

# V b o r n Net



National Institute for Public Health  
and the Environment  
*Ministry of Health, Welfare and Sport*

## WP4: Strategic paper I

Towards an integrated  
approach in monitoring and  
surveillance of vector-borne  
diseases in Europe

By Marieta Braks on behalf of WP4

19 April 2011

# W b o r n Net



National Institute for Public Health  
and the Environment  
*Ministry of Health, Welfare and Sport*

## Content

1. Basics
2. Monitoring and surveillance system
3. Harmonization and Priority setting
4. Surveillance and intervention
5. From monitoring to surveillance: Decision making
6. Conclusion



# 1. Basics

- **Public health**

- branch of medicine concerned with the prevention and control of disease and disability in a population, and the promotion of physical and mental health of the population on the international, national, or intra-national administrative level.

- **Medical entomology**

- the application and study of insect and other arthropod biology to disease transmission or sanitary matters

- **Vector-borne disease**

- Disease of which the causative agent is transmitted between vertebrate hosts by another organism (vector)

- **Vector**

- Here: an arthropod which is exclusively required for the transmission and propagation of the pathogen.



# 1. Basics

## Different types of VBD context

based on the current presence (✓) or absence (-) of disease (endemic human cases), pathogen or vector

?

Context?	Endemic? disease?	Pathogen?	Vector?	Examples of diseases holding for the Netherlands?
1?	✓?	✓?	✓?	Lyme borreliosis?
2?	-?	✓?	✓?	Dirofilariasis?
3?	-?	-?	✓?	West Nile Fever??
4?	-?	✓?	-?	Leishmaniasis?
5?	-?	-?	-?	Crimean Congo haemorrhagic fever??

?



# 1. Basics

## Different types of VBD context

based on the current presence (√) or absence (-) of disease (endemic human cases), pathogen or vector

?

Context?	Endemic? disease?	Pathogen?	Vector?	Priority? Setting? based on?
1?	√?	√?	√?	Disease burden?
2?	-?	√?	√?	Threat?
3?	-?	-?	√?	Threat?
4?	-?	√?	-?	Threat?
5?	-?	-?	-?	Threat?

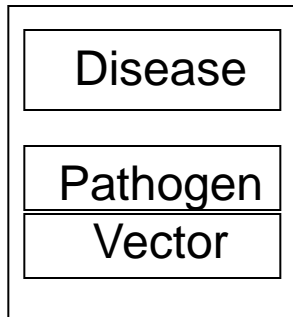
?



