



Passenger Screening for Ebola: The New Security or The New Threat?

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My Background

Researched aviation security since 1995

Operations Research (Math, Comp. Sci., Economics)

Areas of Research

Optimal Security System Design & Analysis

Security device deployment and utilization

Cost-Benefit Analyses

100% checked baggage screening

Intelligence versus technology assessment

Risk Assessment and Mitigation

Real-time passenger security assignment



Ebola Haemorrhagic Fever

Ebola is impacting Western Africa

- Guinea, Sierra Leone, Liberia

Has a 2 to 21 day incubation period after exposure

Requires transfer of body fluids (nonairborne) to be contracted

People are contagious only once symptoms begin to express themselves

- Fever, head ache, muscle pain, vomiting, diarrhea, abdominal pain, hemorrhaging
- High mortality rate (50%?)



First Event on US Soil

- Thomas Duncan was diagnosed with Ebola on 30 September 2014 in Dallas, TX
 - Travelled from Liberia to Brussels to Dulles to Dallas
 - Arrived to Dallas 20 September 2014
 - Showed Ebola symptoms on 25 September 2014
 - Officially diagnosed with Ebola on 30 September 2014
- First case in the United States
- Created public concern/angst: Will it spread?



Passenger Screening

- Most visible aspect of aviation security
- Many changes in aviation security since 9/11
 - New technologies (AITs)
 - New screening strategies (PreCheck)
- Passenger prescreening
 - CAPPS, selectees, nonselectees
 - No fly list
- TSA committed to a risk-based paradigm



Can the Same Principles be Applied to Ebola Screening?

Similarities

- Prevent a threat onto an airplane
- Passengers may wish to obfuscate their threat

Differences

- Success of clears may only for know for 21 days
- Passengers may not even know that they are a threat



Security Approaches

Medical interventions have limited value

- Taking temperature (ibuprofen)
- Interrogation

Key information to assess risk

- Exposure to and direct contact (fluids) with people who are infected (over the past 21 days)



Entry Screening (at Point of Arrival)

Performed in the United States

- Airports: JFK (10/11); IAD, ORD, ATL, EWR (10/16)
- Medical exams and complete 21 day history

Tactically appealing

- Can be controlled by CDC/DHS

Strategically challenging

- * Late in the detection chain



Exit Screening (at Enplanement)

Performed at airports in West Africa

- Medical exams and complete 21 day history

Tactically challenging

- More difficult to control (by CDC/DHS)
- May not provide complete information

Strategically desirable

- Stop at the source



Other Challenges

All flights from West Africa to the United States require a connection (e.g., Brussels).

Passenger can be symptom free at departure, but develop symptoms enroute or after arrival.

Symptoms are not unique to Ebola.



Other Challenges

Passengers with exposure will be highly motivated to under estimate their risk at departure (false clears)

Once they arrive into the United States, passengers will be highly motivated to report any symptoms that they may have (false alarms)

Will Ebola screening divert attention away from security screening?



Good News

Not easy to transmit the virus (nonairborne)

Relatively few people travel from West Africa into the United States (60-150 per day).

A number of cases have been diagnosed outside West Africa; few have been transmitted from outside Western Africa.



Key Observations

Controlling the virus at the source is critical.

Screening for the virus at the source is optimal.

Halting flights into West Africa will exacerbate the problem (social, economic, public health).

Ebola outbreak in West Africa reveals weaknesses in their public health infrastructure



Entry Screening Challenges

Passengers who enter the United States from West Africa are subject to interrogation and medical examination

Results are used to assess risk level and how they should be managed

- Self-monitor
- Self-quarantine
- Full-quarantine



Costs and Risks

If someone becomes ill with Ebola, costs incurred include treatment (~500K/patient) and contact trace of all people they have been in direct contact with.

Are assessments overly cautious?

What does the recent data suggest?



Entry Screening Data+

1993 travelers (11 October – 10 November 2014)

- 86 referred for additional screening (4.3%)
 - All were health care workers
 - 79 were deemed low risk
 - 7 showed some symptoms (8.1%)
 - **None were diagnosed with Ebola**

No passengers were deemed high risk

+ MMRW, "Airport Exit and entry Screening for Ebola – August-November 10, 2014"



Opportunities

Should other factors being used in addition to risk?

- Potential breadth of contact trace footprint
- Age
- Gender
- Physical condition

Can exit screening be further enhanced?



Up-to-Date Numbers

	Cases	Deaths
Liberia	7,719	3,177
Sierra Leone	7,897	1,768
Guinea	2,292	1,428
	17,908	6,373

As of 10 December 2014 (CDC)

<http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/case-counts.html>



Up-to-Date Numbers

	Cases	Deaths
Liberia	7,977 (+258)	3,413 (+256)
Sierra Leone	9,409 (+1512)	2,732 (+964)
Guinea	2,695 (+403)	1,697 (+269)
	20,081	7,842

As of 30 December 2014 (CDC) (since 10 December 2014)

<http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/case-counts.html>



Up-to-Date Numbers

	Cases	Deaths
Liberia	8,115 (+396)	3,471 (+314)
Sierra Leone	9,772 (+1875)	2,915 (+1147)
Guinea	2,769 (+477)	1,767 (+339)
	20,656	8,153

As of 5 January 2015 (CDC) (since 10 December 2014)

<http://www.cdc.gov/vhf/ebola/outbreaks/2015-west-africa/case-counts.html>



Key Take-Away Points and Observations

Exit screening is critical

Entry screening is “too late”

* Costs, risks

Sierra Leone is out of control



Thank you

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