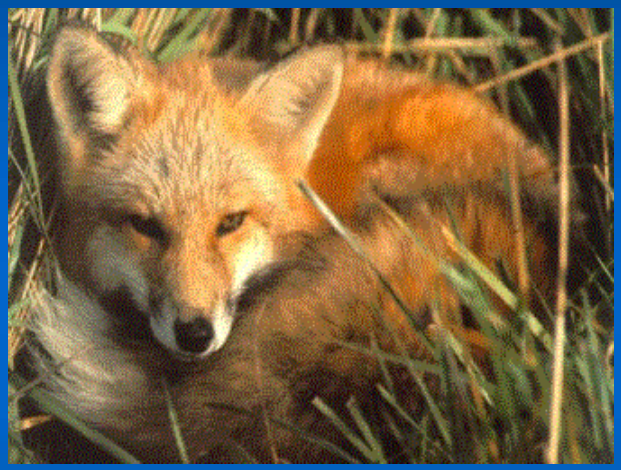
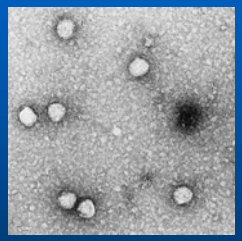
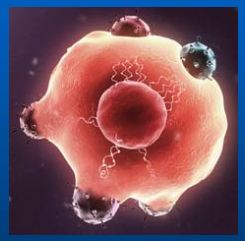
Situation-based surveillance

to do what we really want







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Background

We recognized for wildlife disease surv… …hemes

- copied from corres… …stock
- conti… …otocols after elimination
- …nt testing of quotas.

Dissatisfying

We pin-point for epidemics

- efficient surveillance adapts to changing disease situation.

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Situation-based surveillance

to do what we really want

- Alignment of concepts
- Construction of an adaptive scheme
  - Exploration of existing schemes
  - Exploration of surveillance data base
  - Exploration of aims & logical needs
- Synthesis

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Concepts

Measure & aim

Disease Surveillance

Aim: Detecting infected animals

Incidence estimation

Target: Infected population

Follow Up of control

Aim: Assessing control efficacy

Immunization coverage

Bait uptake

Target: Non-infected population

Concepts

Measure

Disease Surveillance

Follow Up of control

Sample source

Indicator Animals

(Passive Sampling)

Found dead

Suspicious behavior

Road Kills

Hunting Bag

(Active Sampling)

Shot quotas from population census

Concepts

Measure

Disease Surveillance

Follow Up of control

Sample source

Indicator Animals

Hunting Bag

Putting things together using the example of rabies…

WHO 1990

Guiding principles for surveillance of wildlife rabies in Europe, Geneva 2-5 July 1990

Sampling over time for

Rabies Surveillance & Follow up of oral mas… …tion

Guidance:
8 foxes/100km² p.a.

Indicator Animals	• Road kills, Found dead, Abnormal behavior
Hunting Bag	• Any which is not an indicator animal

Analysis

- Temporal aspect
- Sample basis
- Sample size

Analysis

- Temporal aspect
- Sample basis
- Sample size

Temporal aspect

Follow Up of control

Performance?

