile states

incubation period longer than even the farthest plane ride
7 genes that put migration back into global health

New and better prediction models needed
7 genes that rocked the world

- Destabilized several countries
- Exposed failure of African WHO
- Exposed that social determinants also act at country and regional level
7 genes that made history

With delay the UN declared it a threat to international peace and security (second time in history) – but it took a cross atlantic case
7 genes that pacified pacifists

*Doctors without Borders (and other NGOs)* called for a *military response* to the Ebola epidemic, after 43 years of discouraging military intervention in other humanitarian crises.
7 genes that did what superpowers failed

Fundamental reform of WHO
Global emergency response fund
7 genes made more noise than the really big killers

HIV/AIDS, malaria, TB, diarrhoea
What kills us may be very different from what frightens us or substantially affects our social systems.
The inverse mortality risk

Health care workers, lacking necessary equipment to provide safe treatment, were dying at even faster rates than patients.
Was the epidemic a black swan?
NO!

A well prepared disaster that we were warned about
"The results seem to indicate that Liberia has to be included in the Ebola virus endemic zone. Medical personnel in Liberian health centers should be aware of the possibility that they may come across active cases and thus be prepared to avoid nosocomial epidemics"
Ebola virus in bats and humans in West Africa since 2005 (at least)

Human blood samples collected in Sierra Leone, Liberia and Guinea between 2006 and 2008 from patients with suspected Lassa fever but tested negative for Lassa virus & malaria found that 8.6 per cent, of 220 samples tested were positive for Ebola Zaire antibodies


The extent of the map is roughly congruent with the area most affected by the virus.

http://elifesciences.org/content/early/2014/09/05/eLife.04395.23
Not a new virus or a sudden mutation
The virus doesn’t decide on it’s own whether it wants to be severe.

It has the potential – but human behaviour and the environment decides.
Humans change behaviour and their environment

That could be the black swan
Measles, Cholera, TB and Dengue

Can also change severity and come up with surprise attacks caused by changes in human behaviour
The new normal is crises

Caused by our lack of understanding of human behaviour & it’s consequences
“Where the borders of the three countries intersect is now the designated hot zone, where transmission was intense and people in the three countries continued to reinfect each other.”
Who’s to blame for WHO failure?

WHO funding levelled off after 20 years of constant increase

Other global health investors have grown US and other channel more funding to National research and GH organisations

Shifted balance of power away from the WHO

WHO's Regional Office for Africa (AFRO) has a record and reputation for failure second to none in global health today."

Richard Horton, Chief Editor, The lancet
The world was ill-prepared to respond to an outbreak that was so widespread, so severe, so sustained, and so complex. WHO was overwhelmed, as were all other responders. The demands on WHO were more than ten times greater than ever experienced in the almost 70-year history of this Organization.

"A rapidly transmitted disease in the world's poorest countries, that's what WHO was created for, and it just utterly failed. It was unconscionable."

- Lawrence Gostin, a professor of global health law at Georgetown University
Margaret Chan, WHO Director-General's speech at the Sixty-eighth World Health Assembly 18th May 2015

The world was ill-prepared to respond to an outbreak that was so widespread, so severe, so sustained, and so complex. WHO was overwhelmed, as were all other responders. The demands on WHO were more than ten times greater than ever experienced in the almost 70-year history of this Organization.

“WHO does not have the operational capacity or culture to deliver a full emergency public health response” (Draft of external review of WHO ebola response)
Outdated institutions tackling future challenges

We live in a star wars civilization with Stone Age emotions, medieval institutions and Godlike technology

2002: Chinese authorities lied about SARS cases for fear of trade & tourism effect

2004: Thailand with held information on avian flu cases for fear of tourism

2014: Ebola epidemic declared March 2014, WHO aware but didn’t declare emergency until 8th of August for fear of interrupting tourism, making affected countries angry and for fear of interfering with annual pilgrimage to Mecca
Experience is a ticket to a train that has already left

Ebola teams from Uganda were not welcome in Liberia: their experience from 7 epidemics was unwanted.

http://www.globalhealthminders.dk/interview-six-times-i-fought-a-war-against-ebola-and-beat-it/#comment-11121
6 lessons we refuse to learn
1. Impact

Uncontrolled pandemics are devastating

- 1918 influenza pandemic killed 50 mill people within a year
- HIV/Aids has killed 40 mill since 1981
- Pandemics disrupt societies and economies and cause widespread secondary effects
2. Inequalities

Pandemics love poverty

Pathways by which poverty increases risk include: inadequate sanitation, poor nutrition, crowded living conditions, lack of healthcare services, poor infection control, lack of public health infrastructure and poor governance.
3. Uncertainty

The emergence, origin & transmission routes of individual pandemics is unpredictable.

