



Public Health
England



Field Microbiology in West Africa



Neil Bentley
18th November 2015



Field Microbiology in West Africa

UK Response

- European Mobile Lab Deployment
- PHE Laboratory Deployment
- Support and Logistics
- Provision of Public Health Service
- Maintaining Service provision with added Research and Development
- Legacy planning
- Personal Reflections





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The European Mobile Lab - EMLab Deployment



26th March 2014

The European Mobile Lab – EMLab

The Road from Conakry to Gueckedou



27th March 2014

The European Mobile Lab - EMLab Ebola Outbreak in Guinea



30th March 2014



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Trip 1: PHE-led laboratories in Sierra Leone

Kerry Town (Western Area)

- DFID-funded Kerry Town ETU
- NGO- Save the Children /Aspen



Makeni (Bombali Region)

- DFID-funded Makeni ETU
- NGO- International Medical Corps



Port Loko (Northern Region)

- DFID-funded Port Loko ETU
- NGO- GOAL





PHE Sierra Leone laboratories

Kerry Town PHE Laboratory:

Opened 28th October

Port Loko: PHE-led laboratory

Opened 5th December

Makeni: PHE-led laboratory

Opened 8th December





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Kerry Town laboratory

1 laboratory; 2 roles

- PHE-led Ebola molecular diagnostics
- MOD clinical chemistry & haematology





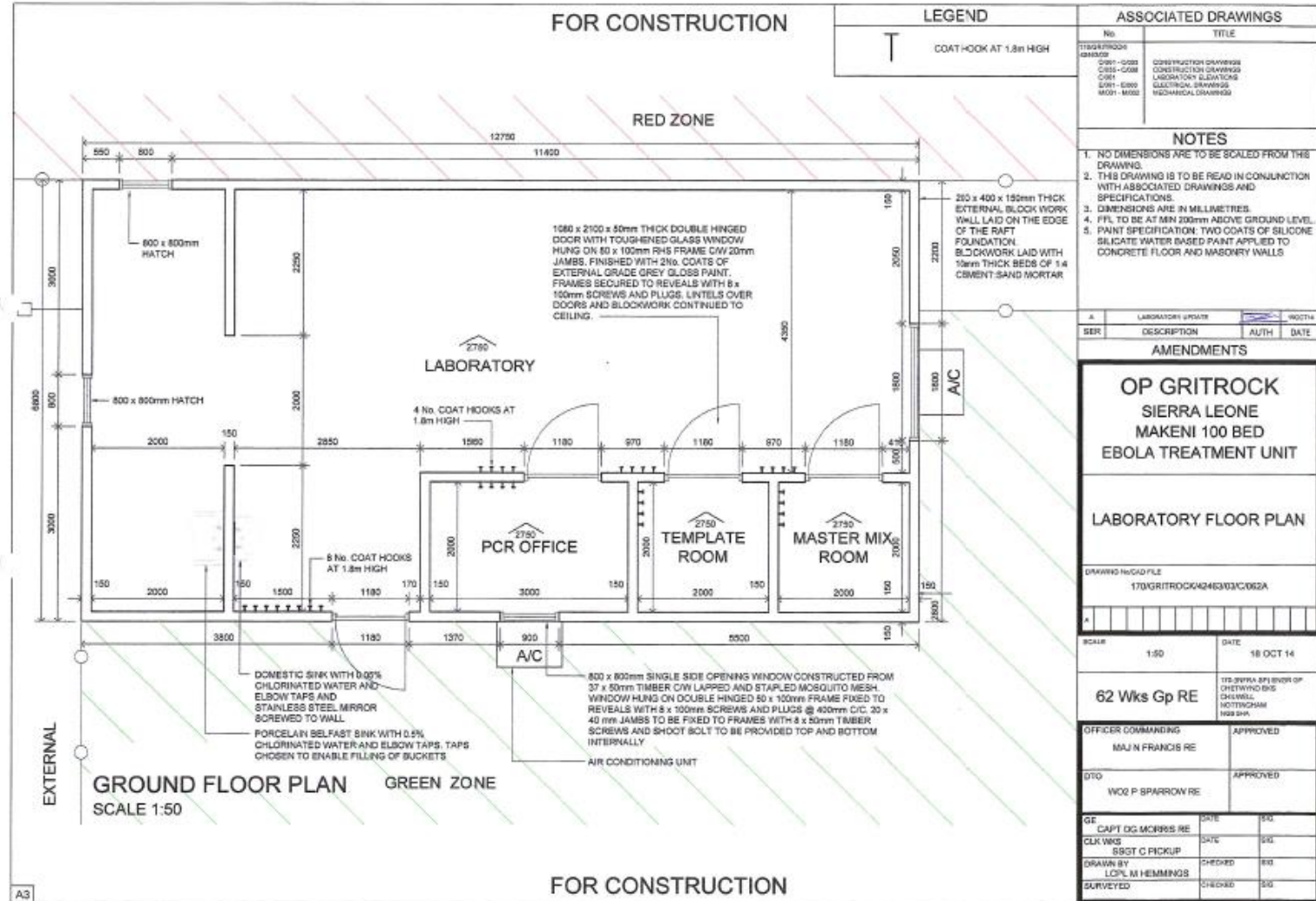
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Kerry Town laboratory: Opened 28th Oct 2014