## 2. Monitoring and surveillance system



## Monitoring





Research

## Monitoring

Disease

Pathogen

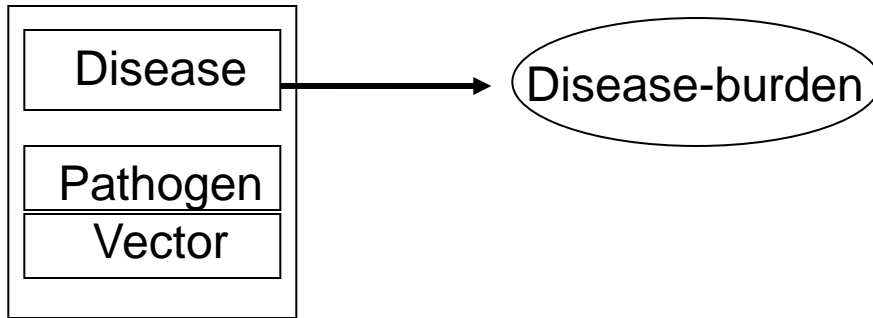
Vector





Research

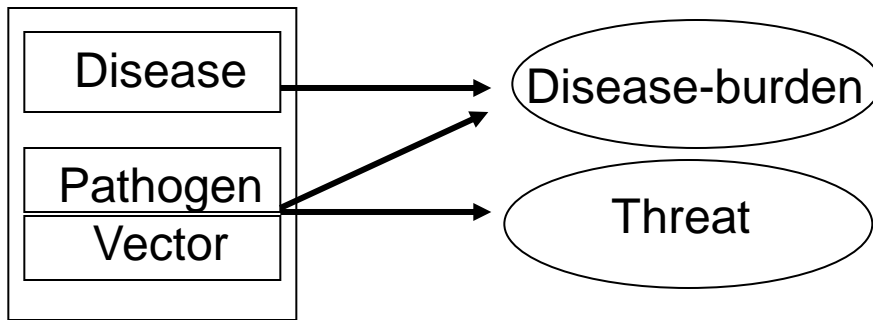
## Monitoring

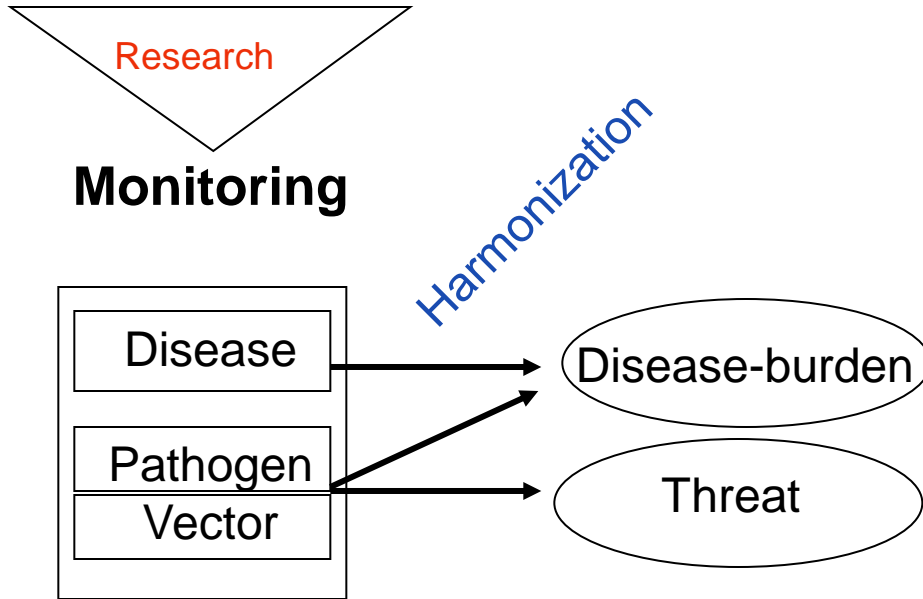


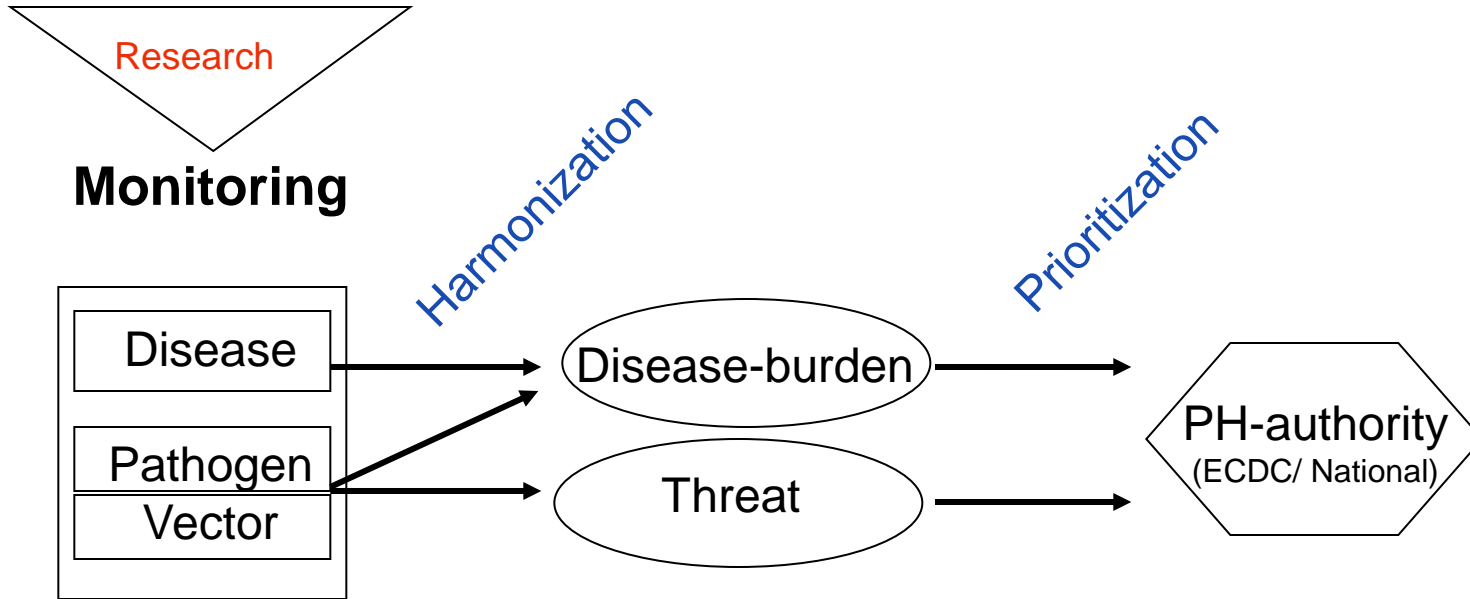


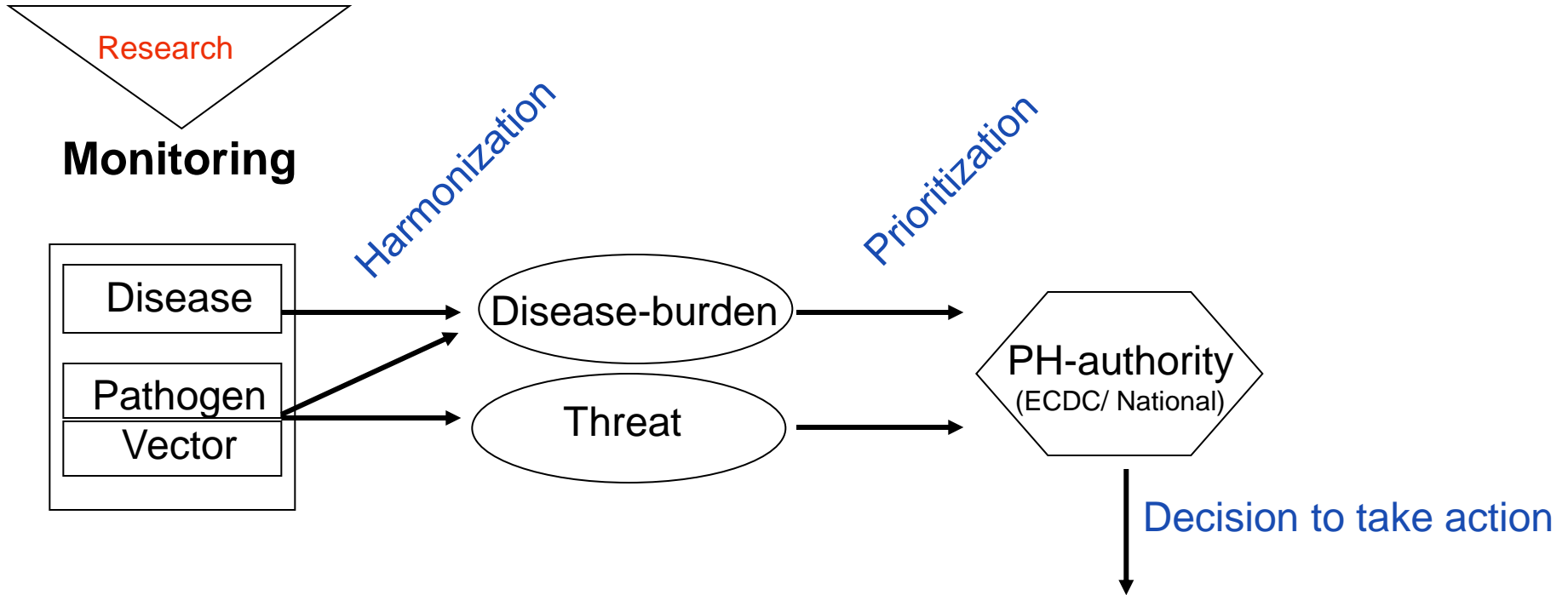
Research

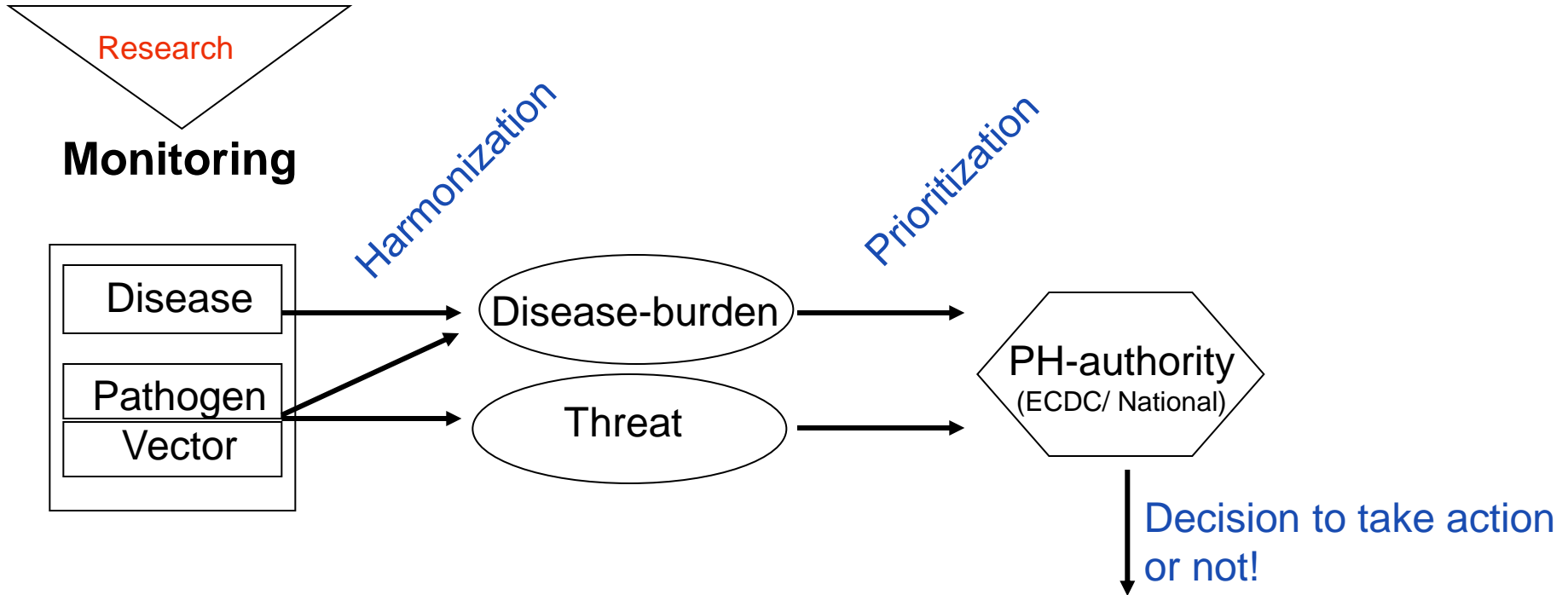
## Monitoring

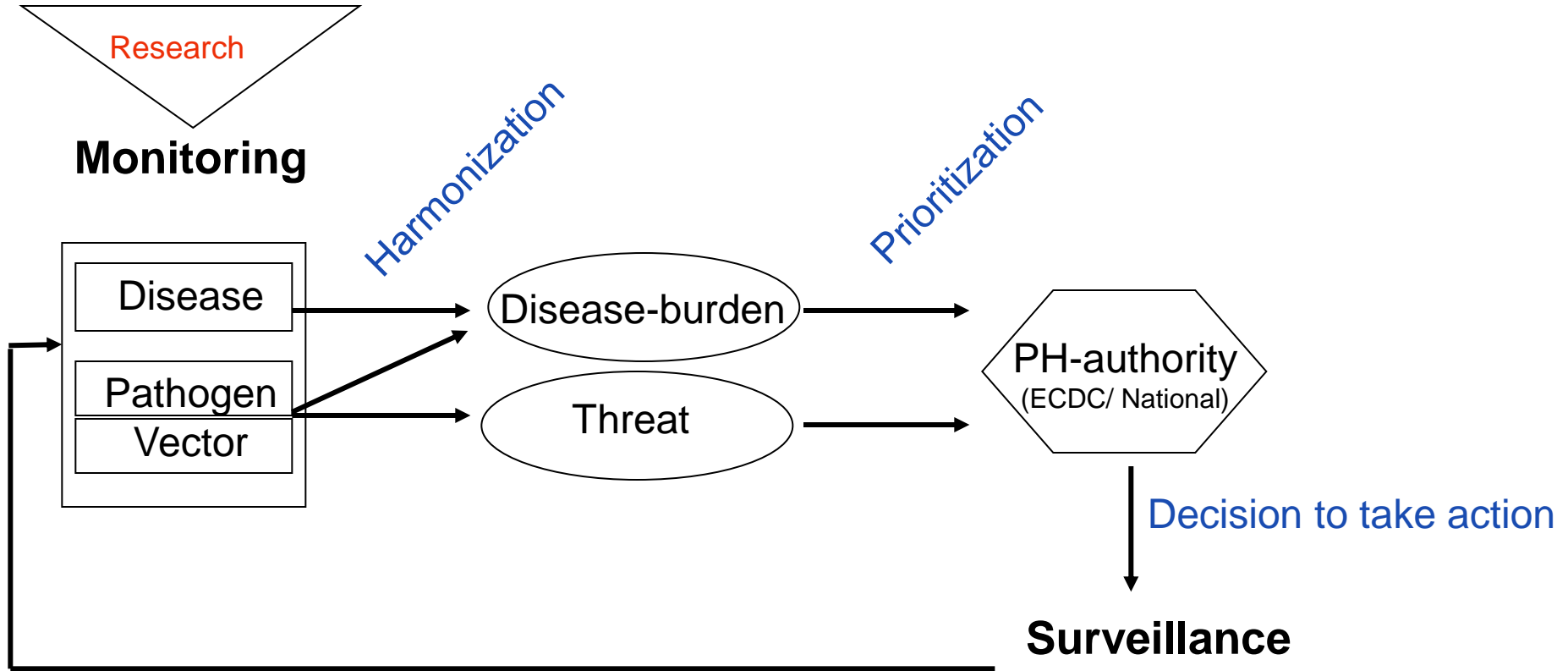


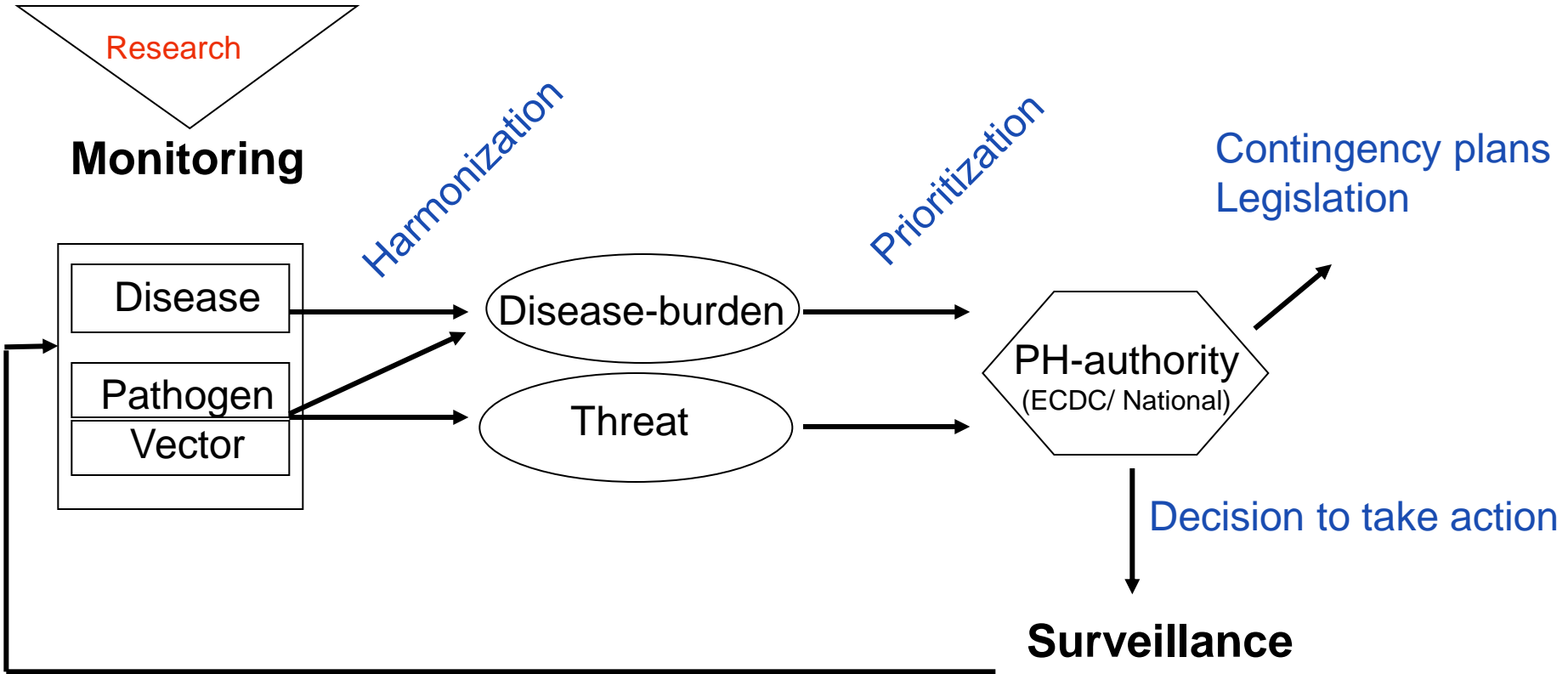




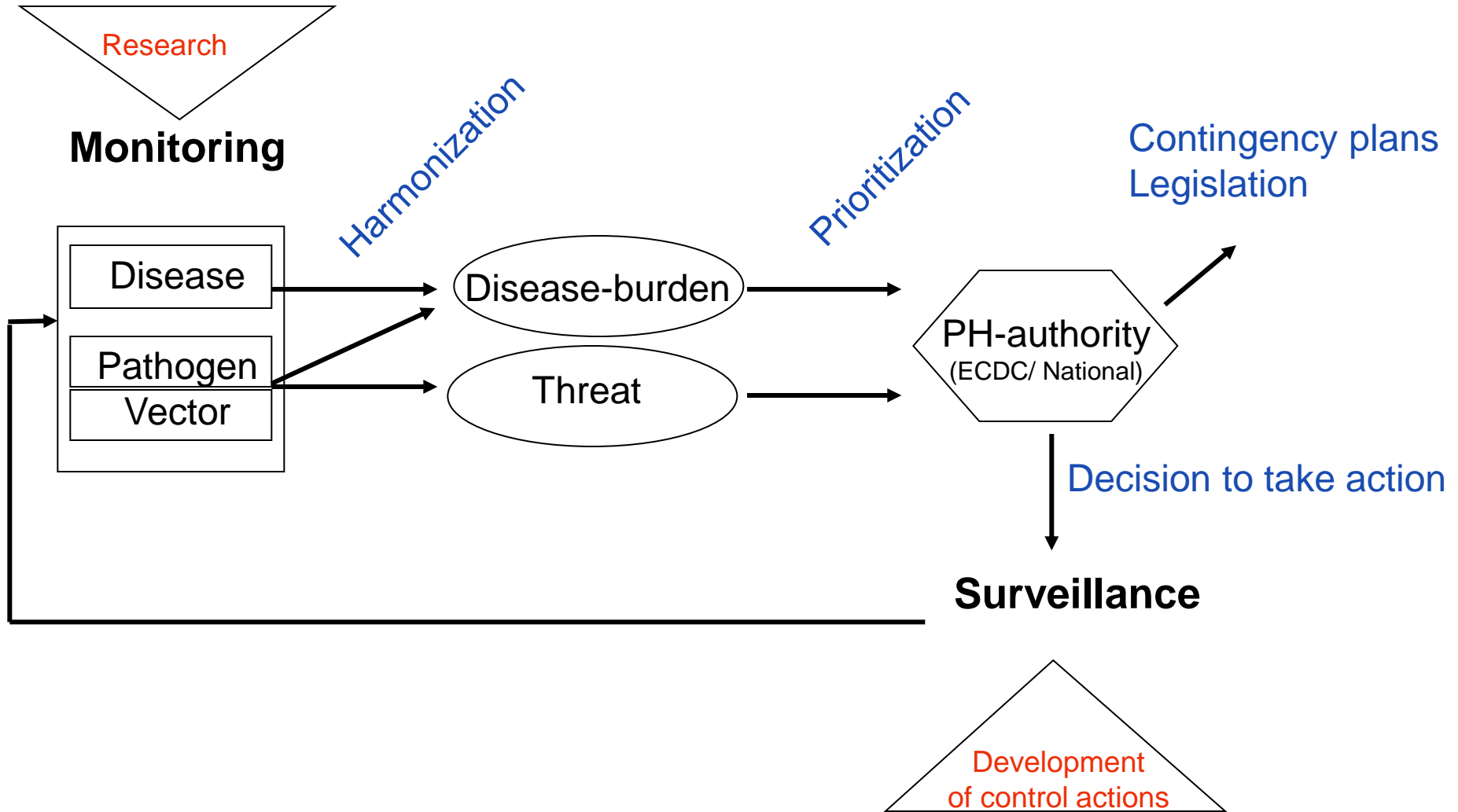


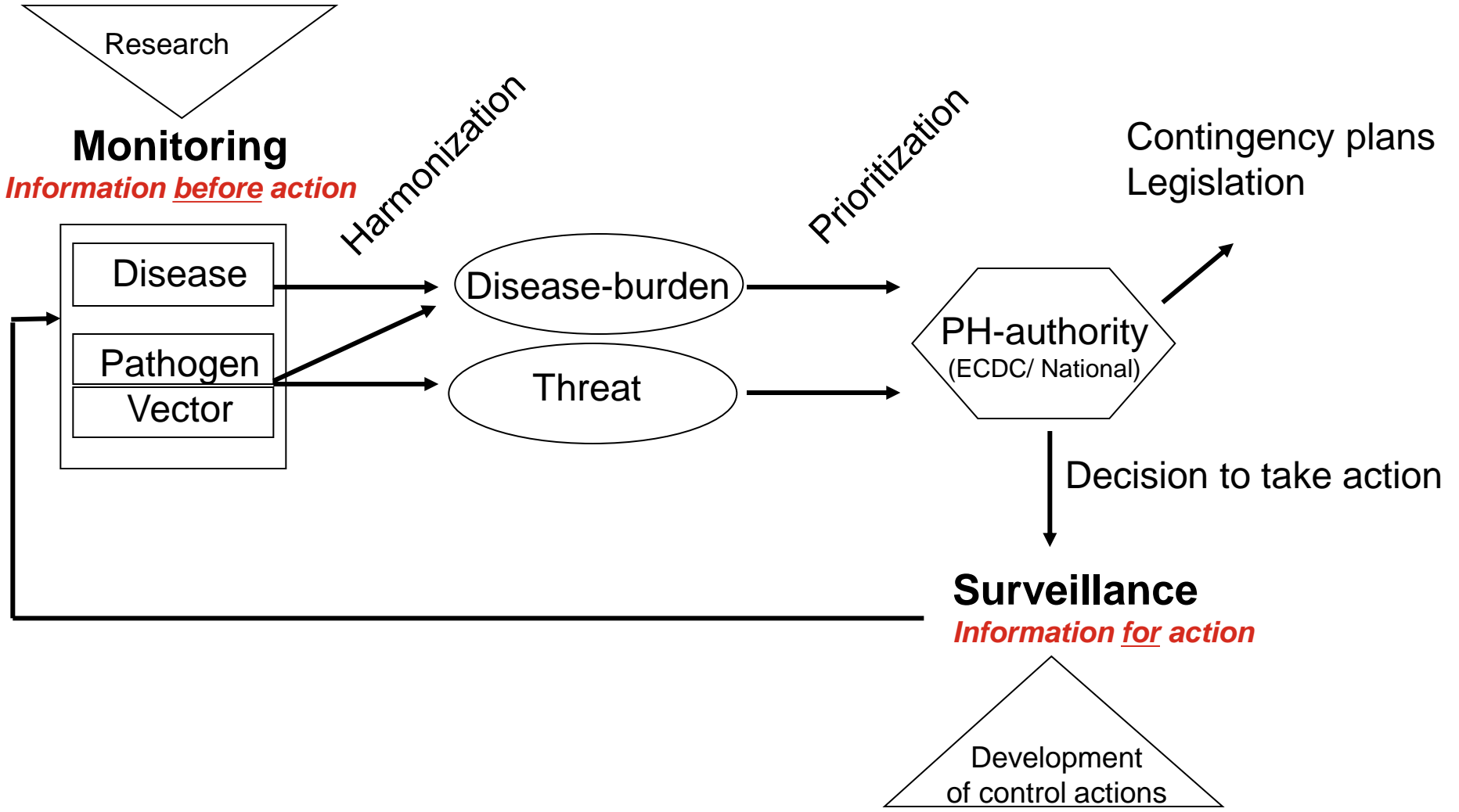














# Monitoring

Different types of data input

1. .
2. .
3. .
4. .
5. .



# Monitoring

Different types of data input

## 1. Germ data

- Pathogen detection and identification in human, reservoir, vector



# Monitoring

Different types of data input

1. Germ data
2. Serological data
  - immunological response in blood of humans and animals to exposure to pathogen



# Monitoring

Different types of data input

1. Germ data
2. Serological data
3. Clinical data
  - Basic data from clinical patient files



# Monitoring

Different types of data input

1. Germ data
2. Serological data
3. Clinical data
4. Syndromic data
  - Data on clinical symptoms without any differential/laboratory diagnosis



# Monitoring

## Different types of data input

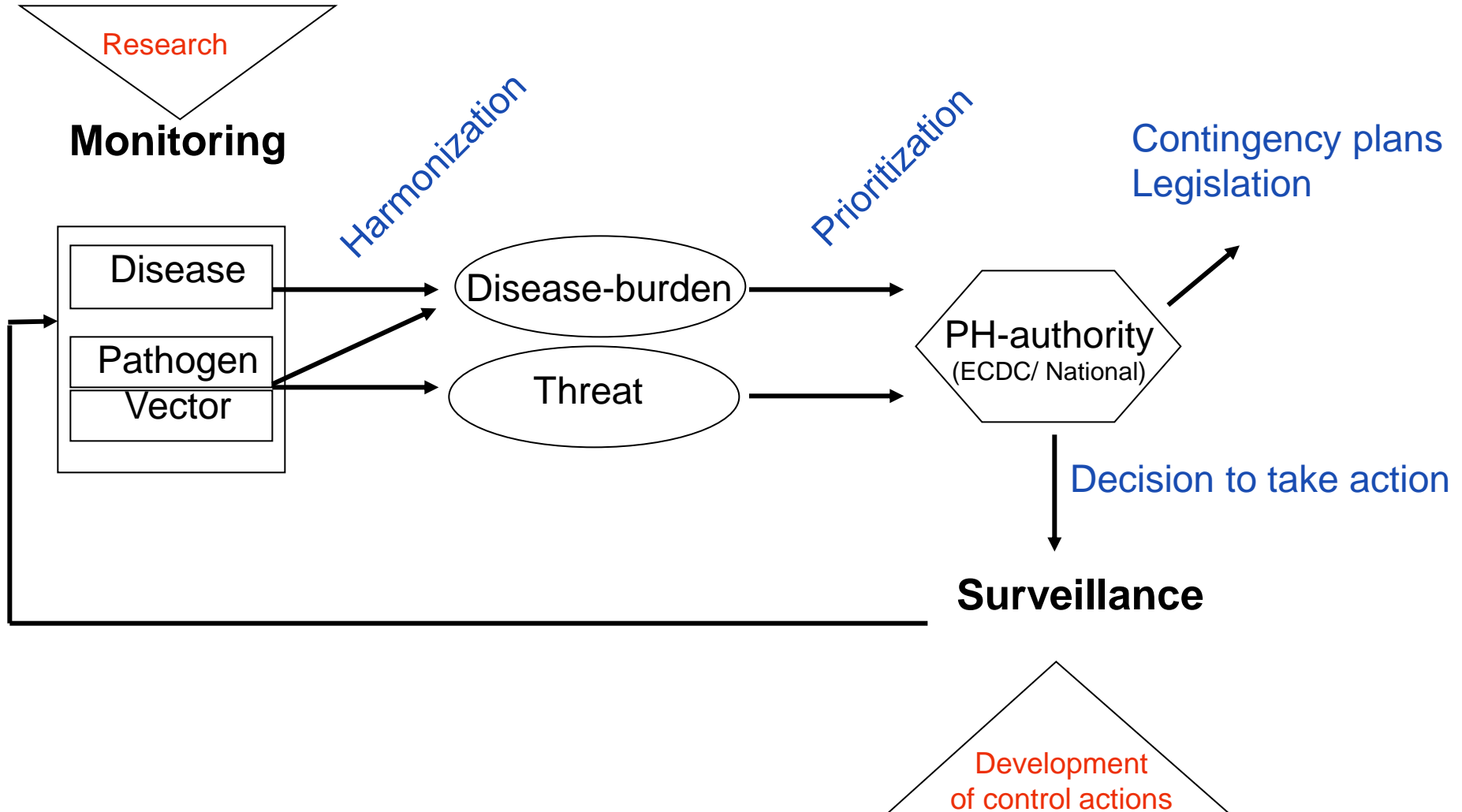
1. Germ data
2. Serological data
3. Clinical data
4. Syndromic data
5. Risk data
  - Detecting risk factors e.g.

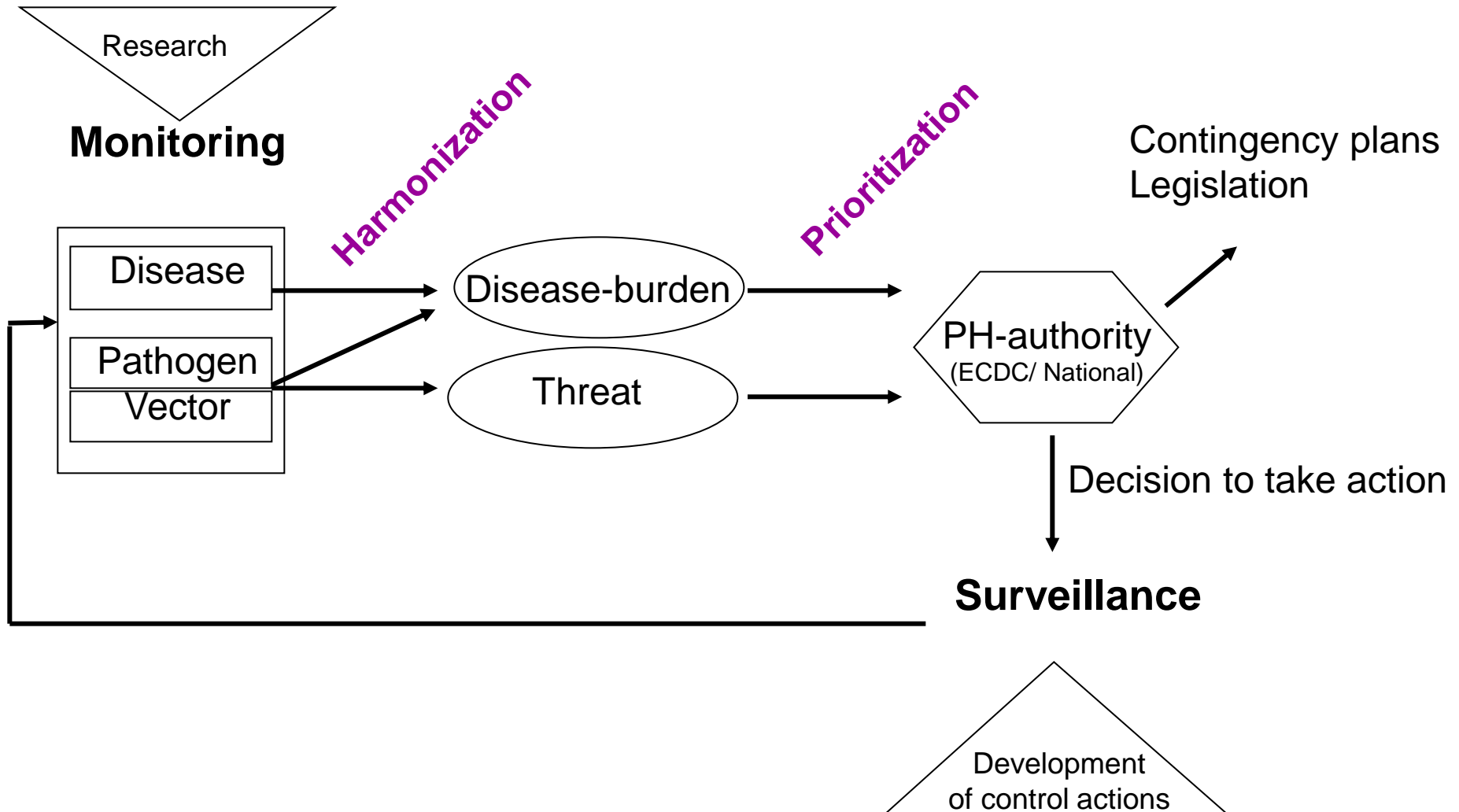
presence absence of vectors  
human risk behaviour