Uncertainty around transmissibility of new infectious agents and seriousness (case fatality) during early stages
4. Controllability

Most pandemics can be controlled but socio-economic and environmental context, speed and preparedness can change that.
Fear is natural with new threats. Frequently translates into panic and outrage in the face of pandemic diseases.
6. Media

Social epidemics, panic and fake facts spread fast. Effective risk communication is key to managing this response.
Politicised epidemics: Sierra Leone

When the first cases emerged in Kailahun, heartland of the main opposition party, they prompted rumours: country’s ruling party had set up ‘death squads’ to take whole communities to treatment centres in order to administer a lethal injection

People accused President Ellen Johnson Sirleaf of deliberately poisoning citizens and of exaggerating the scale of the epidemic in order to receive international donor money.
Evidence doesn’t solve any problems

People talking to people do
Researchers, public health officials and WHO should have and could have imagined how Ebola would explode in an African suburban slum area.
Looking around corners

More creative imagination needed in considering future infectious disease scenarios and in planning
Governments and organizations that fund global public health should support research that explores Black Swans
Why didn’t WHO declare stage 3 emergency = slowed response

West African context added to complexity: few doctors, civil war/post-conflict, low trust

Guinea: initial public “success” was not true: many hidden patients

Guinea was not used to UN presence = conflict

Suboptimal rural strategy used in urban setting

Top-down approach in Liberia better in suburban/urban case detection and quarantines
Three epidemics in one

World Health Organization declares the epidemic a public health emergency of international concern.

Liberia  New cases each week

Sierra Leone  Sierra Leone reports its first cases.

Guinea

The three countries’ leaders set target for zero cases in 60 days.

World Health Organization declares an Ebola outbreak in Guinea.
Mortality and the darling factor

27th May 26,971 cases (confirmed and probable) with 11,122 deaths (41 %)


Figure 1: Confirmed, probable, and suspected EVD cases worldwide (data up to 10 May 2015)

- Guinea: 2392 cases, 3597 deaths (67 %)
- Liberia: 4769 cases, 10,604 deaths (45 %)
- Sierra Leone: 3904 cases, 12,523 deaths (31 %)
- Mali: 8 cases, 6 deaths
- Nigeria: 20 cases, 8 deaths
- Senegal: 10 cases, 2 deaths
- Spain: 10 cases, 1 death
- United Kingdom: 41 cases, 10 deaths
- United States of America: 1 case, 1 death
- Total: 26,759 cases, 11,080 deaths

Health worker case fatality

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guiné</td>
<td>56 %</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>68 %</td>
</tr>
<tr>
<td>Liberia</td>
<td>80 %</td>
</tr>
</tbody>
</table>

(illegal home clinics?)
The multiple girl effect?

• Girls and women more likely to be infected by men who have recovered: virus in semen for 7 weeks
• Women at higher risk as the majority of the health-care workers are women
• Women tend to be the ones caring for the sick at home and preparing the dead for funerals.
• Pregnant women seeking antenatal care more likely to be exposed to infected healthcare workers.