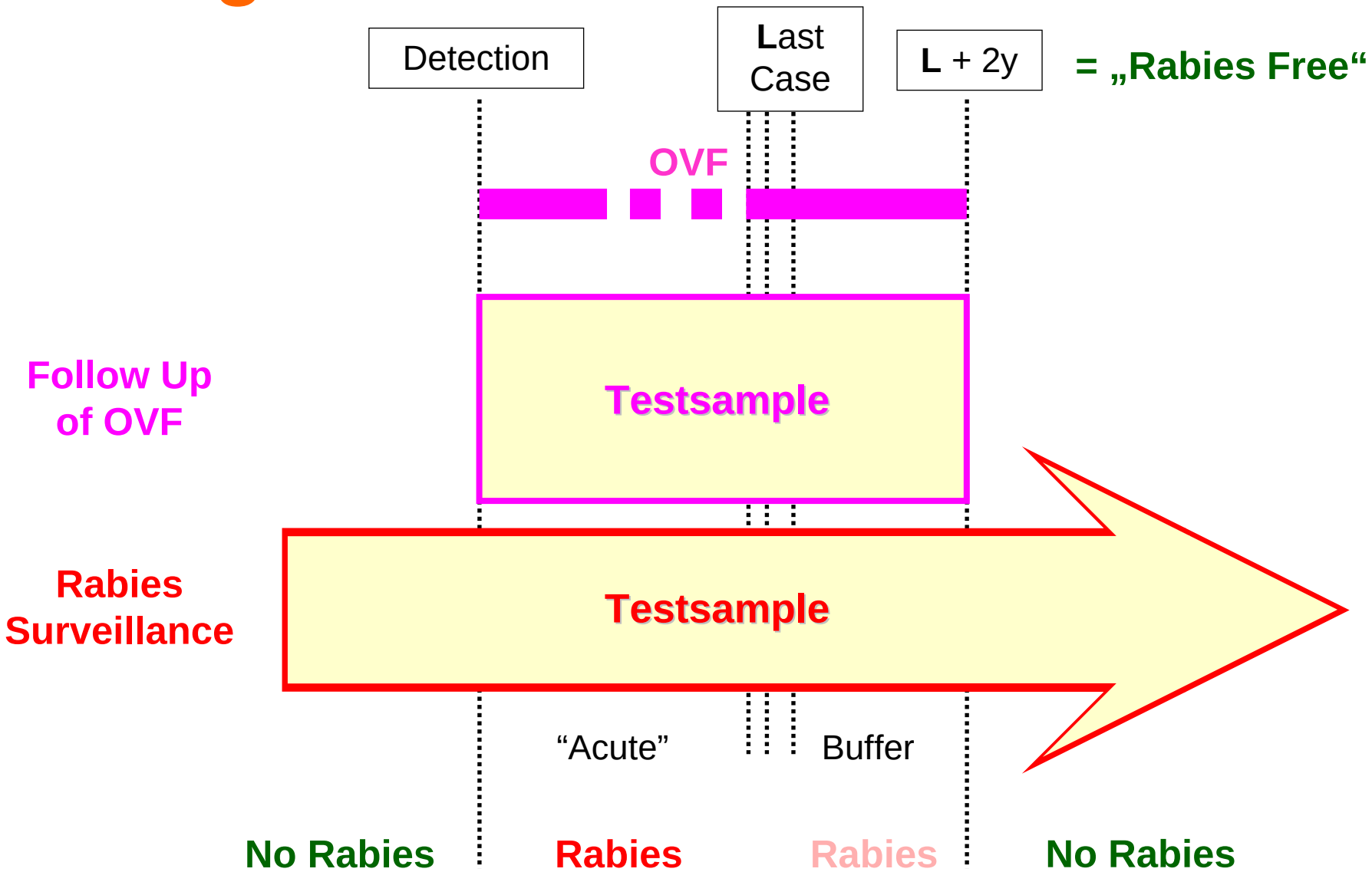
Knowledge needed only during control

Disease Surveillance

Disease?

Knowledge needed always

Timing of Measures



Analysis

- Temporal aspect
- Sample basis
- Sample size

Analysis

- Temporal aspect
- Sample basis
- Sample size

Sample Basis

Hunting Bag

Always available

Representative for population

Perfect sample for estimating proportions:

Follow Up of control

Indicator Animals

Randomly available

High chance of detection

Rabies cases & Tests for rabies!!!

Any data source: ICP / RP-SVS / WHO-CC / TSN / Operational Manuals

Investigation effort per case detection in hunting bag compared to indicator animals

Any data source: ICP / RP-SVS / WHO-CC / TSN / Operational Manuals

Investigation effort per case detection in hunting bag compared to indicator animals

Field data

Tests per detected case	Indicator wild boar	Hunted wild boar	Ratio	OR
No vaccination	1.7 (272)	42 (21.319)	1:24	55
Vaccination	3.3 (234)	695 (164.652)	1:208	296
Serology	4.3 (56)	4.3 (22.586)	1:1	0,99

Any data source: ICP / RP-SVS / WHO-CC / TSN / Operational Manuals

Sample Basis

Hunting Bag

Always available

Representative for population

Perfect sample for estimating proportions:

Follow Up of control

Indicator Animals

Randomly available

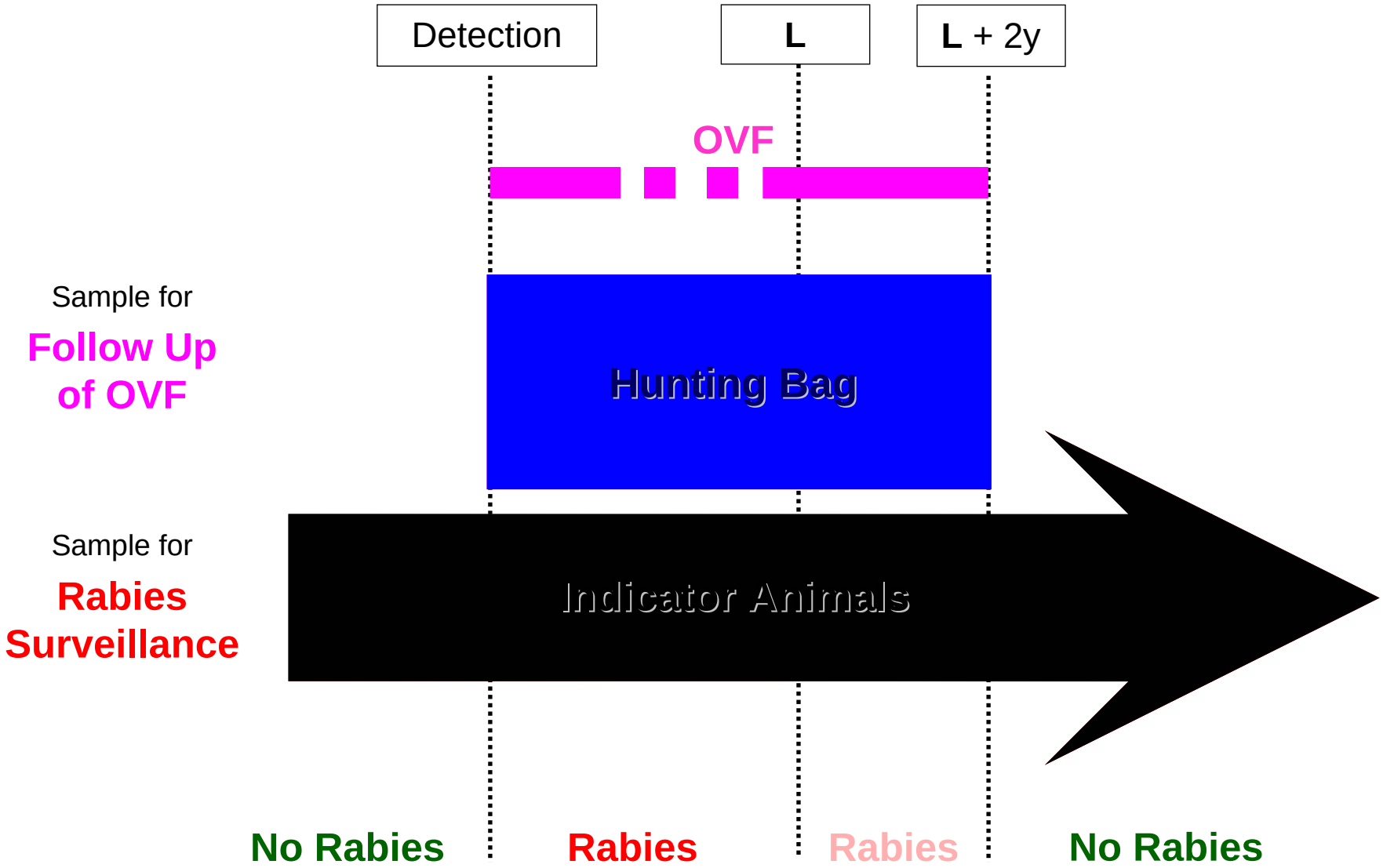
High chance of detection

Points to infective population

Perfect sample for finding disease:

Disease surveillance

Sample Basis of Measures



Analysis

- Temporal aspect
- Sample basis
- Sample size

Analysis

- Temporal aspect
- Sample basis
- Sample size

Sample Size

Follow Up of control

Hunting Bag

Percentage estimation!

Confidence

Sample Size

Percentage estimation:

- Assume an area containing >10.000 animals
- Sample size to estimate with 5% precision:

  n = 384 ~ 400 animals
- Then, of 5.000 km² control area 8/100km²/year animals must be sampled (if density >2/km²)

Any data source: ICP / RP-SVS / WHO-CC / TSN / Operational Manuals

Sample Size

Follow Up of control

Hunting Bag

Percentage estimation!