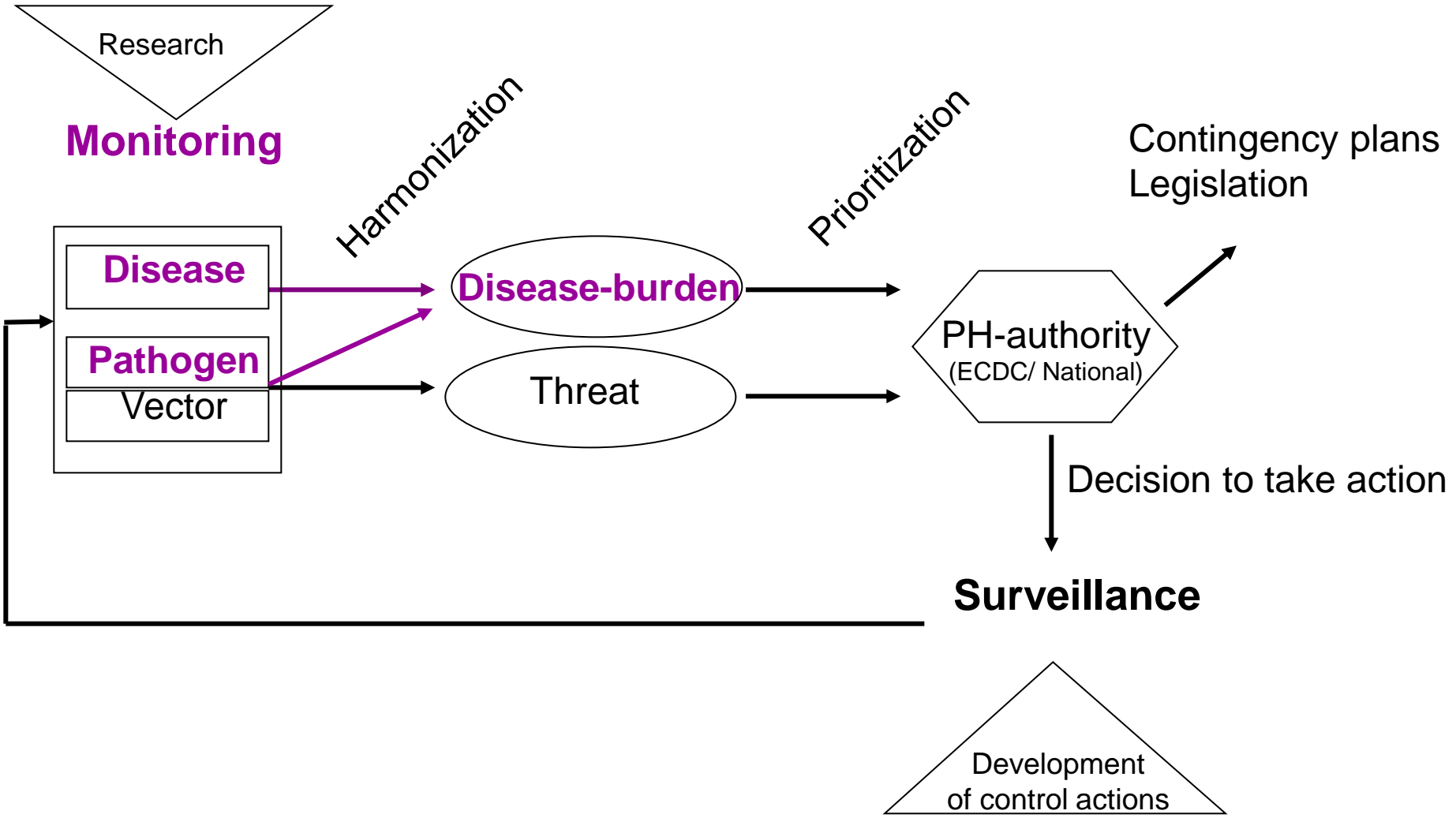




### 3. Harmonization and priority setting









### 3. Harmonization and priority setting

**Disease** -> Disease burden

To a lesser extent **pathogen**-> Disease burden

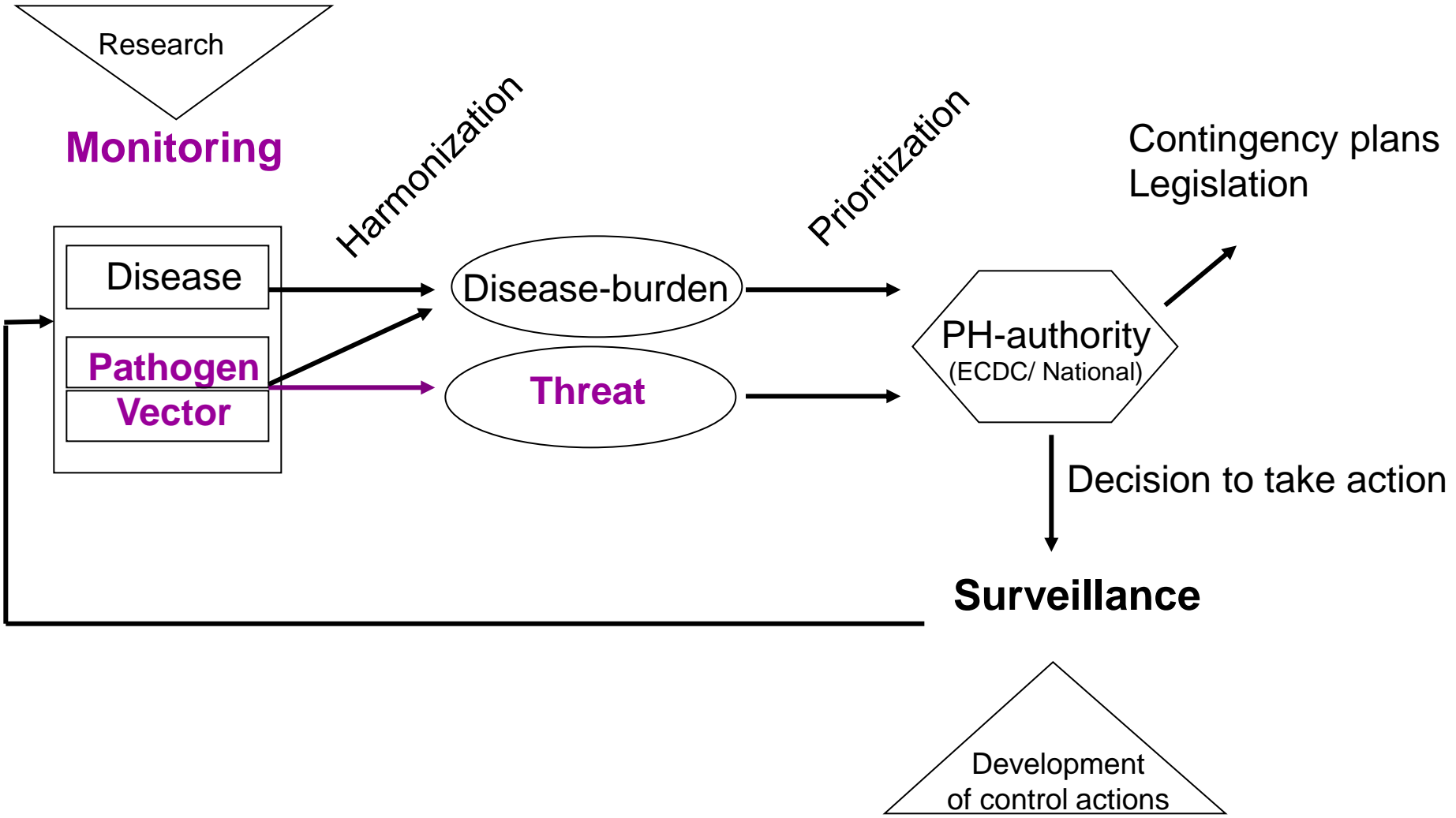
See two presentations later today:

*14h15 – 15h00:*

*Burden of Disease assessments: the experience of BCoDE,  
Cheryl Gibbons (University of Edinburgh, UK)*

*16h15 – 17h00:*

*Public health impact Lyme disease in Temperate Europe.  
Kees van den Wijngaard (RIVM, the Netherlands)*





### 3. Harmonization and priority setting

**Pathogen / vector** -> Threat



## 3. Harmonization and priority setting

**Pathogen / vector** -> Threat

### **Harmonization**

- Presence / absence and abundance data of vector
- Prevalence of pathogen in vectors
- Prevalence of pathogen in reservoirs





## 3. Harmonization and priority setting

### **Pathogen / vector** -> Threat

#### **Harmonization**

- Presence / absence and abundance data of vector
- Prevalence of pathogen in vectors
- Prevalence of pathogen in reservoirs

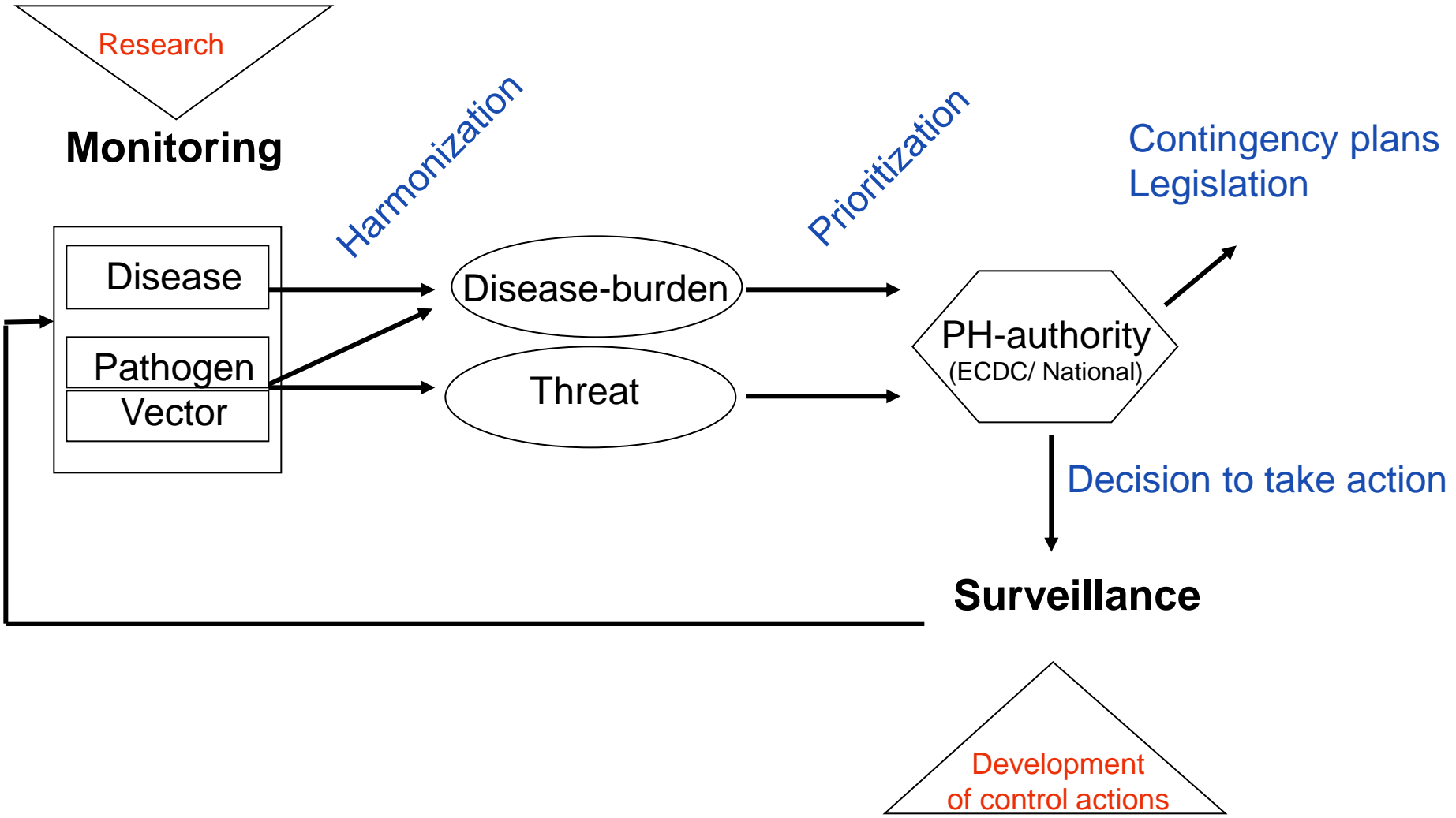
#### **Priority setting**

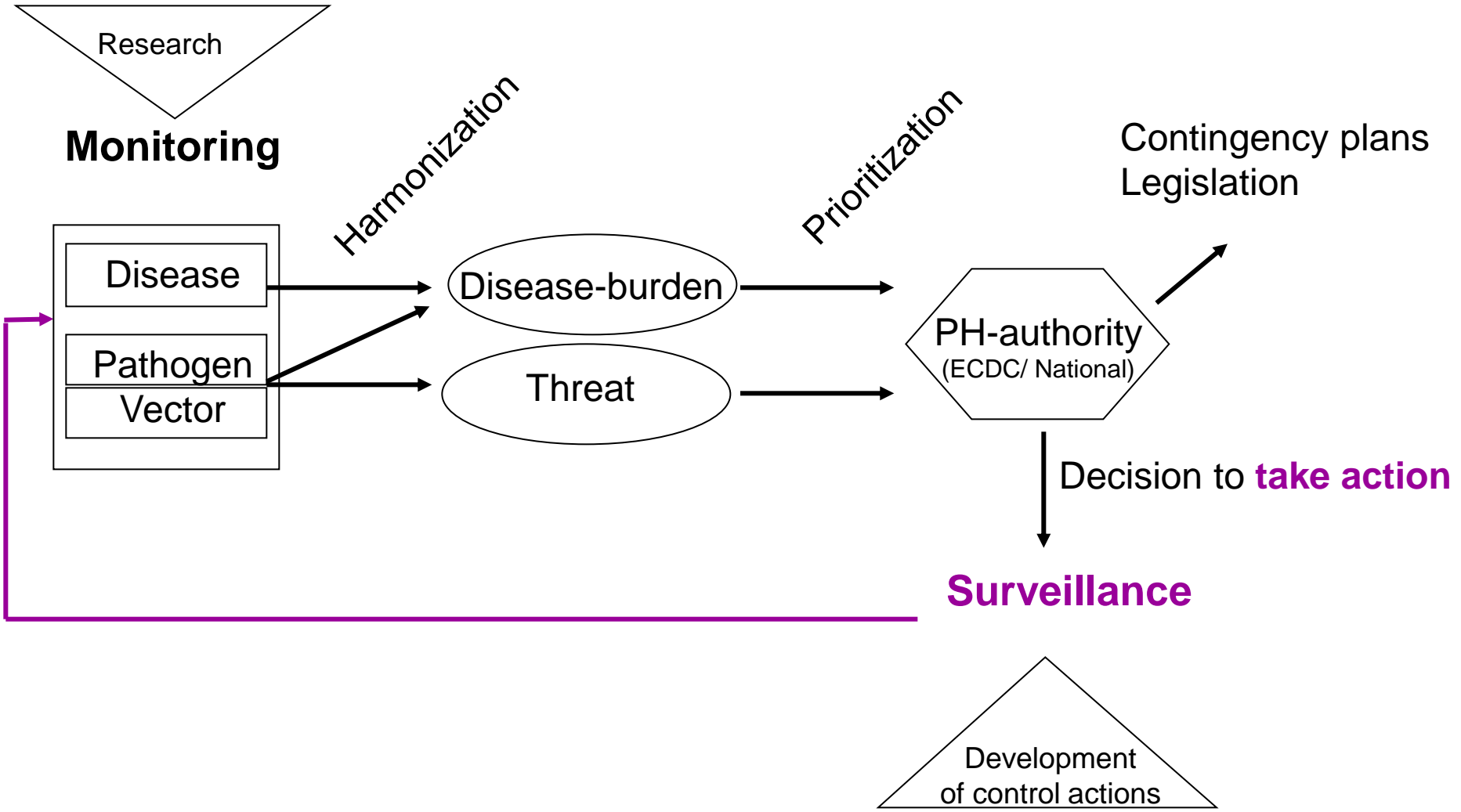
- Comparing threats is difficult

*Havelaar et al.* Priorizing emerging zoonoses in the Netherlands. PLOS one 2010  
Tool developed **E**merging **Z**oonoses **I**nformation and **P**riority **s**ystem  
<http://ezips.rivm.nl/>