During Ebola 2014

Pregnant women attending antenatal care dropped by 30% (Sierra Leone)

Attended births dropped from 52% to 38% (Liberia)
No overall gender difference in mortality

Female 70 %
Male 72 %
Women die initially and men later?
Understanding gendered dimensions of health emergencies from cradle to grave

women’s compounded vulnerability to Ebola through their role as carers and as they give life
Ebola teaching us resilience

Not only focus on visible manifestations of ill-being without changing the (social and health) structures that underpin them
Current epidemic has raised new questions

Sexual transmission
Handling of hospital waste
Subclinical cases
Modes of transmission: superspreaders
Survivors role in continuous spread / care
Current epidemic has raised new questions

New global interest in non-communicable diseases has shifted focus and funding away from infectious diseases

Resurgence in Guiné: unsafe burials, bodies secretly transported to home, still no burning of corpses

New strategy:
Incentives to relatives for information
Including taxi drivers in health promotion

http://www.eboladeeply.org/articles/2015/05/7894/guineas-dr-sakoba-keita-taxi-drivers-drive-ebola-away/
Resurgence Guiné

- French speaking
- Low prestige (UN / WHO)
- Weak health care
- Huge country
- Many remote inaccessible areas
- Not used to UN or foreign agencies
- Mining and forestry... (new or old phenomea?)
Resurgence Guiné

• Donor Darlings and donor devils:
• Guiné got less economic support than Liberia or Sierre Leone – but 5 times bigger
• All labs in Guiné = 100 ebola tests per day
• One lab in Monrovia = 200 test per day
Sierra Leone lost 9% of its doctors in 7 months.

Koroma and Lv, Infectious Diseases of Poverty 2015, 4:10
http://www.idpjournal.com/content/4/1/10

Reversing Africa’s Medical Brain Drain

Oxford – There is understandable consternation over Uganda’s plan to send almost 300 health workers to Trinidad and Tobago. The plan reportedly includes four of Uganda’s 11 registered psychiatrists, 20 of its 28 radiologists, and 15 of its 92 pediatricians. In return, the Caribbean country (which has a doctor-to-patient ratio 12 times higher than Uganda’s) will help Uganda exploit its recently discovered oil fields.

Uganda’s foreign ministry says the agreement is part of its mandate to promote the country’s interests abroad through the transfer of skills and technology, as well as an opportunity to earn foreign exchange.

The trouble is that the so-called brain drain in Uganda and elsewhere is not the cause of this dearth of health-care workers. It is only a symptom of health-care systems that are already in crisis. The ultimate solution is not to discourage professionals from working abroad; it is to ensure better training and more amenable working conditions. That way, we health-care professionals can focus on the task at hand: providing health care to our people.

http://www.project-syndicate.org/commentary/developing-countries-doctor-shortage-by-serufusa-sekidde-2015-05
"In pandemics good isn’t good enough"

Tweet citing chief medical officer Sierra Leone at Sixty-eighth World Health Assembly 18th May 2015
African CDC needs more money and a strong leader

Ebola spurred US support for pan-African health agency, but centre needs much more to succeed.

Declan Butler

24 April 2015
Social scientist feel they are called in too late and Run over my medical researcher
Psychologists also want to help

As Ebola raged in West Africa last fall, the United States battled an outbreak of “fearbola,” the term the media invented to describe a paranoia that infected this country.

Although there were only 10 confirmed U.S. cases — all of them people who had direct, prolonged contact with Ebola patients — parents in Texas, Mississippi and New Jersey pulled children out of school after other students or administrators had chance encounters with Ebola patients or visited West Africa, and a teacher in Maine was put on leave after attending a conference in Dallas where the first U.S. case was discovered. The states of New York, New Jersey and Illinois mandated 21-day quarantines for health workers who had treated Ebola patients in West Africa, and Connecticut reserved the right to quarantine anyone believed to have been exposed to the virus.

Though the spread of Ebola may have come as a nasty shock to many, psychologists weren’t surprised at people’s outsized fears. “What happens is quite consistent with what we know about risk perception,” says Paul Slovic, PhD, professor at the University of Oregon and president of Decision Research, a nonprofit whose scientists study human judgment and decision making. “The minute the Ebola threat was communicated, it hit all of the hot buttons. It can be fatal, it’s invisible and hard to protect against, exposure is involuntary and it’s not clear that the authorities are in control of the situation.”

For four decades, Slovic and other psychologists have studied how people perceive risk and what causes them to overreact to epidemics, terrorist attacks and other extreme events, even when their personal risk is infinitesimal, yet at the same time be less attentive to other threats that are far more likely to harm them, such as the flu.

Those misplaced reactions can lead to the stigmatization of people on top of a current crisis. In response, psychologists are helping public to help make sure actions meet needs.

