The Regional Laboratory Network

Biological Weapons Convention
Meeting of Experts
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Dr. Thomas Binz
Federal Office of Public Health
Coordinating Committee of the Regional Laboratory Network
Background

- The anthrax attacks in the United States in 2001, the outbreak of SARS in 2003, the avian flu in 2005 and the pandemic influenza (H1N1) in 2009 have shown that biological incidents with a high potential hazard must be anticipated at any time.

- The anthrax crisis revealed insufficient resources, expertise and biosafety in Switzerland with regards to the analysis of dangerous organisms – notably in the analysis of environmental samples.
Needs

- Diagnostic capacity for rare and/or dangerous pathogens which cannot be provided by public or private laboratories
- Rapid test for these pathogens through laboratory analysis
- Rapid access to diagnostic facilities; close coordination with first-response organisations
- High-quality diagnostics
- Security in case of crises through networking and redundancies
- Interoperability: Prevention - Identification - Control
Objectives of the RLN: Create capacities

- Increase the crisis-resilience of primary diagnostic capacities for biological incidents
- Establish environmental analysis for biological incidents
- Subsidiary tasks in human and veterinary medicine during an incident
- Decentralised primary diagnostic capabilities
  - Short transport distances for samples; rapid analysis
  - Geographically comprehensive diagnostic capacities
  - Take the burden off the national reference centres
- Use existing infrastructure
Objectives of the RLN: Ensure coordination

- Cantonal organisation – national coordination
- Regional laboratories linked to partner cantons (concordat principle)
- In a crisis, coordination of analytics with the local authorities, between the regions and with the national reference centres
- Interface with intervention
- Information sharing between the partners
Structure of the RLN

National reference centres and high-containment laboratories (primary and confirmatory diagnostics)

- Other reference centres as required
- National reference centre for anthrax (NANT)
- Institute for viral diseases and immunoprophylaxis (IVI)
- National reference centre for newly emerging viral infections (NAVI)
- High-containment Spiez laboratory (LS)

Biosafety level 3  
Biosafety level 4

Regional laboratories (primary diagnostics)

- Regional laboratory North (BS)
- Regional laboratory South (TI)
- Regional laboratory East (ZH)
- Regional laboratory West (GE/VD)
- Regional laboratory East Central (LU)
- Regional laboratory West Central (BE)

Biosafety level 3

* The IVI operates to biosafety level 4 VET
Composition of the Coordinating Committee

- Regional laboratories: 2 representatives each
- National reference centres: 1 representative each (IVI, LS, NANT, NAVI)
- Federal Office of Public Health: 2 representatives
- Federal Office for the Environment: 1 representative
- Swiss Expert Committee for Biosafety: 1 permanent guest
- Cantonal NBC Coordination Platform: 1 permanent guest
Tasks of individual players

- Confirmation of primary diagnostics results
- Development and transfer of analytical methods
- Typisation of the pathogens
- International networking

National Reference Centres

- Primary analysis in case of an incident
- Coordination with first-response organisations
- (see catalogue of requirements)

Regional laboratories

- Organisation and coordination at cantonal level

Advisory board

- First-response organisation
- Funding of regional laboratories

Cantons
Catalogue of requirements

The list of requirements to be fulfilled by the laboratories of the RLN is the basis of the regional organisation and settles the following points:

- Necessary infrastructure
- Sampling, transport and sample analysis (available methods)
- Preparedness, capacity and mutual support
- Quality assurance
- Cost of studies
- National coordination
Regionalisation
### Available Analysis