Confidence

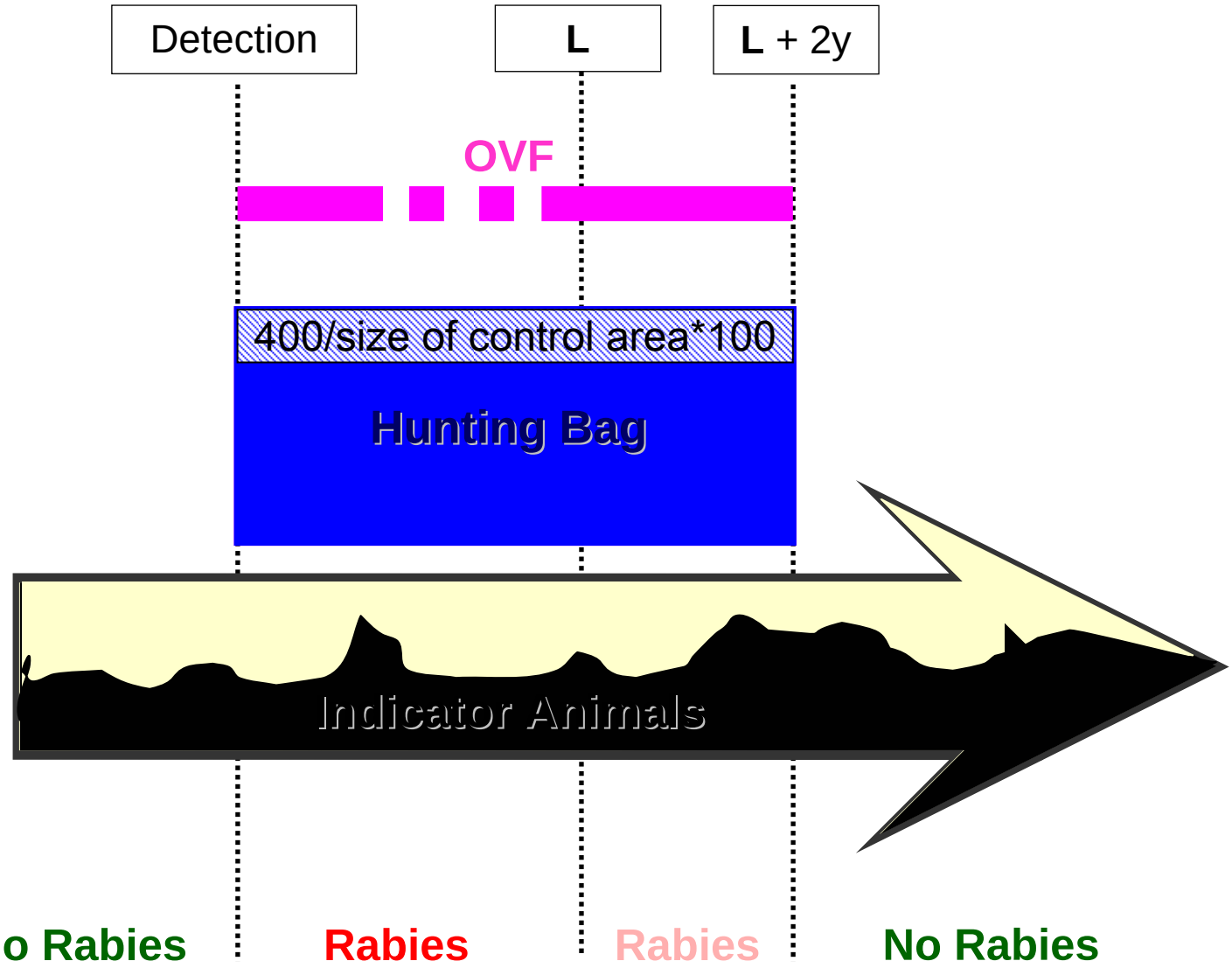
Disease Surveillance

Indicator Animals

Yes / No !

No estimation

Sample Size of Measures



Follow Up
"8" foxes
/100km²/year

Rabies Surveillance
"a.m.a.p."

Conclusions

- Testing of **hunted animals** for **disease detection**

  => low efficiency

- Testing of **hunted animals** without **control**

  => futile

- Testing of **8/100km²/year** for **disease surveillance**

  => not justified

- If **“disease free”** then maximize testing of **indicator animals** on the long run

Overview

Situation	Know-ledge of disease	Aim	Strategy	Source
Free	Absent	Detection of Arrival	Disease Surveillance passive	Indicator animals
Diseased	Present	---	---	---
Control	Present + Management	Monitor Performance	Follow up active	Hunted healthies
Finished?	Present + Management	~~Proof of Freedom~~	~~Reject design prevalence~~	*Indicator animals !!*

Situation-based surveillance

Thomas Selhorst
Andreas Fröhlich
Christoph Staubach

Inst. for Epidemiology at
FLI – Friedrich-Loeffler-Institut,
Wusterhausen, Germany

Thomas Müller

WHO CC for Rabies Surveillance and Research, Germany

Stefan Szips

RTA Twining “Strengthening animal health control and contingency planning”

Hans-Hermann Thulke

EcoEpi at
Helmholtz Centre for Environmental Research - UFZ, Leipzig, Germany

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Thank you !

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Thank you for attention…

Remarks

- The analysis of surveillance scheme holds for any highly contagious disease that kills most infected hosts.
- The analysis relates to the states own interest of surveying a disease due to its harmful consequence (zoonosis, huge losses for farm industry etc.).
- The obligatory demonstration of freedom of disease to third parties is a different aim:

  But logically, the sample for demonstration of freedom of disease MUST be taken from the **hunting bag**.