Framing risk, reducing panic

Timely, honest communication from a source an audience deems credible is essential to containing fear during an epidemic, but governments have the tough job of explaining risk and telling people how to act without also seeding alarm, says Carnegie Mellon University psychologist Baruch Fischhoff, PhD. He chaired the Food and Drug Administration’s Risk Advisory Committee and the Environmental Protection Agency’s Homeland Security Advisory Committee.

"The discipline is very straightforward: Identify the few things that people most need to know and figure out how to explain them in clear, trustworthy terms,” Fischhoff says.
A more precise system to risk stratify geographic settings susceptible to disease outbreaks
Reconsideration of International Health Regulations Criteria to allow for earlier responses to localized epidemics before they reach epidemic proportions
Increasing flexibility of the World Health Organization director general to characterize epidemics with more detail
WHO's professional staff:

**43.8% medical specialists**

0.1% are economists

1.4% lawyers

1.6% social scientists
Margaret Chan’s plan to change WHO

• Establish a $100 million emergency reserve fund that can finance field operations for up to three months in response to an infectious disease outbreak;

• Create a rapid response team that can be deployed quickly to provide services on the ground;

• Set up a review committee to consider improvements to the International Health Regulations and their requirements that states set up robust disease surveillance systems; and

• Develop a semi-autonomous committee within WHO, insulated from political pressures, that will have responsibility for declaring global health emergencies.
Losing the grip – easing political pressure

**PUBLIC INTEREST VS. EBOLA CASES**

![Graph showing weekly new Ebola cases and interest](http://www.vox.com/2015/5/22/8640607/ebola-WHO-reform)

- **March 25, 2014** World Health Organization reports Ebola cases in Guinea with suspected cases in the neighboring Liberia and Sierra Leone.
- **March 31, 2014** Doctors Without Borders calls the outbreak “unprecedented.”
- **August 8, 2014** Ebola declared a public-health emergency.

*Sources: Google Trends / The New England Journal of Medicine*

*Reflecting how many searches have been done for a particular term, relative to the total number of searches done on Google over time. Data is normalized and presented on a scale from 0-100.*
Ebola? – what’s that?

Ebola Was the Wake-Up Call for Global Health...
Are We in Danger of Hitting the Snooze Button?

“The most common final end to a pandemic is what I call profound amnesia. SARS? What’s that? We are not yet at ‘Ebola? What’s that?’ But I guarantee you we will be there. And that’s the real problem.”

Howard Markel, MD, PhD, the George E. Wantz Distinguished Professor of the History of Medicine at the University of Michigan [Source]
“That's exactly what happened after H1N1 in 2009 – we lost the grip”

Julio Frenk, former minister of health Mexico, now Harvard
Preparedness epidemic

9/11 got us on the wrong track down a blind alley
Before September 14

most researchers in global health would not have considered it good public policy to allocate limited resources toward developing an effective vaccine against Ebola virus disease

BRICS countries (Brazil, Russia, India, China and South Africa) (25% of global GNI):

Very little
Disorganised
Unfocused

BRICS and global health: the case of the Ebola response

By Guyang Zou on May 14, 2015

Güyang Zou (China Program, COMDIS Health Services Delivery Research Consortium, University of Leeds, Shenzhen, China & Institute for International Health and Development, Queen Margaret University, Edinburgh, UK) wrote this blog together with Kristof Decoster (ITM), Swati Srivastava (PHFI, India), Bhaskar Purohit (PHFI, India & Indian Institute of Public Health Gandhinagar (IIPHG)), Shakira Choonara (University of the Witwatersrand) and Daniel Eduardo Hensio Nieto (Fundación Universitaria Autónoma de las Américas, Pereira, Colombia).
Ebola wasn’t the Black swan

We wanted it to be
IM NOT TOTALLY USELESS.

I CAN BE USED AS A BAD EXAMPLE.
Infectious diseases are like people: they are born, grow and die. But it's only through the actions of human beings that they can complete that life cycle. It's up to human beings to break it

Dr. Sakoba Keita, Guinea's National Ebola Response Co-ordinator
Crises is the new normal

Let's prepare for normal