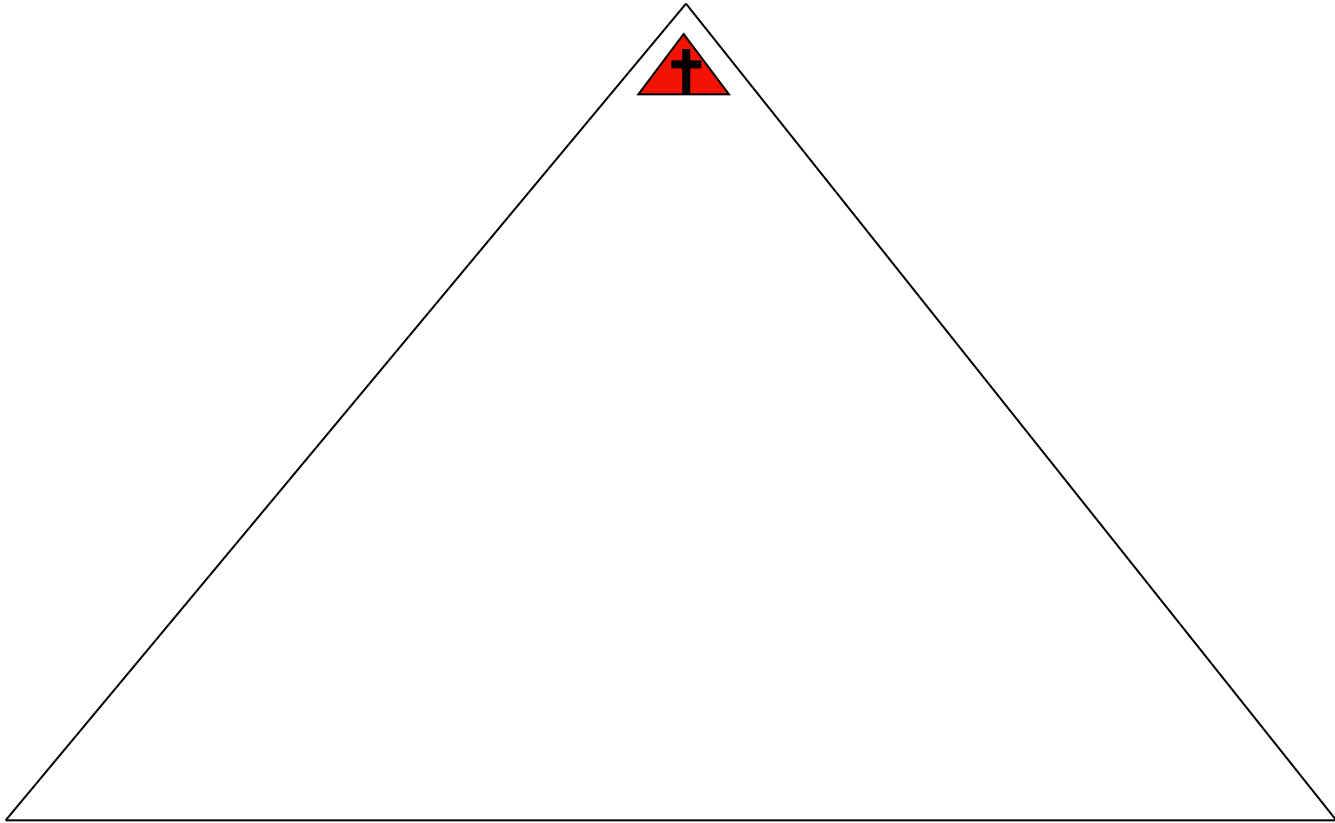
## 4. Surveillance and intervention

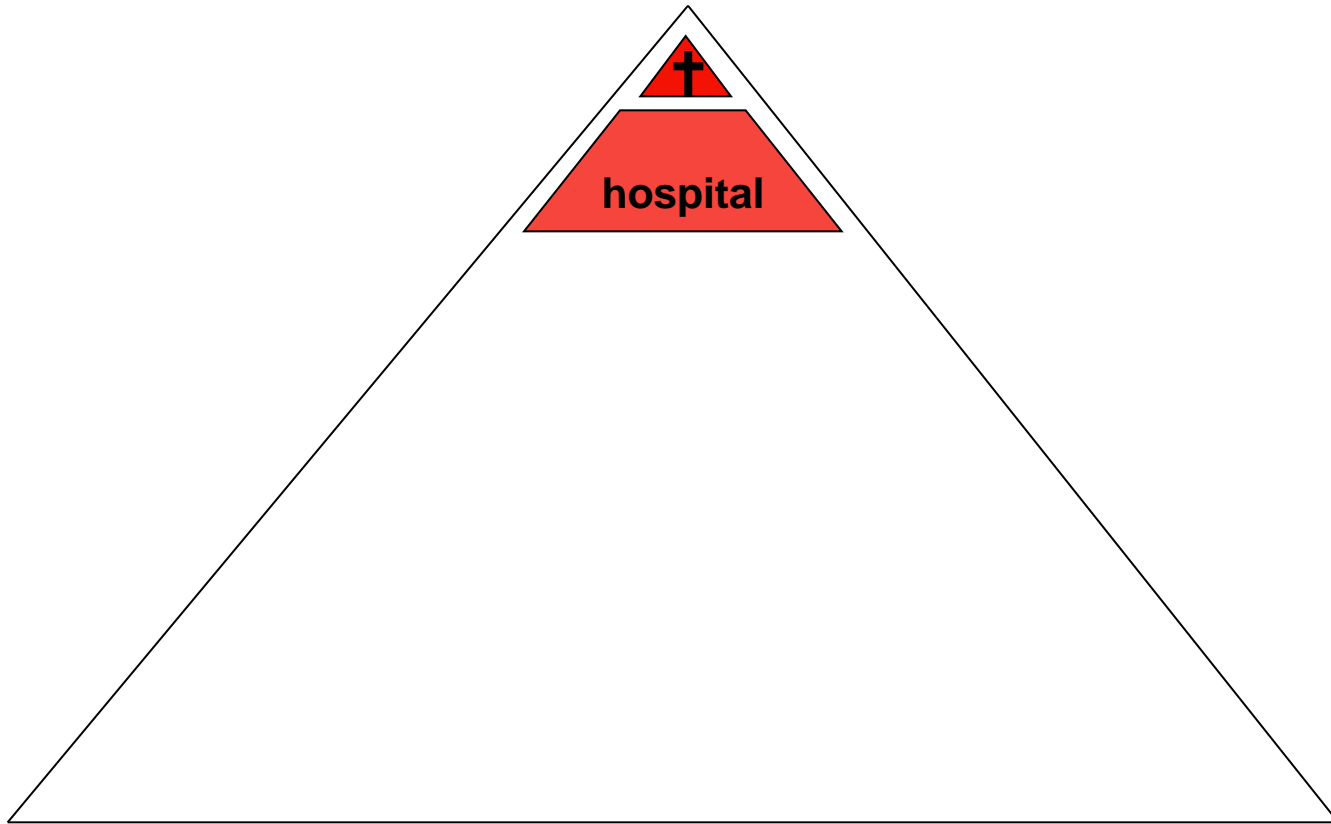


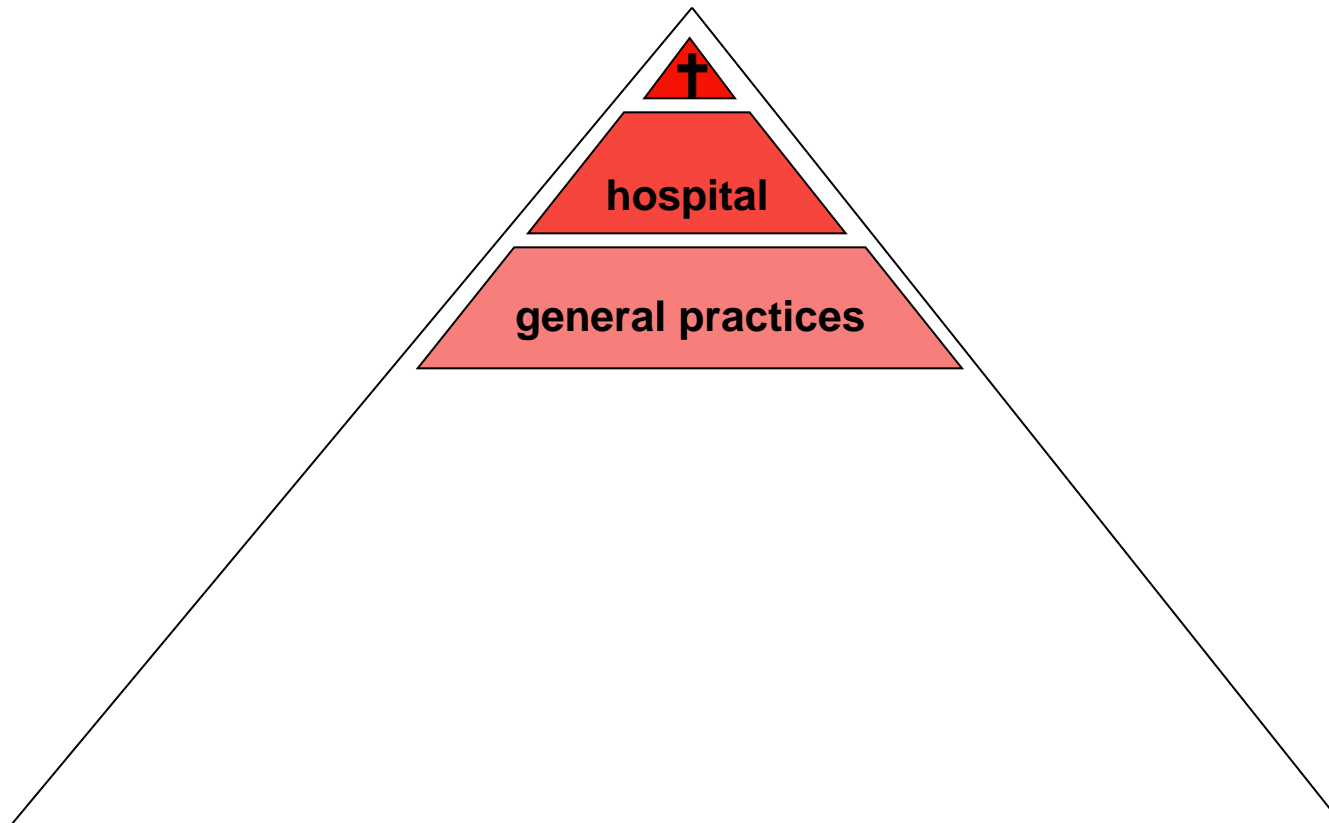




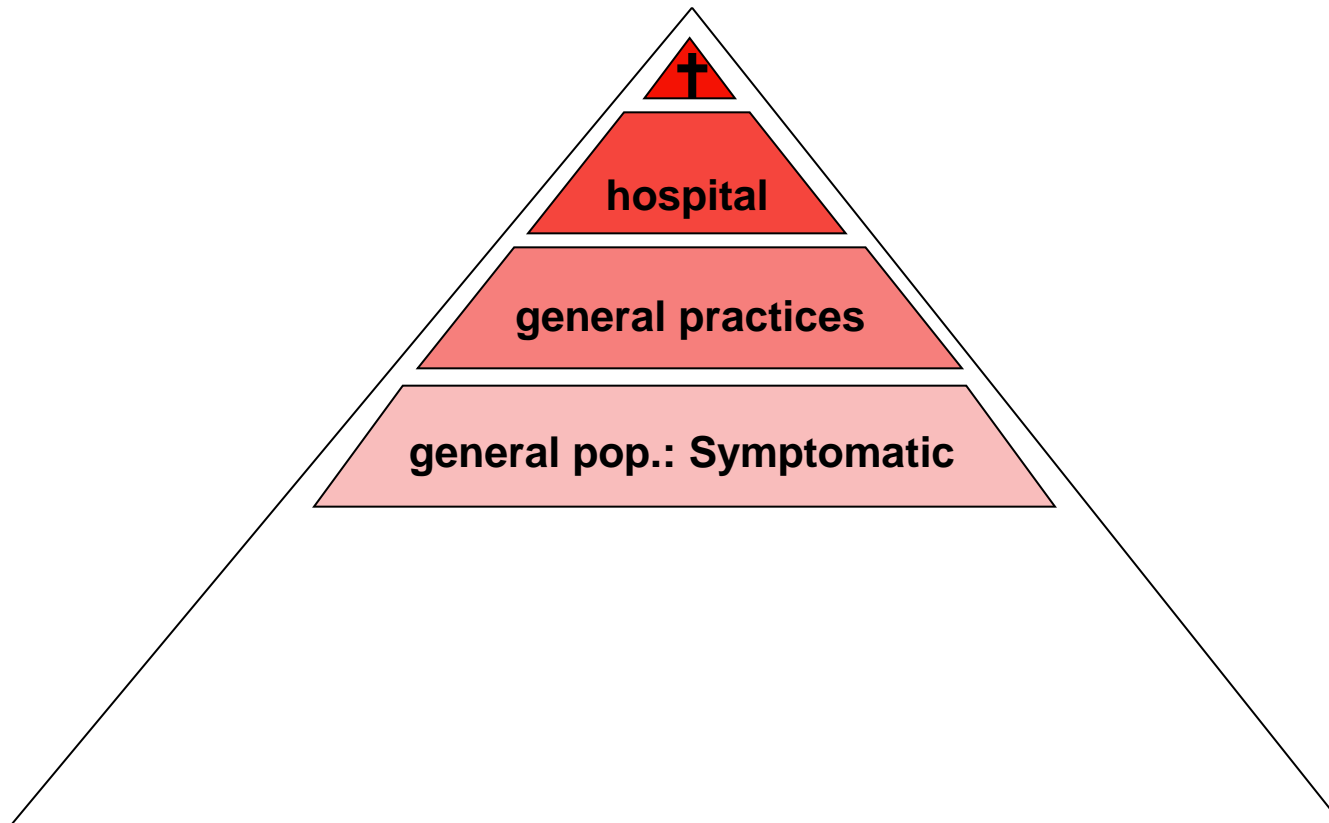
## 4. **Surveillance** and intervention

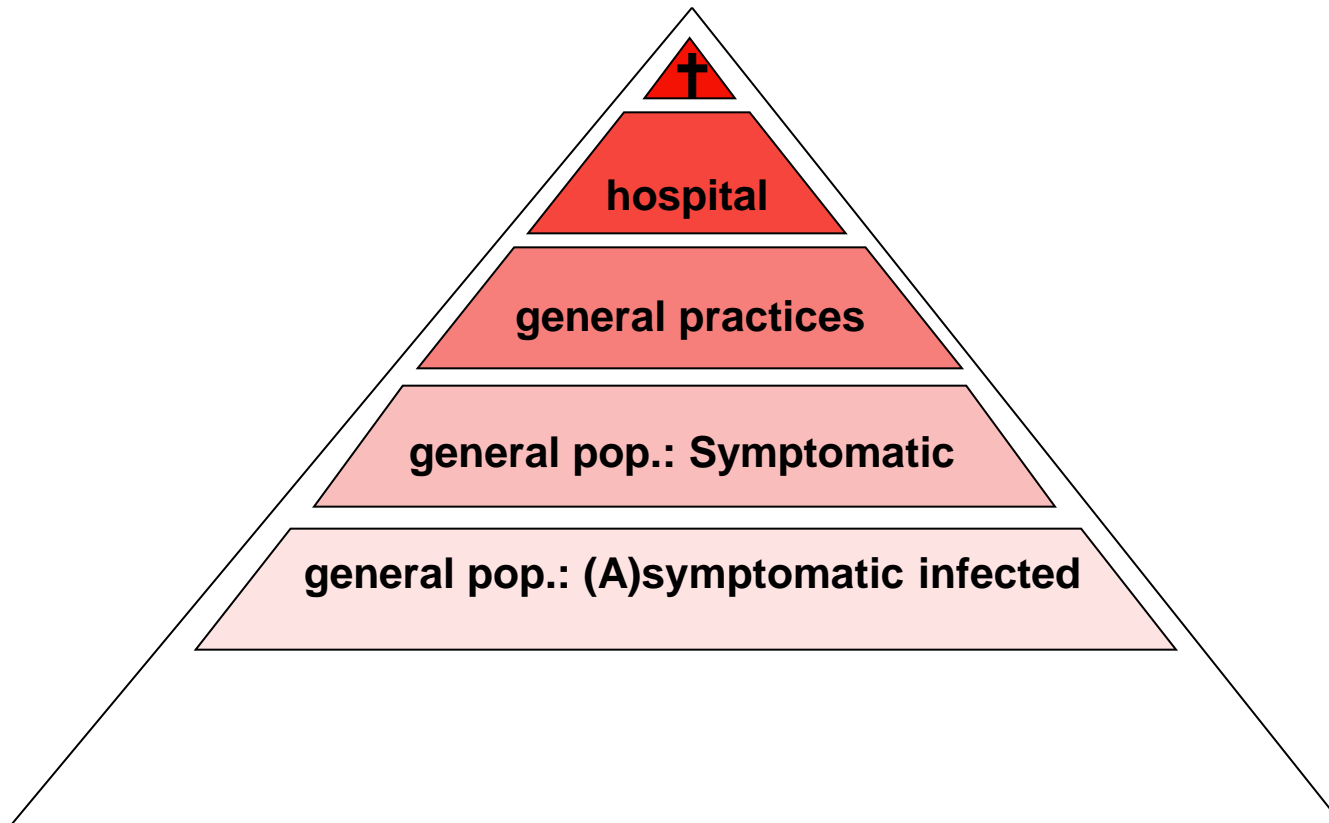


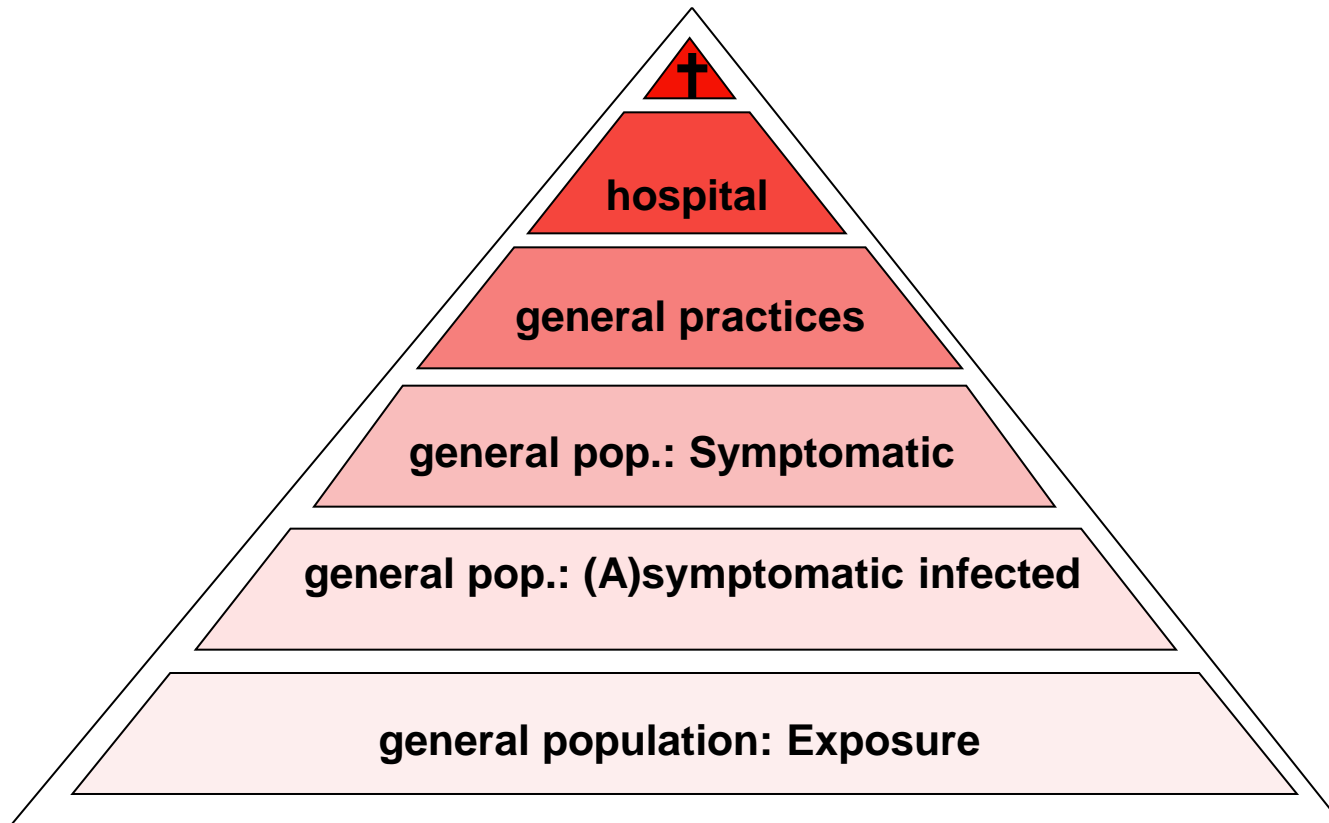


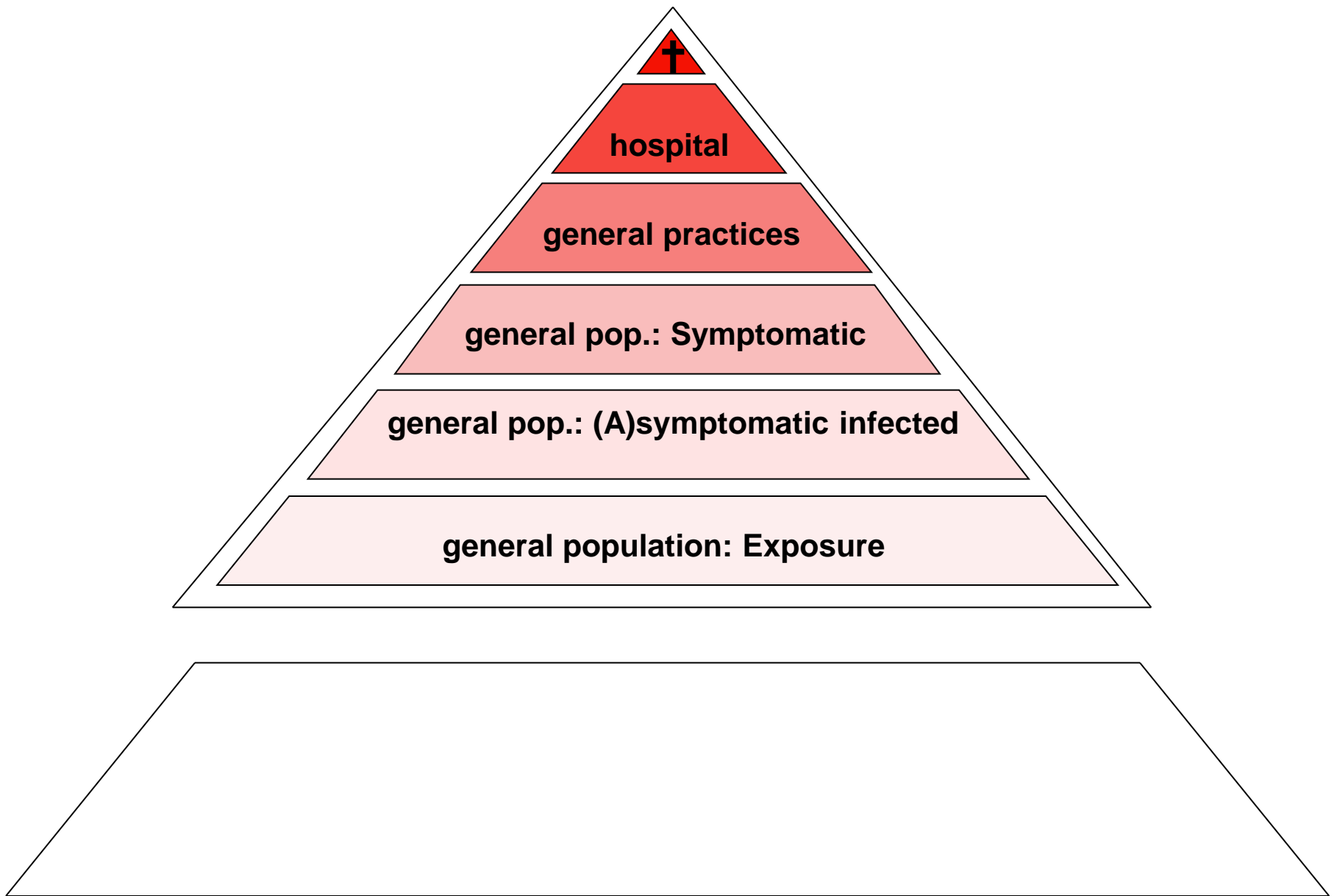


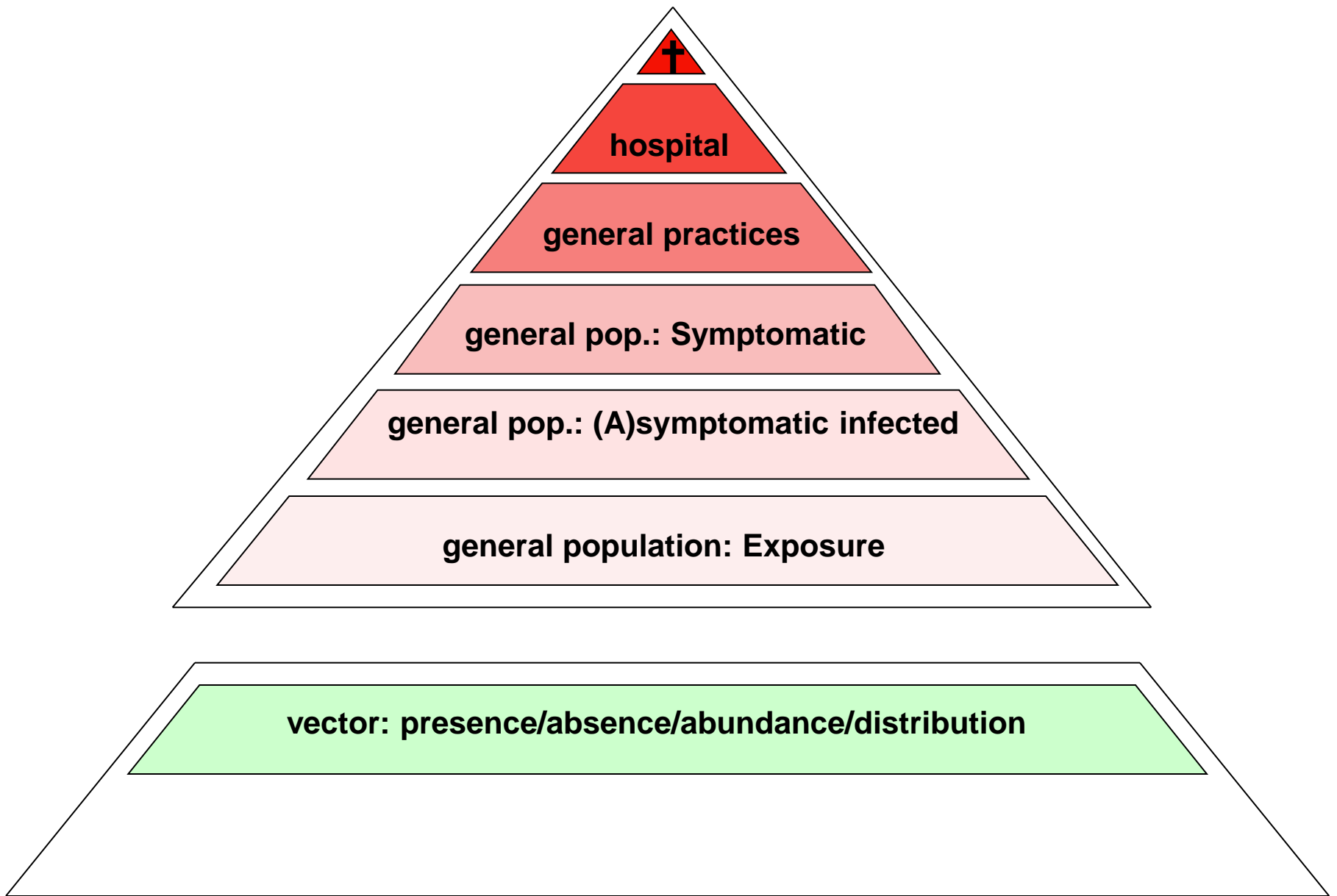


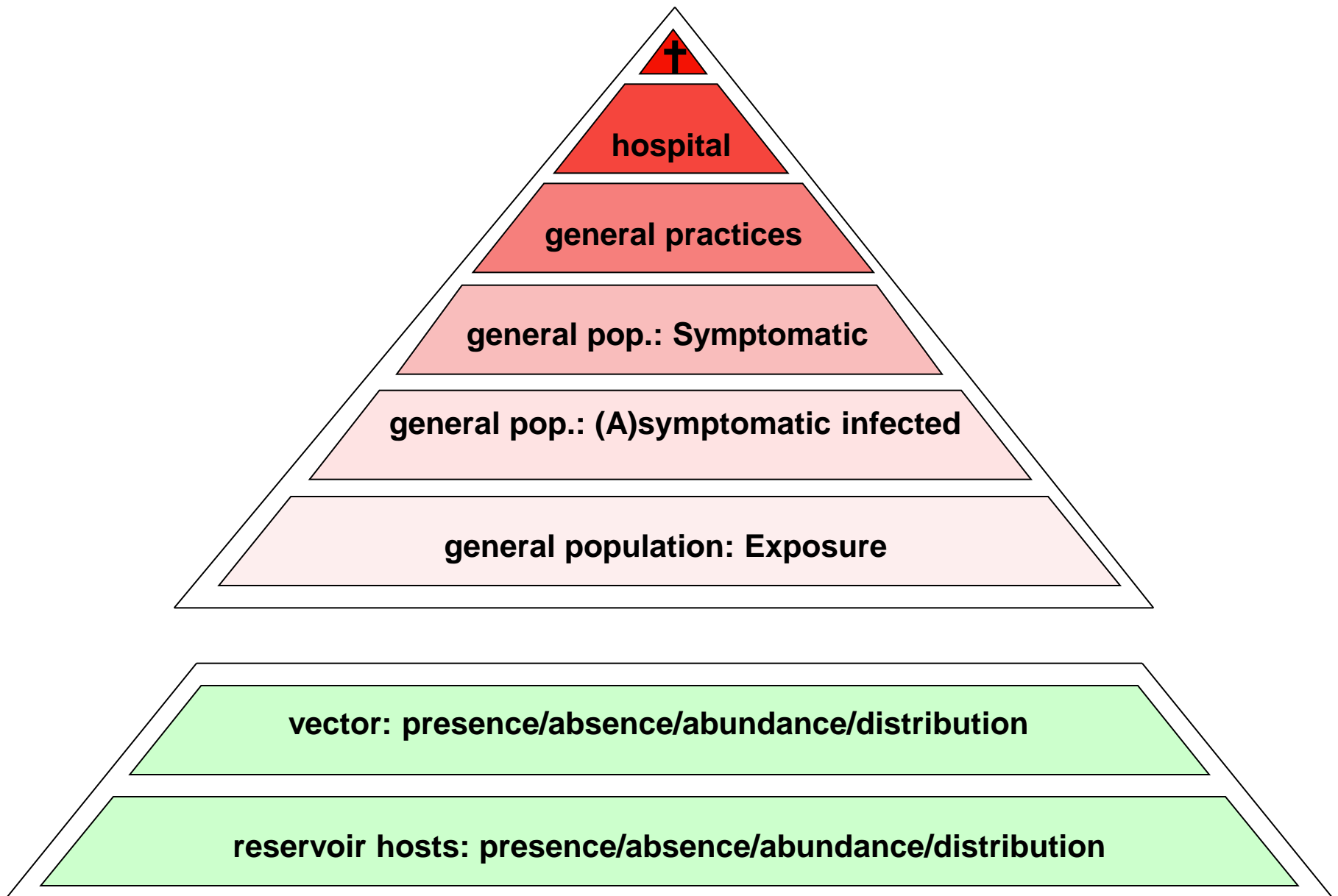


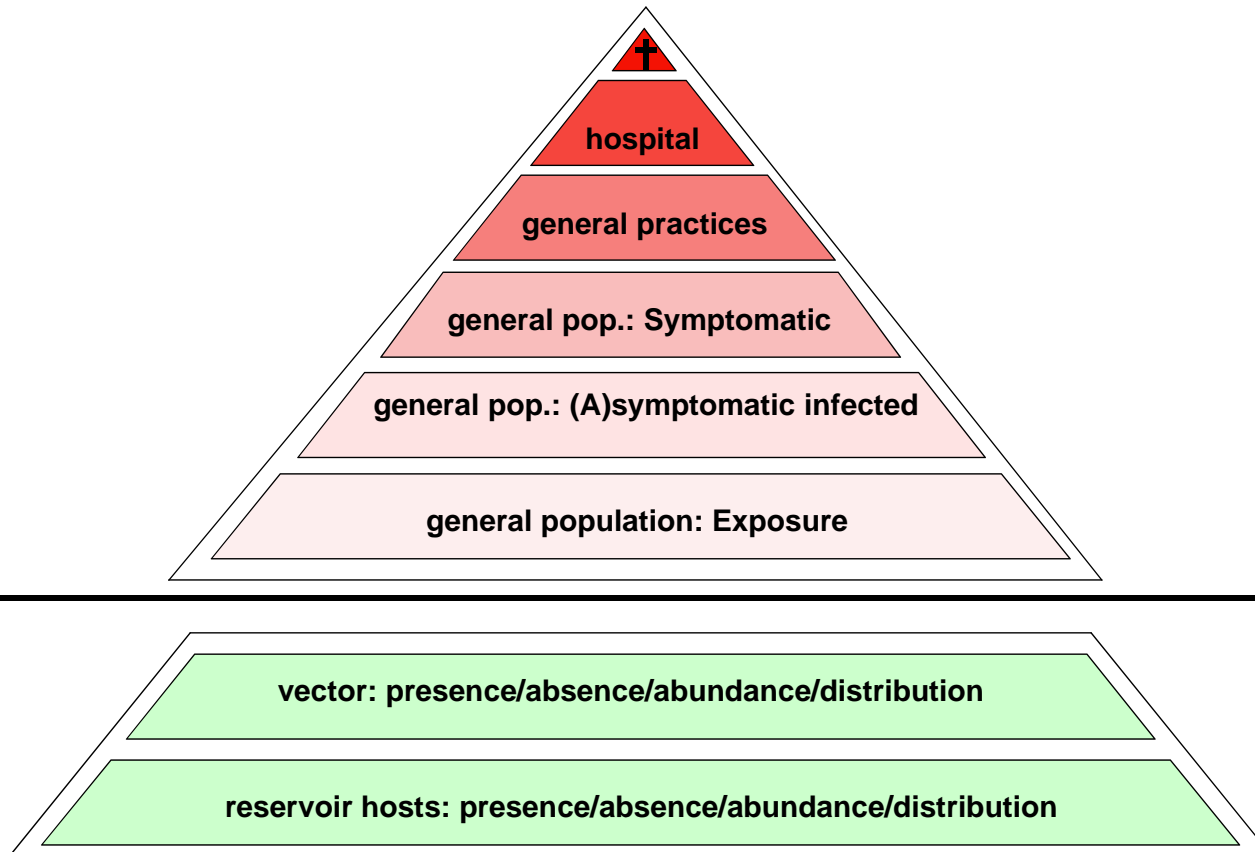


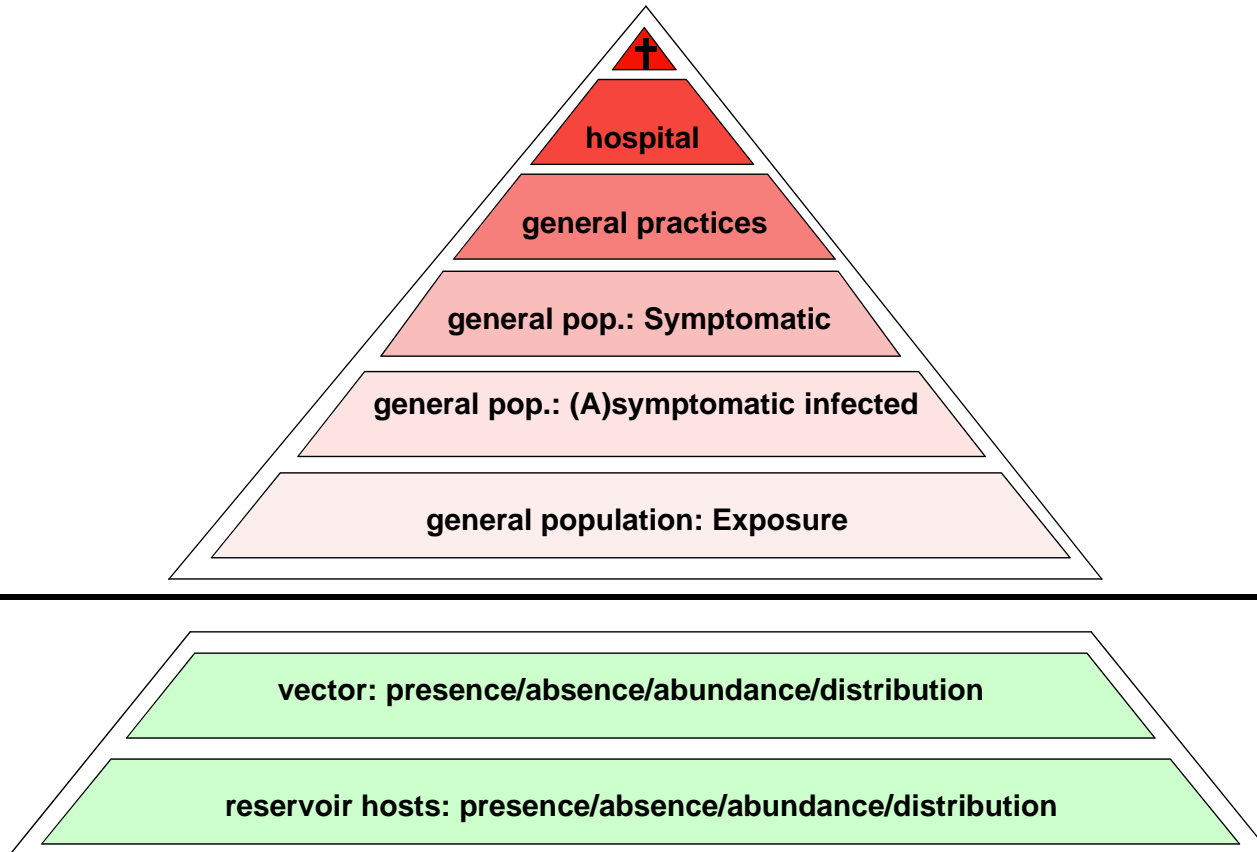






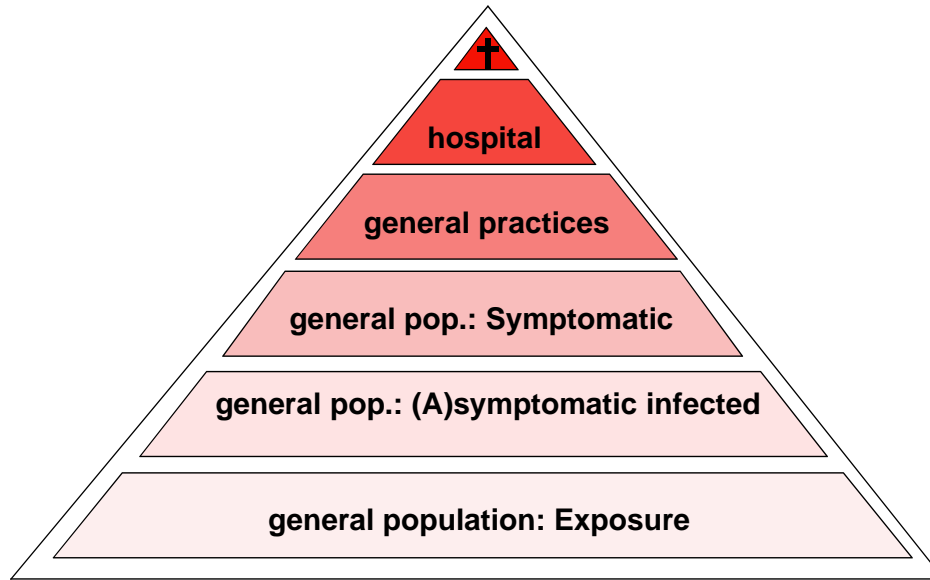




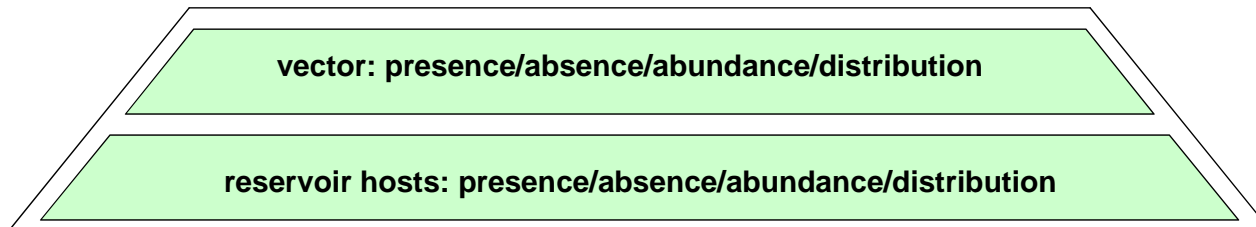




Disease burden

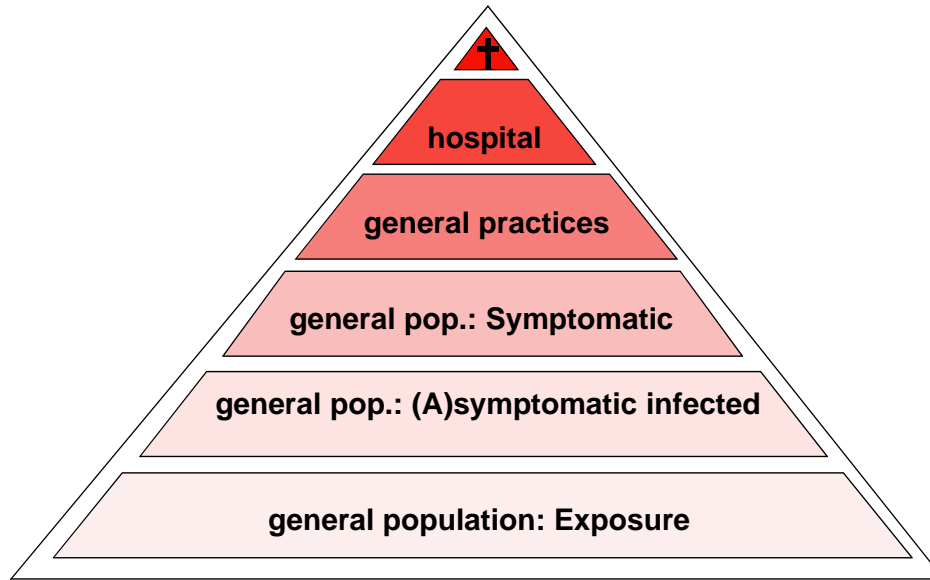


Threat

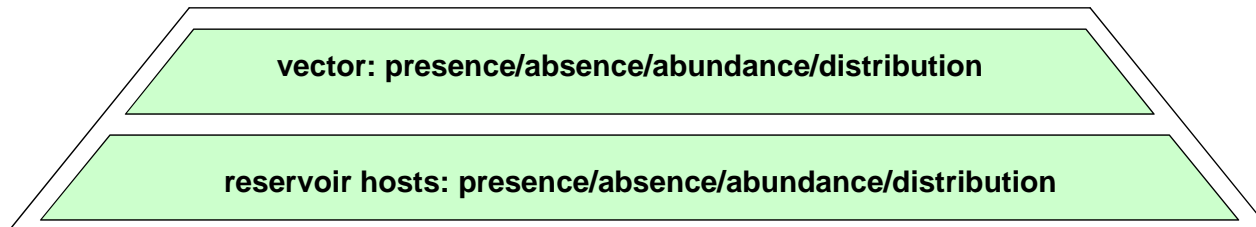


# Surveillance

Disease burden

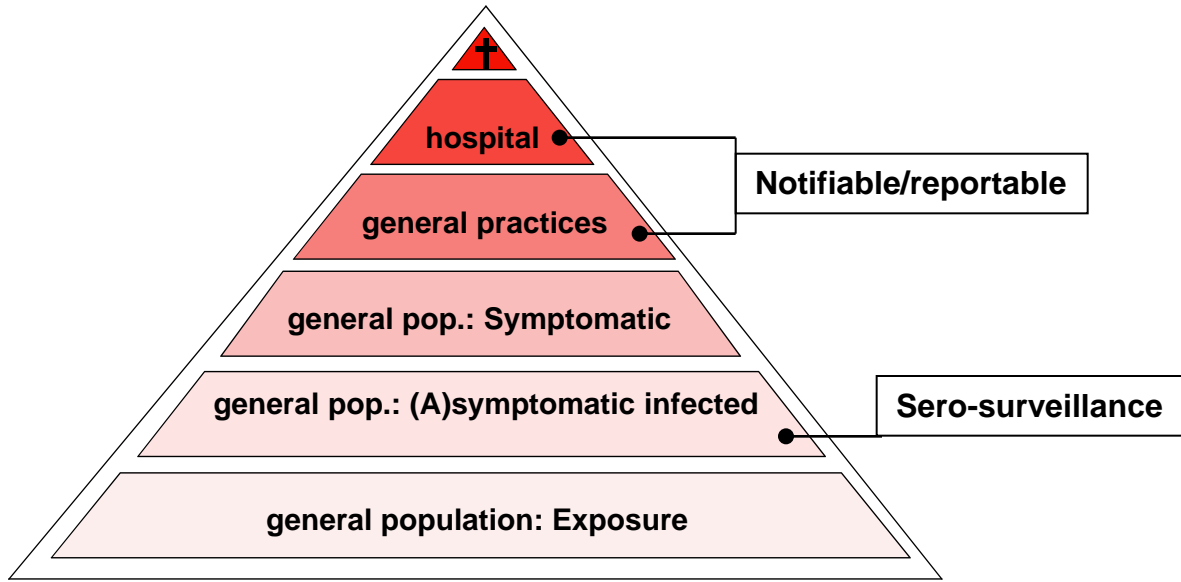


Threat

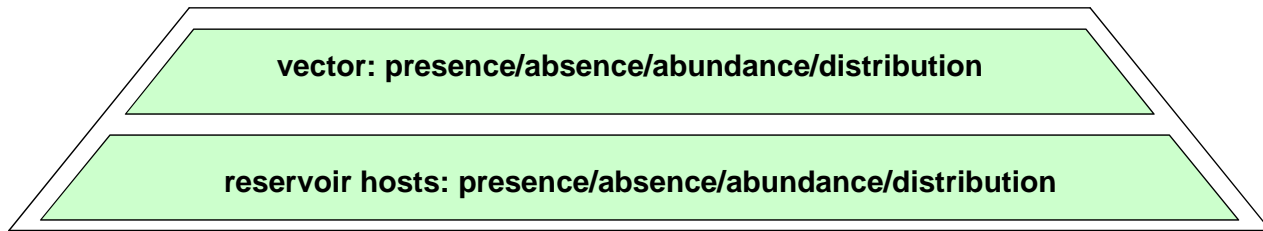