Makeni & Port Loko laboratories





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Port Loko 19th Nov





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Makeni 19th Nov







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Port Loko 23rd nov





Install Equipment


Bill of quantity and estimated
Construction of benches and the
treatment centre in Makeni.

- 3/4 plywood type 8' x 4' long - 65 ps
- 2 x 12' x 14' timber
boards (finished) - 75 ps @ 900
- Melic (Acrylic type) - 86 ps @ 250
- Coscamite, polish
sine paper etc - - - Du

Cost of materials → 29,500,000
Cost of labour → 44,250,000
Final cost → 233,925,000

Contact
07672890 } Iba Linn Sitde Water
088616385 }

Approved By: [Signature]
Completion period within 4 days from Sat. date.





Commission isolators





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Port Loko Laboratory (opened 5.12.14)





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Makeni Laboratory (opened 8/12/14)





Finishing touch





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- PHE
- MOD
- DFID
- MOH
- Commercial Suppliers

Support and Logistics





Lab staff remit:- labourer, electrician,
chippy, cleaner, entertainer, negotiator
and finally a scientist!





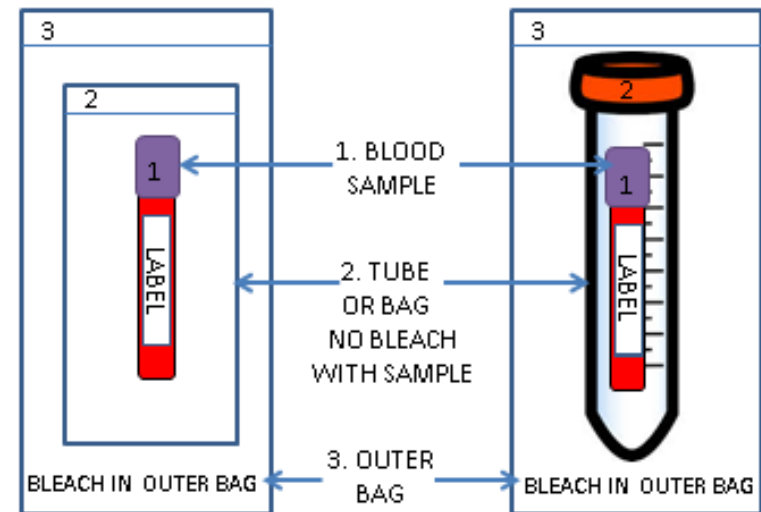
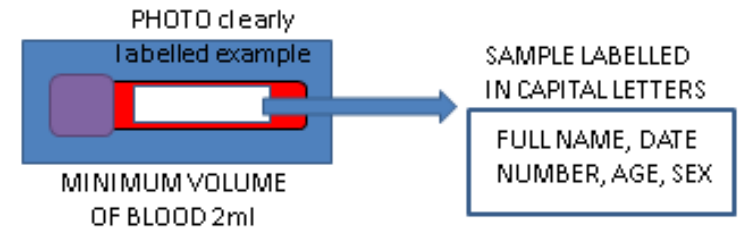