<table>
<thead>
<tr>
<th>Biological Agents</th>
<th>Biological Agents</th>
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<tbody>
<tr>
<td><em>Bacillus anthracis</em></td>
<td><em>Marburg Virus</em></td>
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<tr>
<td><em>Brucella sp.</em></td>
<td><em>Monkeypoxvirus human</em></td>
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<tr>
<td><em>Burkholderia mallei</em></td>
<td><em>Nipah Virus</em></td>
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<tr>
<td><em>Burkholderia pseudomallei</em></td>
<td><em>Norovirus</em></td>
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<tr>
<td><em>Chlamydia psittaci</em></td>
<td><em>Omsk Virus</em></td>
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<tr>
<td><em>Coronavirus (SARS)</em></td>
<td><em>Puumala Virus</em></td>
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<tr>
<td><em>Coxiella burnetii</em></td>
<td><em>Rickettsia prowazekii, Rickettsia sp.</em></td>
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<tr>
<td><em>Cryptosporidium parvum</em></td>
<td><em>Rift Valley Virus</em></td>
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<tr>
<td><em>Dengue Virus</em></td>
<td><em>Sabia Virus (Brazilian Hemorrhagic Fever)</em></td>
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<tr>
<td><em>Ebola Virus</em></td>
<td><em>Salmonella sp. bzw. Salmonella Typhi</em></td>
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<tr>
<td><em>EEE Virus (Eastern Equine Encephalitis)</em></td>
<td><em>Shigella sp. bzw. Shigella dysenteriae</em></td>
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<tr>
<td><em>Escherichia coli O157:H7</em></td>
<td><em>Sin Nombre Virus</em></td>
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<tr>
<td><em>Francisella tularensis</em></td>
<td><em>Toxin: Clostridium botulinum Toxin</em></td>
</tr>
<tr>
<td><em>Gelbfiebervirus</em></td>
<td><em>Toxin: Clostridium perfringens Epsilon toxin</em></td>
</tr>
<tr>
<td><em>Guaranito Virus (Venezuelan Hemorr. Fever)</em></td>
<td><em>Toxin: Mykotoxine (Trichothecone, T2-Toxin)</em></td>
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<tr>
<td><em>Hantaanvirus</em></td>
<td><em>Toxin: Ricin Toxin</em></td>
</tr>
<tr>
<td><em>Influenza Virus A(H5N1)</em></td>
<td><em>Toxin: Saxitoxin (Algal toxin)</em></td>
</tr>
<tr>
<td><em>Influenza Virus A(HxNy)</em></td>
<td><em>Toxin: Staphylokokken Enterotoxin B</em></td>
</tr>
<tr>
<td><em>Junin Virus (Argentinian Hemorrhagic Fever)</em></td>
<td><em>Toxin: Tetrodotoxin (Pufferfish toxin)</em></td>
</tr>
<tr>
<td><em>Krim Kongo Virus</em></td>
<td><em>Variola major Virus (Orthopoxvirus variola)</em></td>
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<tr>
<td><em>Kyasanur Forest Virus</em></td>
<td><em>VEE Virus (Venezuelan Equine Encephalitis)</em></td>
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<tr>
<td><em>Lassa Virus</em></td>
<td><em>Vibrio cholerae</em></td>
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<tr>
<td><em>Legionella</em></td>
<td><em>WEE Virus (Western Equine Encephalitis)</em></td>
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<tr>
<td><em>Louping ill-Virus (FSME- u. RSSE-Virus)</em></td>
<td><em>West Nile Virus</em></td>
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<tr>
<td><em>Machupo Virus (Bolivian Hemorrhagic Fever)</em></td>
<td><em>Yersinia pestis</em></td>
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Added value for biological alert situations

- Structuring and focusing of diagnostic capacities in Switzerland
- Increased preparedness and short response times
- Successful crisis management through flexibility, front-line presence and redundancy
Future challenges

- Maintaining the network
- Flexibility (preparedness, methods, etc.) to respond rapidly to new threats
- Maintaining high quality standards
- Integration in a national NBC protection system
- Lean structures
- International networking
Thanks to

### Regional Laboratories
- Dr. Claudia Bagutti, Kantonales Laboratorium Basel-Stadt
- Dr. Hans-Peter Bühler, Kantonales Laboratorium Bern
- Dr. Daniel Fischer, Amt für Abfall, Wasser Energie und Luft, Zürich
- Prof. Dr. Gabriela Pfyffer, Institut für Medizinische Mikrobiologie, Kantonsspital Luzern
- Dr. Mauro Tonolla, Istituto Cantonale di Microbiologia, Bellinzona
- Dr. Thomas Rhomberg, Amt für Abfall, Wasser Energie und Luft, Zürich
- Dr. Sylvain Rodriguez, Service de l’environnement et de l’énergie, Epalinges
- Dr. Jacques Schrenzel, Service des maladies infectieuses, Hôpitaux Universitaires de Genève
- Dr. Urs Vögeli, Kantonales Laboratorium Basel-Stadt

### National Reference Centres
- Dr. Pascal Cherpillod, Service des maladies infectieuses, Hôpitaux Universitaires de Genève
- Prof. Dr. Joachim Frey, Institut für Veterinärbacteriologie, Universität Bern
- Dr. Paola Pilo, Institut für Veterinärbacteriologie, Bern

### Confederation
- Dr. Christian Griot, Institut für Virokrankheiten und Immunprophylaxe, Mittelhäusern
- Dr. phil. II Hans Hosbach, Bundesamt für Umwelt, Wald und Landschaft
- Dr. Isabelle Hunger-Glaser, Swiss Expert Committee for Biosafety
- Dr. Martin Schütz, Spiez Laboratory

### Federal Office of Public Health
- Dr. Thomas Binz
- Mr Frédéric Eynard
- PD Dr. Richard Felleisen
- Dr. Patrick Mathys