# Surveillance

Disease burden



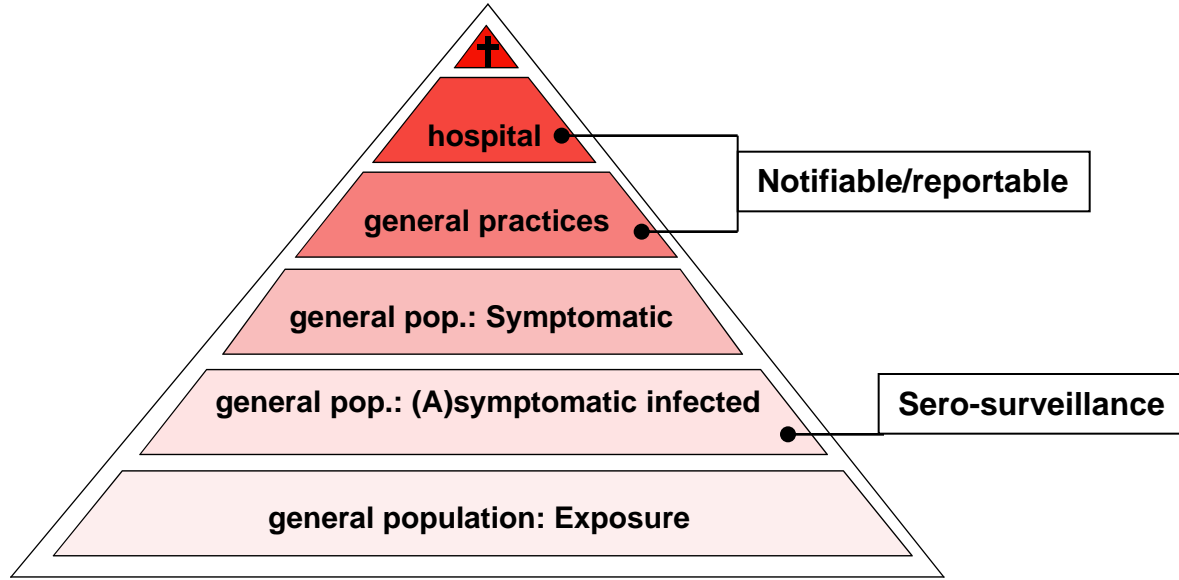
Threat



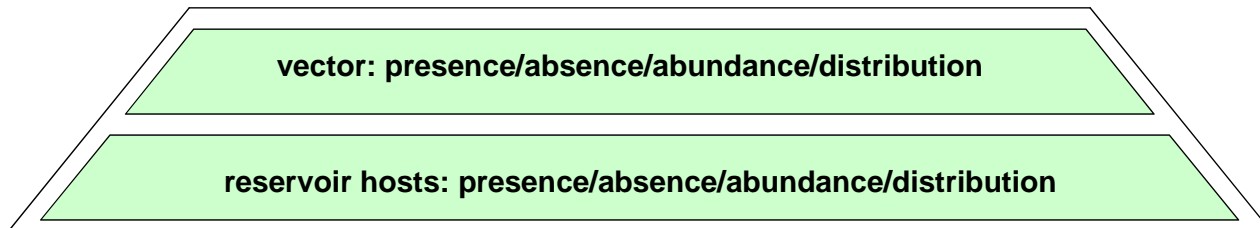
Intervention

Surveillance

Disease burden



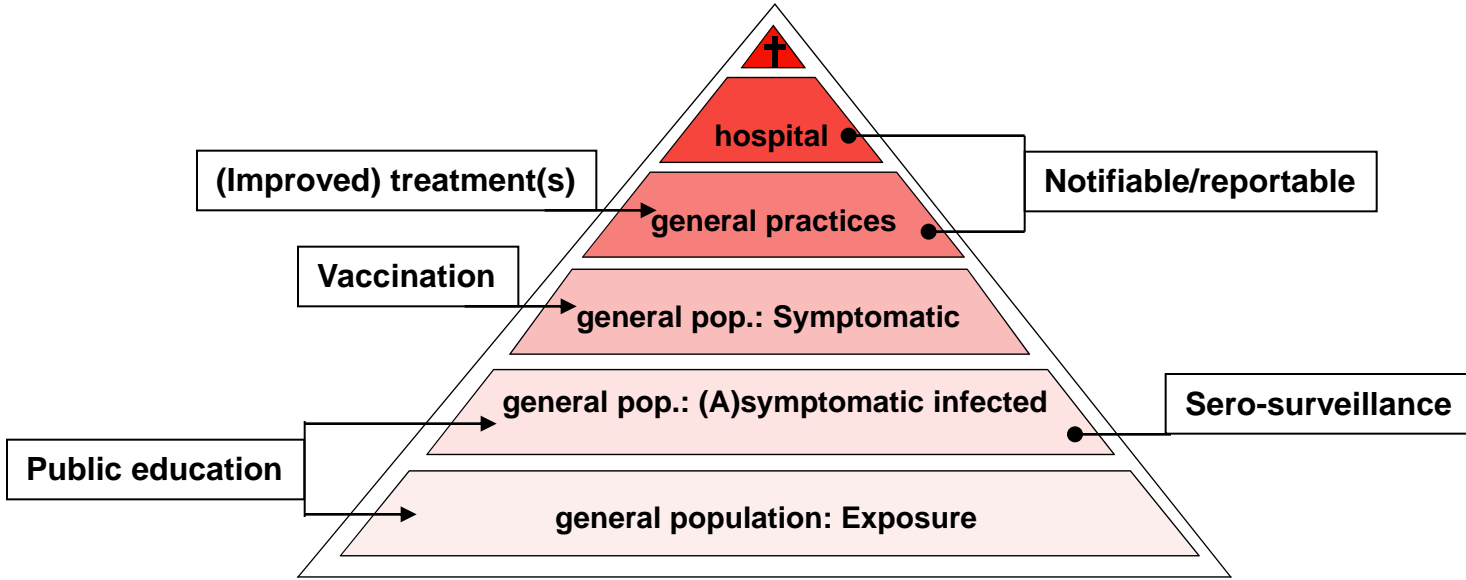
Threat



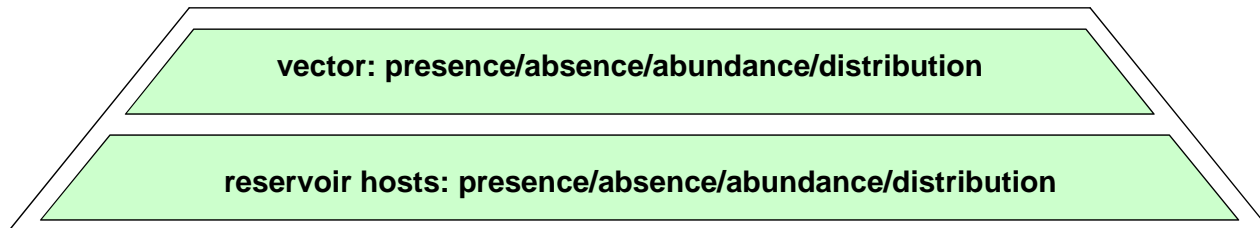
Intervention

Surveillance

Disease burden



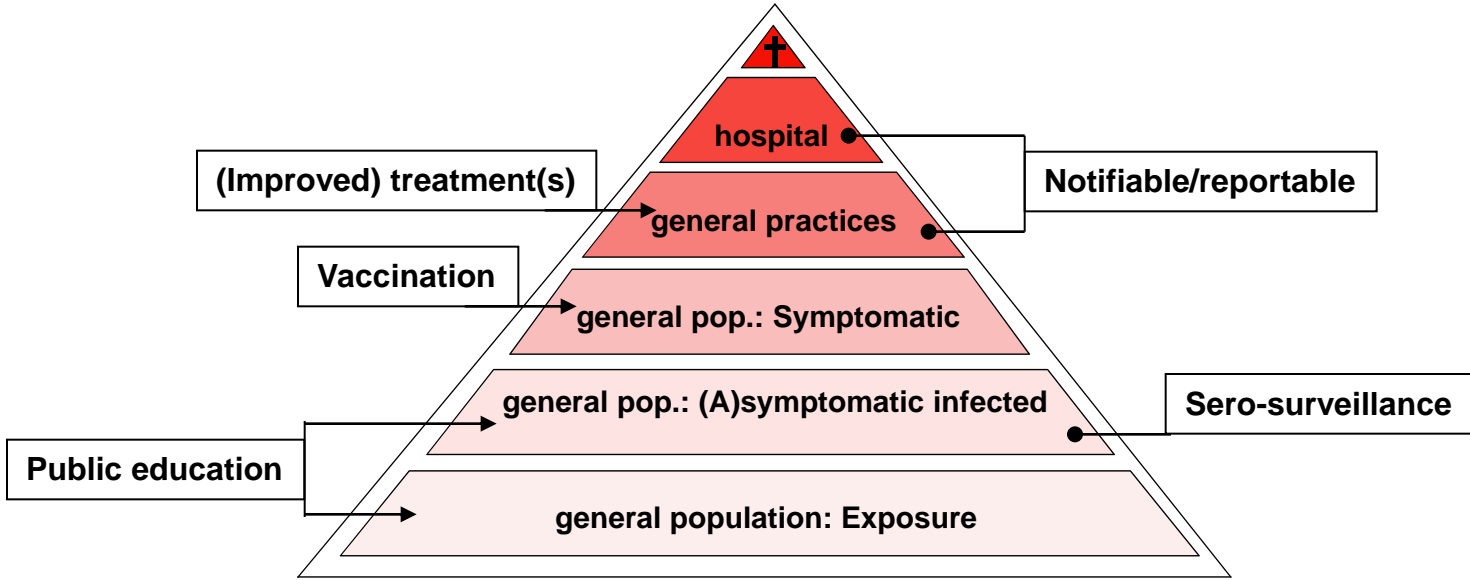
Threat



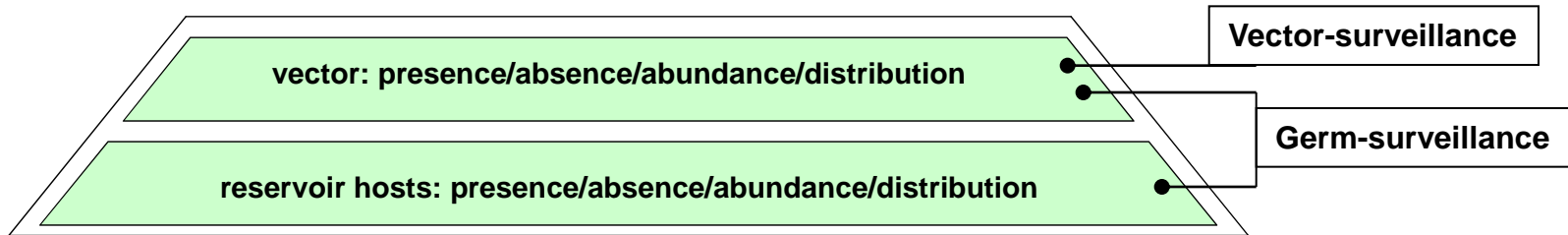
Intervention

Surveillance

Disease burden



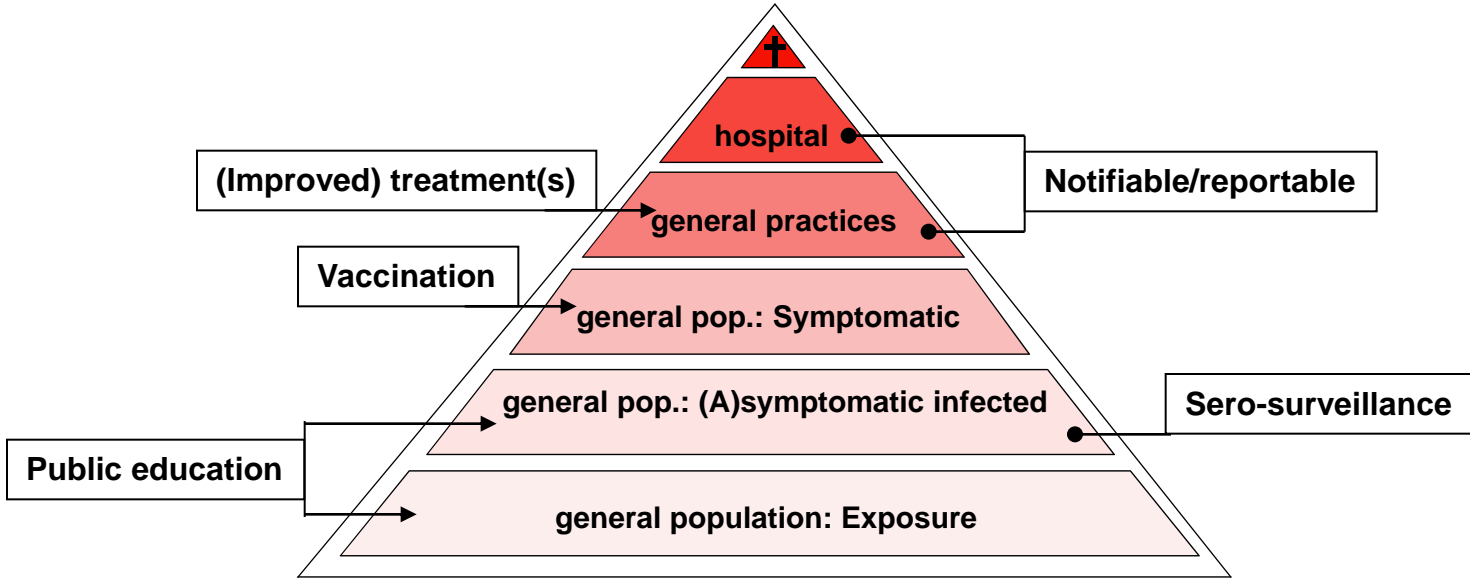
Threat



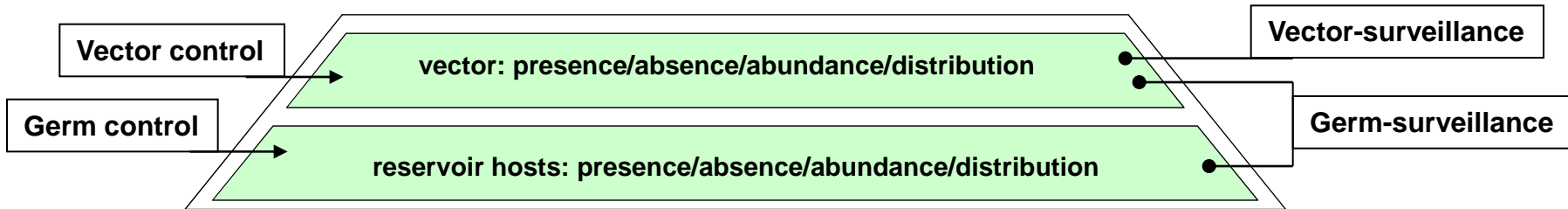
Intervention

Surveillance

Disease burden



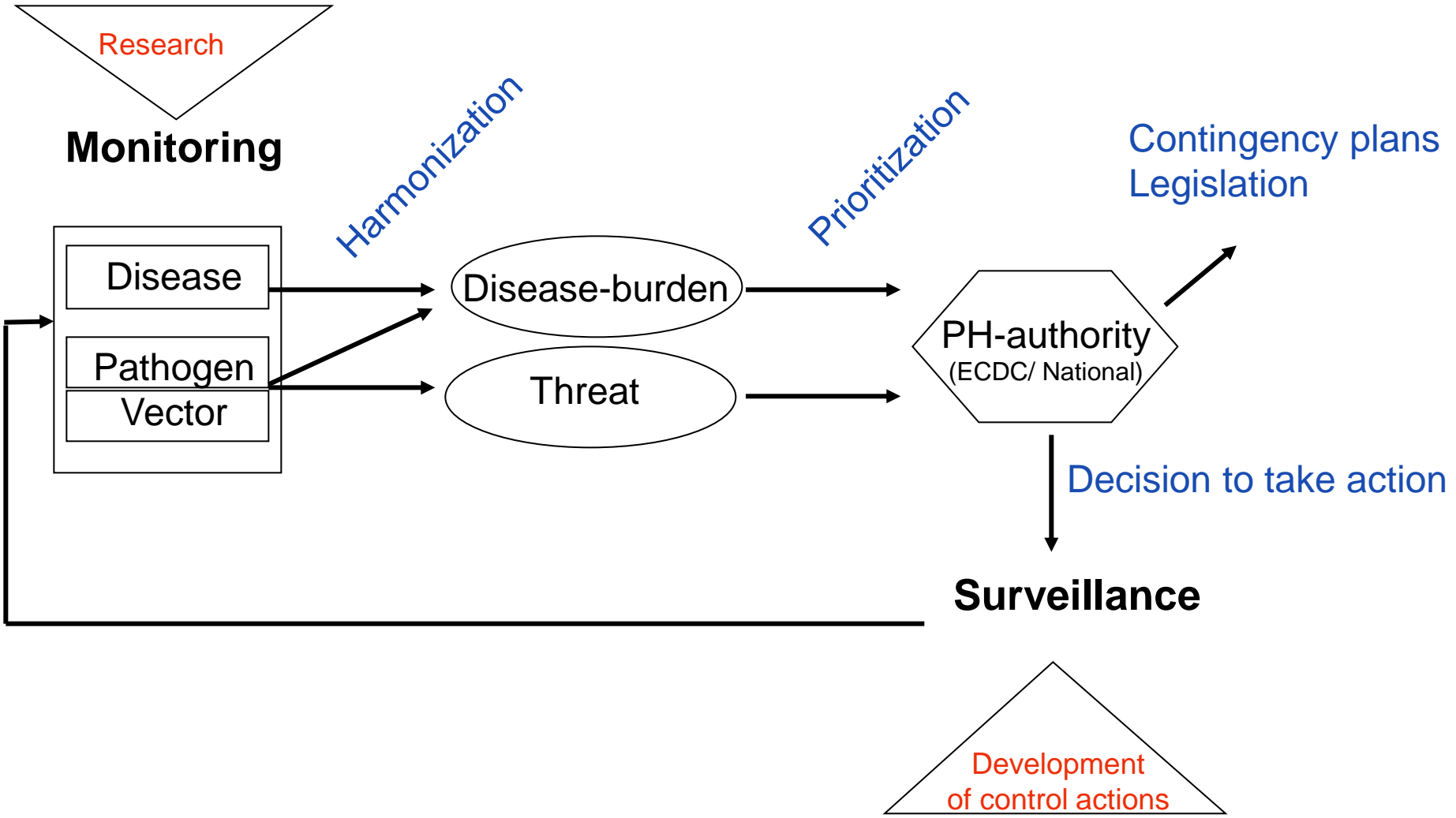
Threat

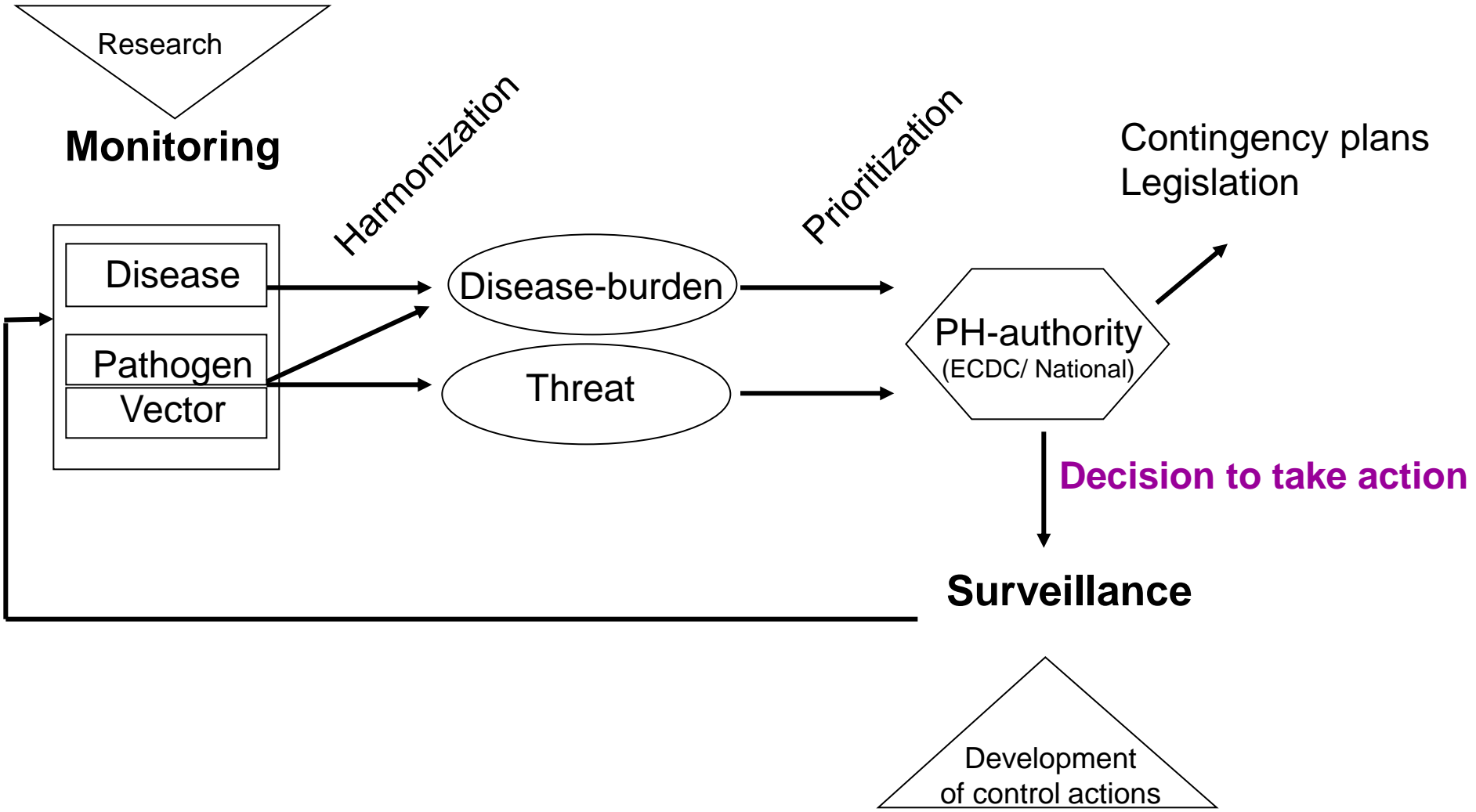


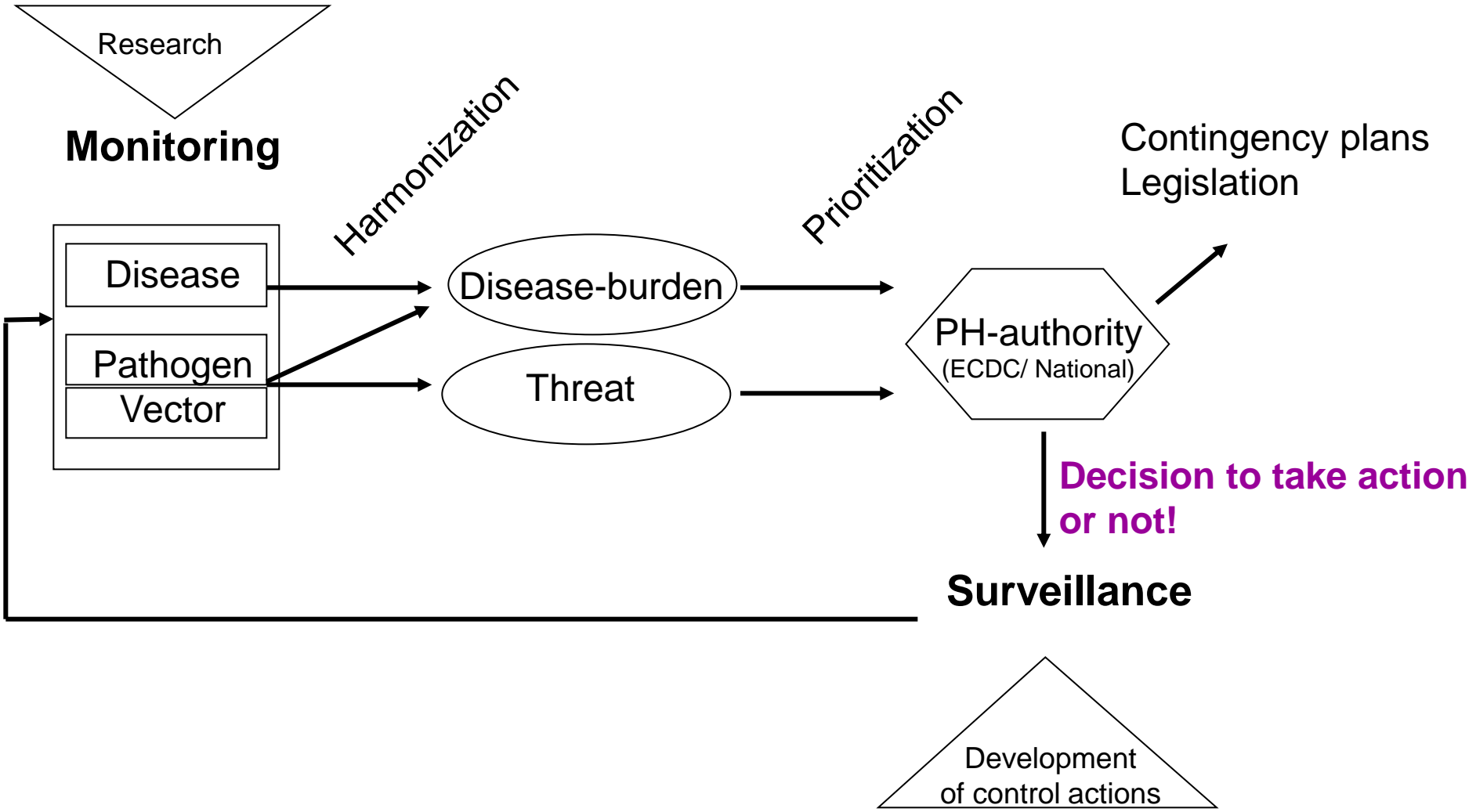


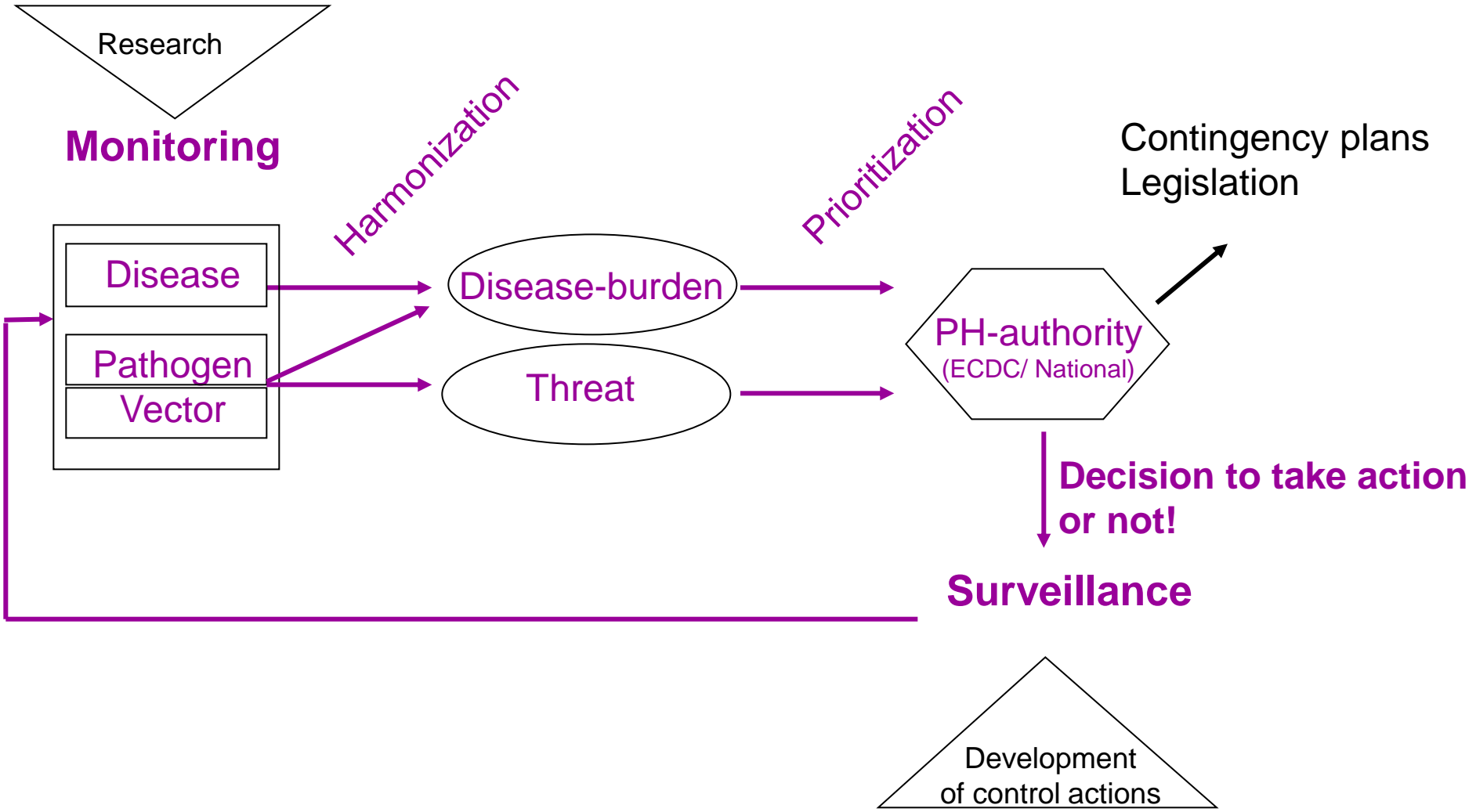
## 6. From monitoring to surveillance: Decision making













# Qualitative data per member state



# Qualitative data per member state

Country x	VBD