PHE Service provision

- Diagnostic Service – not enough
- Public Health Service required
- Our USP



EDTA BLOOD SAMPLE PACKAGING REQUIREMENTS FOR LABORATORY TESTING



LEAKING SAMPLES WILL NOT BE TESTED















Ebola PCR Testing: Oct 14 to Oct 15

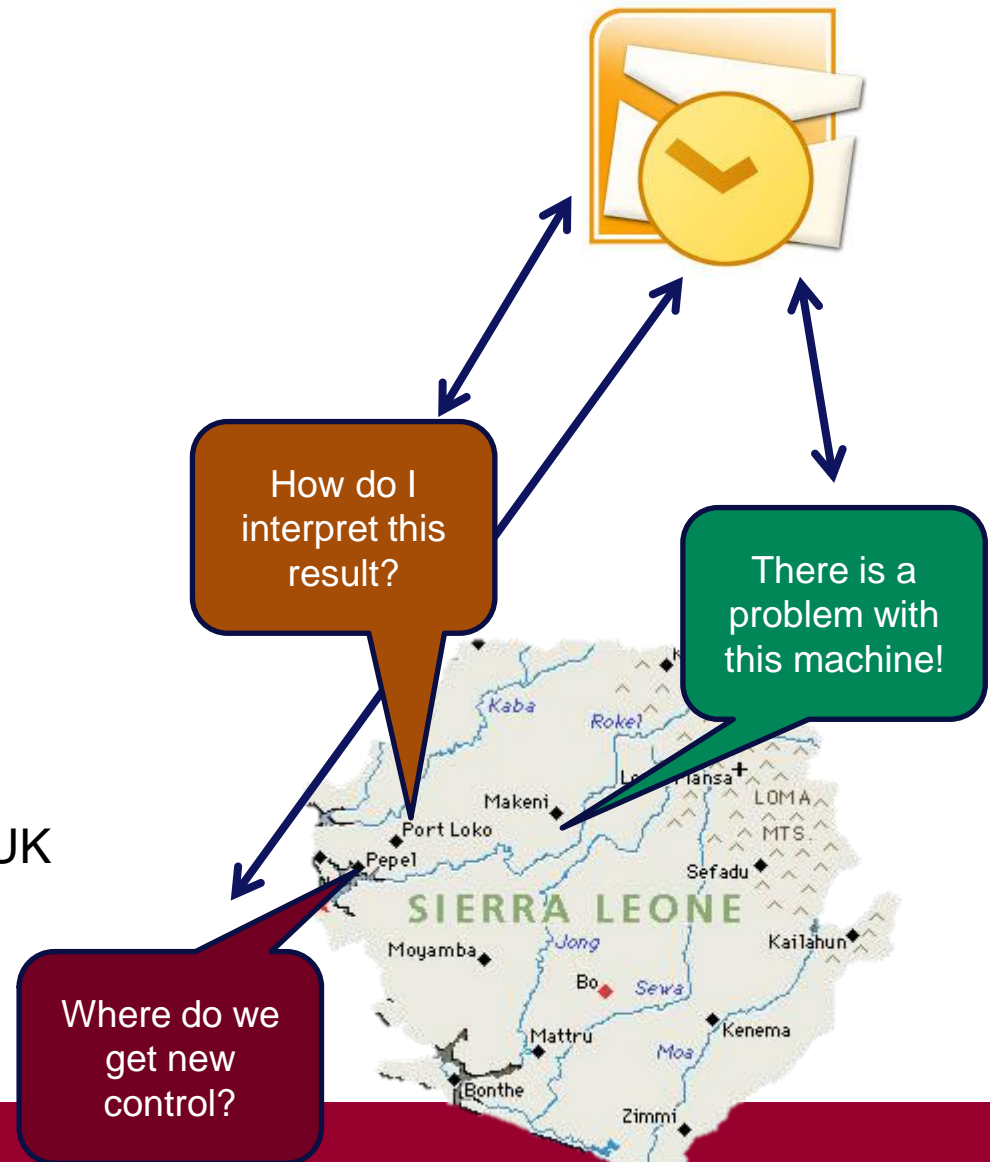


Laboratory Name	Total Samples			Blood		Swabs		Other		TAT within 24hrs	% within
	All	Positive	% Pos	All	Positive	All	Positive	All	Positive	No of Samples	TAT
Kerry Town	6,142	1,211	19.7%	3,119	991	2,616	175	407	45	5,589	89%
Makeni	15,616	327	2.1%	3,497	277	12,046	48	73	2	14,317	93%
Port Loko	15,477	943	6.1%	3,788	713	11,547	223	142	7	13,765	89%
Grand Totals	37,235	2,481	7%	10,404	1,981	26,209	446	622	54	33,671	90%