	Context
<b>Mosquito-borne diseases:</b>	
Chikungunya	x
Dengue	.
West Nile Fever	.
Rift Valley Fever	.
<b>Tick-borne diseases:</b>	
Tick-borne encephalitis	.
Crimean-Congo haemorrhagic fever	.
Lyme borreliosis	.
Tularaemia	.
Rickettsiosis	.
<b>Sandfly-borne diseases</b>	
Leishmaniasis	.
Sandfly fevers	.

Context	Endemic disease	Pathogen	Vector
1	√	√	√
2	-	√	√
3	-	-	√
4	-	√	-
5	-	-	-



# Questionnaire

Country X	Monitoring		
	human	animal	vector
<b>Mosquito-borne diseases:</b> Chikungunya Dengue West Nile Fever Rift Valley Fever			
<b>Tick-borne diseases:</b> Tick-borne encephalitis Crimean-Congo haemorrhagic fever Lyme borreliosis Tularaemia Rickettsiosis			
<b>Sandfly-borne diseases</b> Leishmaniasis Sandfly fevers			



# Qualitative data per member state

Country X	Monitoring		
	human	animal	vector
<b>Mosquito-borne diseases:</b>			
Chikungunya			
Dengue			
West Nile Fever			
Rift Valley Fever			
<b>Tick-borne diseases:</b>			
Tick-borne encephalitis			
Crimean-Congo haemorrhagic fever			
Lyme borreliosis			
Tularaemia			
Rickettsiosis			
<b>Sandfly-borne diseases</b>			
Leishmaniasis			
Sandfly fevers			

Context	Endemic disease	Pathogen	Vector	Priority setting based on
1	√	√	√	Disease burden
2	-	√	√	Threat
3	-	-	√	Threat
4	-	√	-	Threat
5	-	-	-	Threat



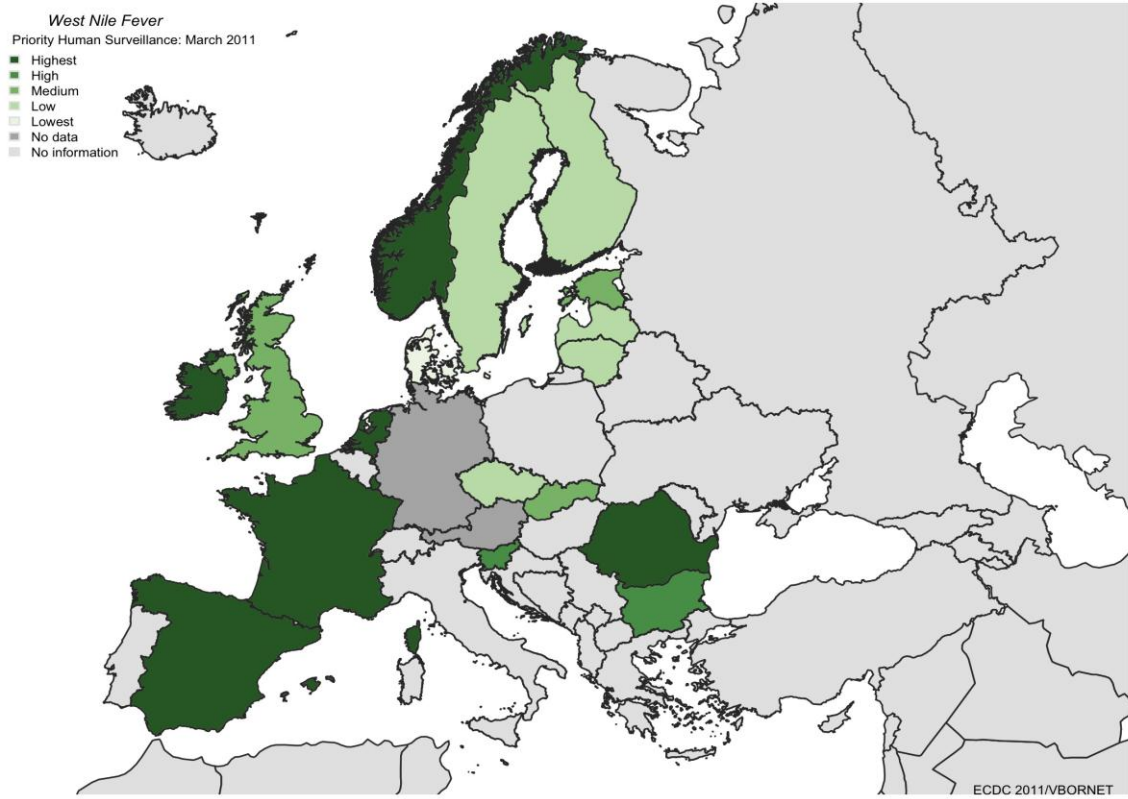


## Qualitative data per member state

<b>Netherlands</b>	<b>VBD</b>
	<b>Context</b>
<b>Mosquito-borne diseases:</b>	
Chikungunya	4
Dengue	4
West Nile Fever	3
Rift Valley Fever	3
<b>Tick-borne diseases:</b>	
Tick-borne encephalitis	3
Crimean-Congo haemorrhagic fever	5
Lyme borreliosis	1
Tularaemia	3
Rickettsiosis	2
<b>Sandfly-borne diseases</b>	