UK Support

- Procurement
- Training
- Scientific Support
- SOP development and writing
- Risk Assessments
- Telephone help
- IT support
- R&D
- IBMS and NHS promotion and advertising
- Emotional and psychological support
- Pathology managers and staff from UK
- Government departments e.g. DFID





Local R&D

Biofire

Cepheid

Corgenix

Lateral flow assays

Buccal Swabs

Virus Shedding in body fluids

Virus in sewage

Patient contamination audit

Infusion studies

Convalescent plasma

Drugs





UK R&D

- Sample movement
- Vaccine development
- Antiviral development
- Serological assays
- Virus isolation work and inactivation studies
- Ebola Genomics
- Sequencing
- Host response studies
- Immune response

EXPERIMENTAL DRUGS USED TO TREAT EBOLA

More than a dozen drugs for treating Ebola are being developed, but none has been formally approved. The current epidemic has prompted the early use of experimental drugs on a few Western patients.

(SEE DIAGRAM BELOW)	DRUGS	INVESTIGATORS
1 Targets the virus before it enters the cell	ZMapp	Mapp
	ZMAb	PHAC
	IgG Ebola	USAMRIID
2 Interferes with viral reproduction	TKM-Ebola	Tekmira
	Brincidofovir*	Chimerix
	Favipiravir*	Fujifilm
	BCX4430	Biocryst
	Gleevec	Inhibikase
	PMOs	Sarepta
3 Prevents the virus from exiting host cells	Glucosidase inhibitor	Drexel
	Glycosidase inhibitor	Unither
4 Bolsters human cells	SMIPs	Novartis
	IRF-3 pathway activators	Gale Laboratory
	IFN alpha Ad5 vector	Defyrus
Tests existing drugs approved for other purposes for use against Ebola	All other drugs	USAMRIID/ Zalicus

*DEVELOPED TO TARGET OTHER VIRUSES, SUCH AS HERPES, INFLUENZA, ADENOVIRUS AND WEST NILE VIRUS



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NGS – African style!





Legacy

- Need to provide on-going laboratory and clinical support
- Bigger than microbiology
- Requires Pathology services
- Requires Public Health services
- Requires training and development
- Requires robust supply chain
- Requires UK commitment
- **Most important – Need a little help**





Possible labs

- CDC USA – Provision of reference services – Lakka
- CDC China – Provision of BSL4 services – Jui
- Provision of PHE pathology services - Concentrate of what kills people locally
- Connaught Hospital – Freetown
- Govt Hospitals in:
 - Makeni
 - Bo Town
 - Kenema





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Local hospital







And the aftermath

Stigma

Disability

Physically

Mentally

Orphans

Western World wants and needs?

Persistence of virus

A new reservoir?

Economic disaster?





Culture and society



Structure

Paramount Chief

Section Chief

Village heads



Religion

60% Muslim

40% Christian

*Leaders of both groups have been
supportive of control measures*

Secret societies

Witchcraft

Ritual (including mutilation)

Sorcery

May hold key to changing practice

Engage locally with help of NGO



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Bat soup

Problem is preparing bats

Now banned in Guinea

Emphasises sociological issues

- Food habits

- Food poverty

- The man thing: hunting

Bats are probably the main reservoir

- PCR evidence in 3 spp

- Clinically unaffected

- Virus may evolve largely by reassortment



*Daily News of
Guinea*





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Acknowledgements

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PHE Patient Diagnostics

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Colindale
The London
Newcastle



**Most importantly - All
the volunteers and
their employers for
releasing them**



Department
for International
Development



Save the Children



International
Medical Corps UK

Summary

The virus is only a part

Humans are responsible for the rest

Despite the hardships, there is great resilience

Local heroes and leaders have risen

The virus does not always go away

Only 1920's medicine was used for most of the outbreak

The mantra forbid 1950's basic fluid management

The studies came too late

***With thanks to all in RIPL and PHE, the NHS, Universities and beyond
without whom none of our work would have been possible.***