Leishmaniasis	4
Sandfly fevers	5

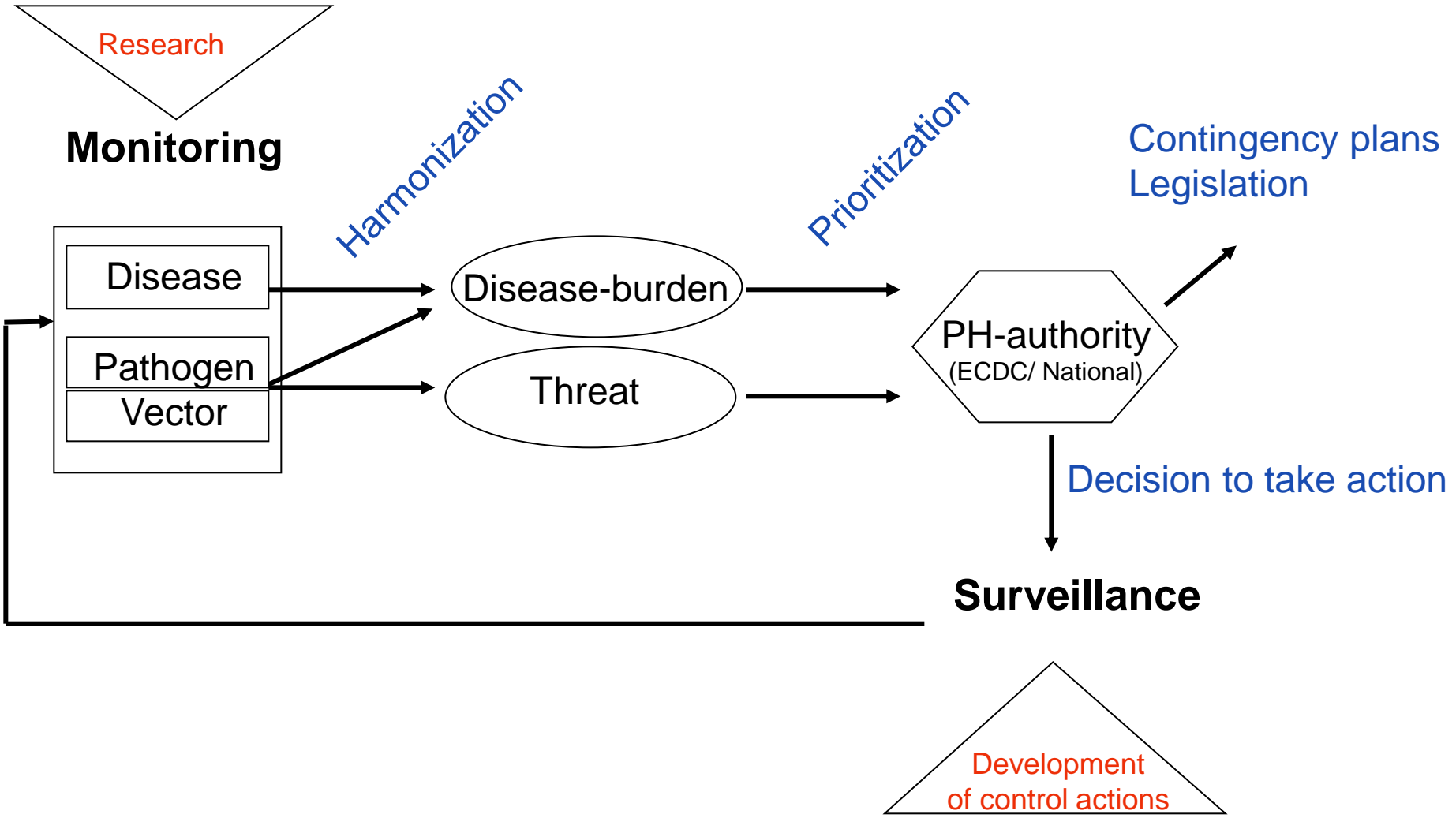


# Qualitative data per VBD per member state





# Quantitative data per VBD per member state





To generate, gather, harmonize and prioritize quantitative data of VBD's in Europe

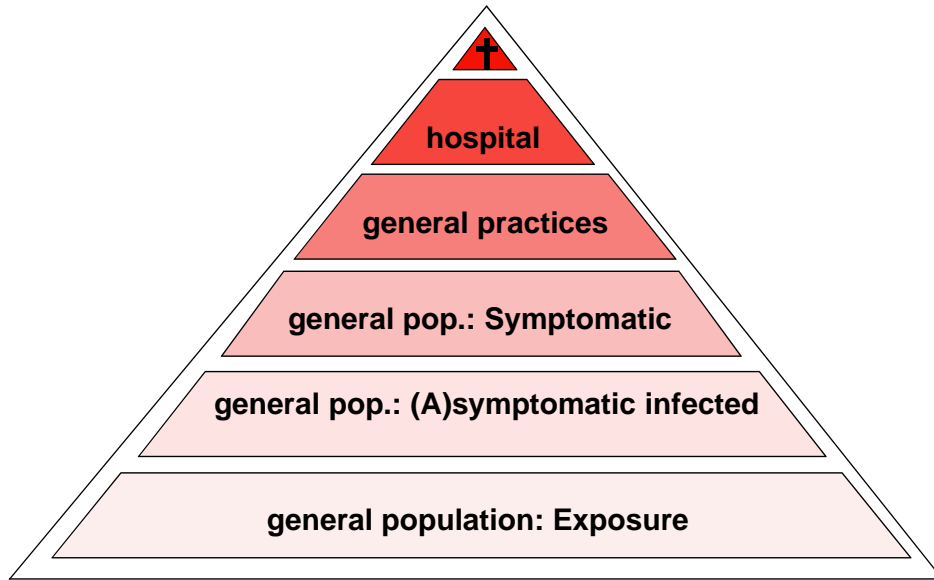
clear guidelines, description and 'formula' to calculate

1. Disease burden
2. Threat

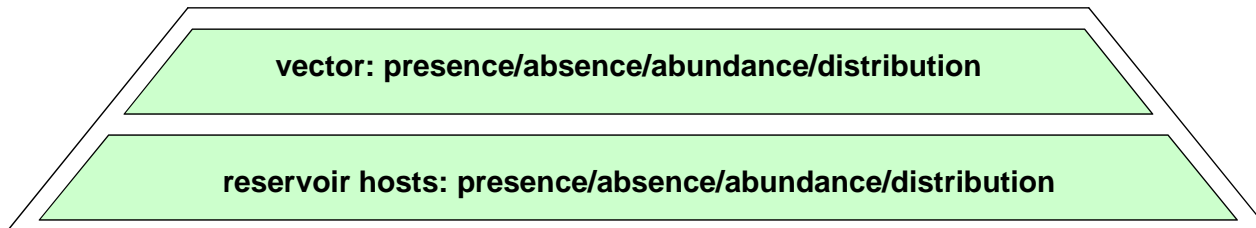
are needed.

Role for National Public Health Authorities and/or ECDC?

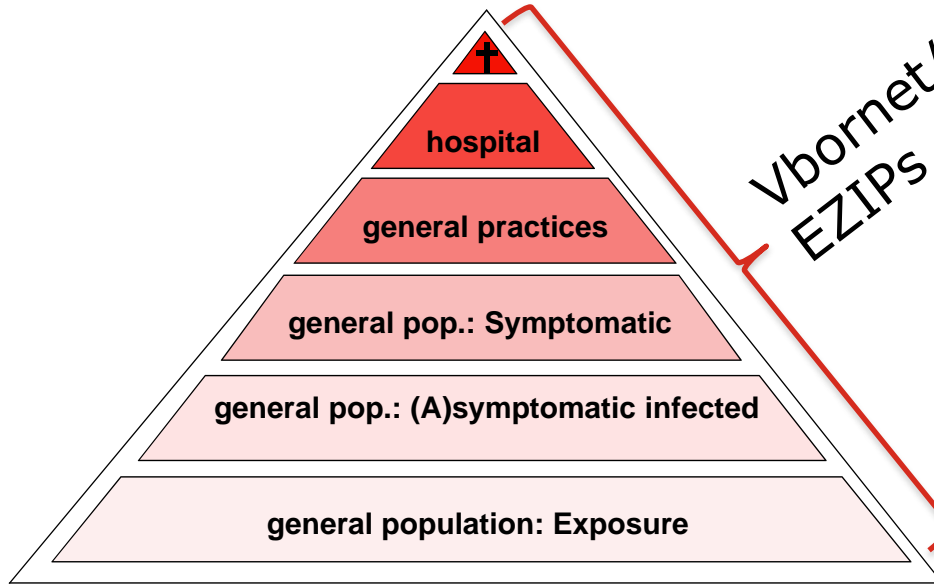
Disease burden



Threat



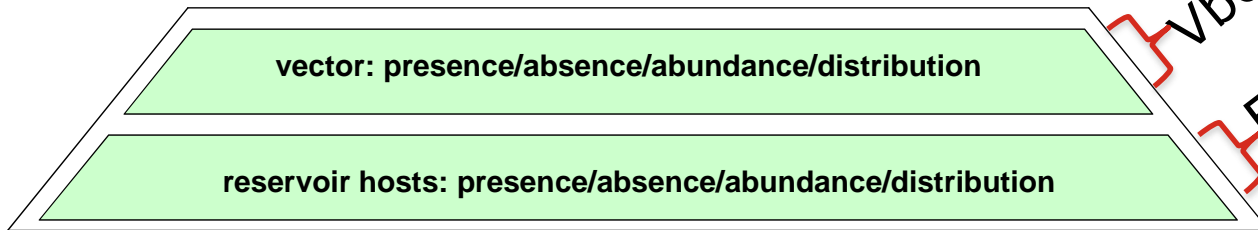
Disease burden



Vbordnet/BCoDe/  
EZIPS

Others?

Threat



Vbordnet/ VecMap  
EDENnext



# Thanks

## Acknowledgements

coauthors on the strategic paper:

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C. Reusken

Vbornet consortium