



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?

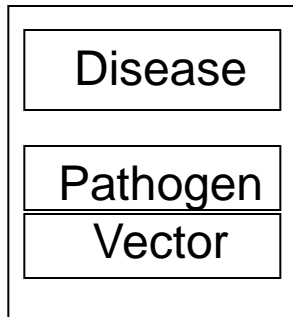
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2. Monitoring and surveillance system



Monitoring





Research

Monitoring

Disease

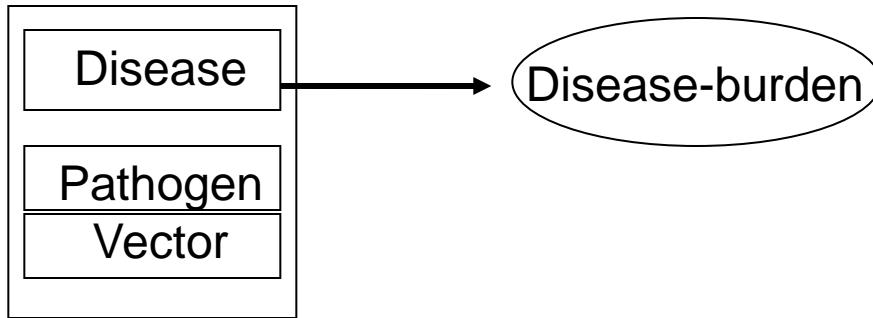
Pathogen

Vector



Research

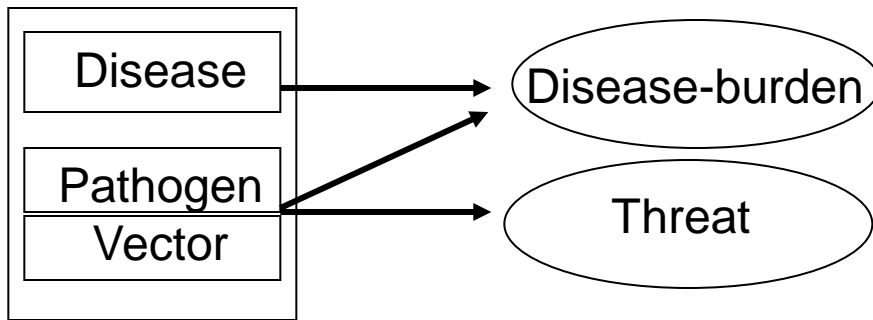
Monitoring

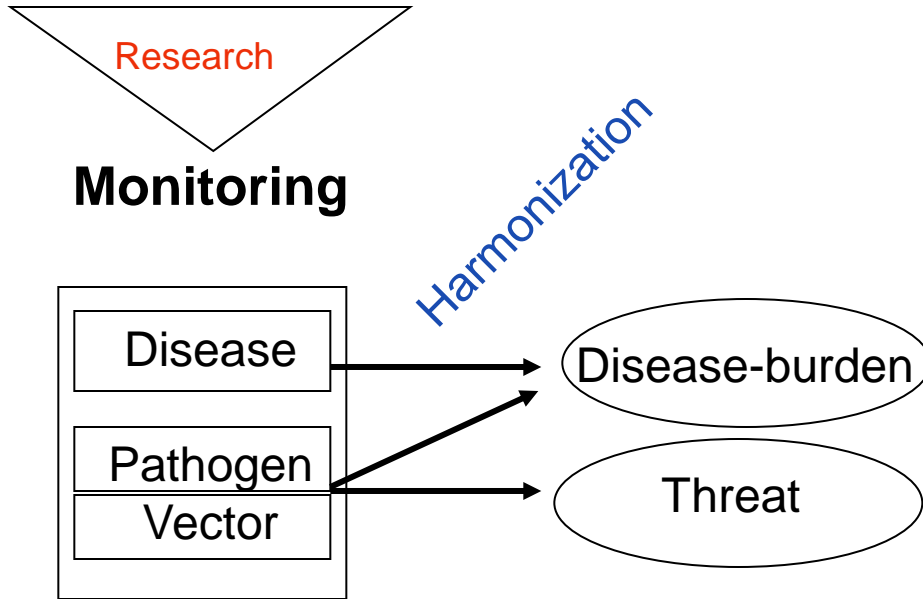


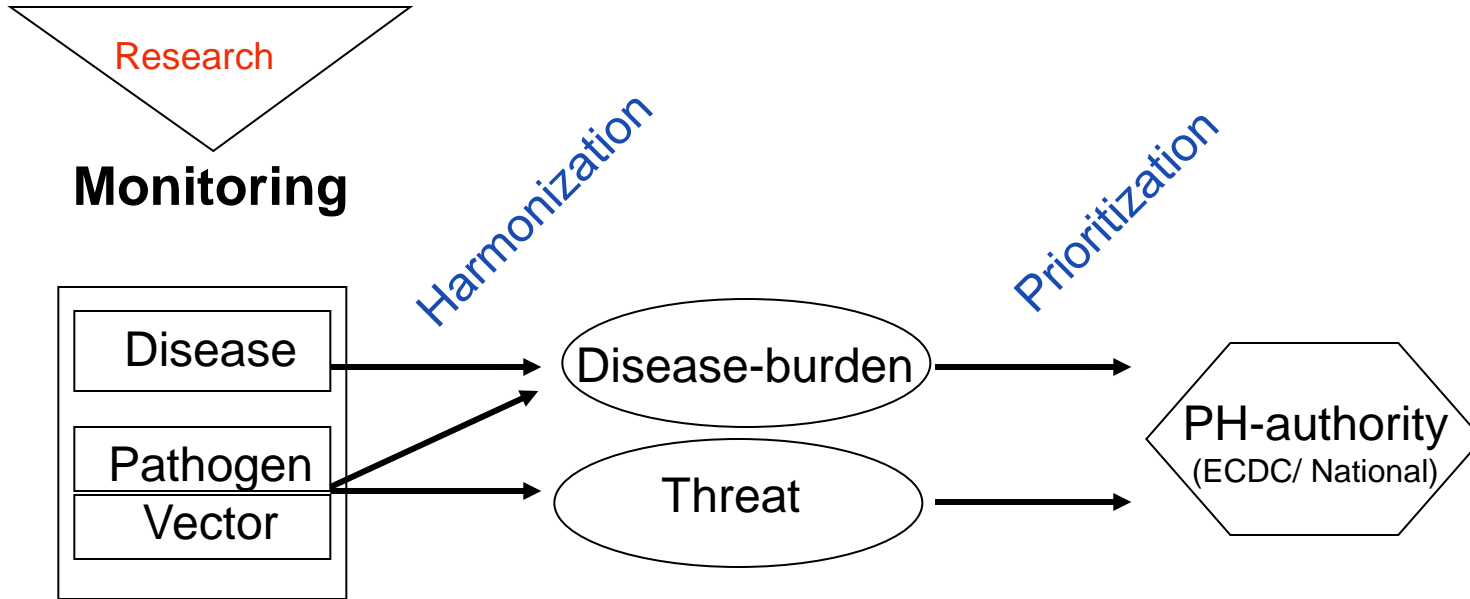


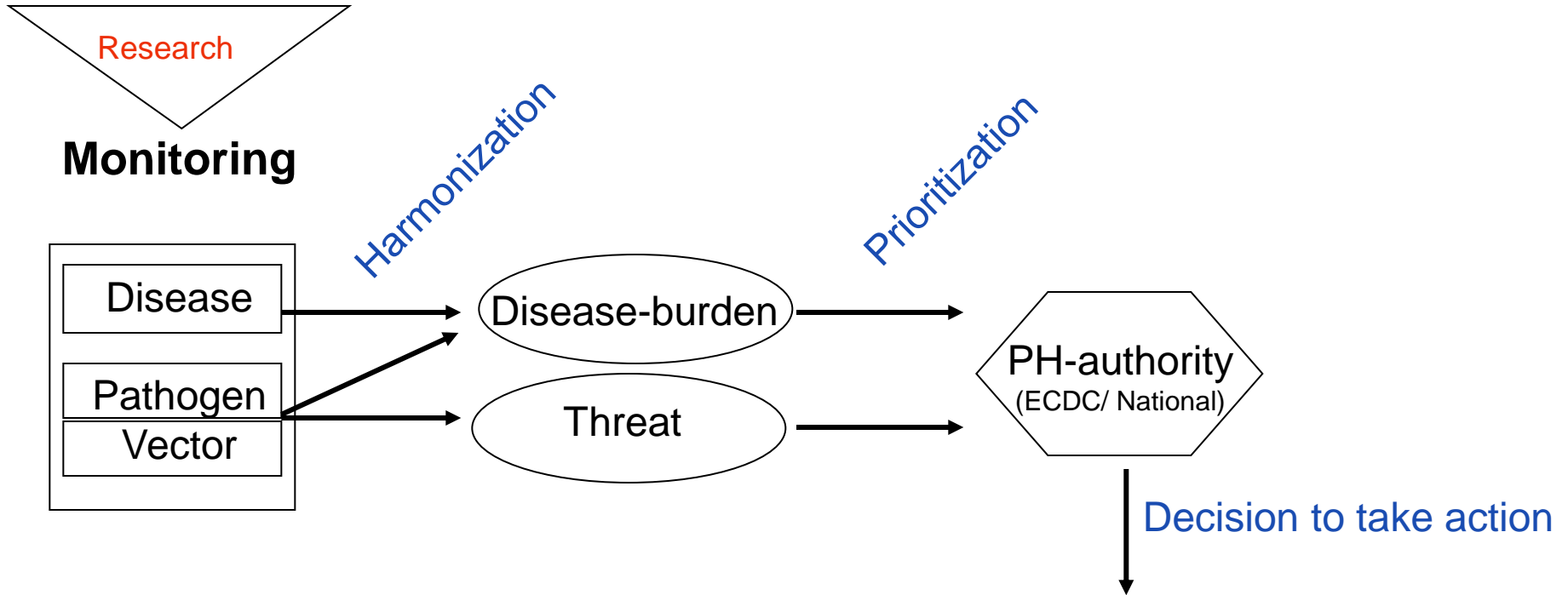
Research

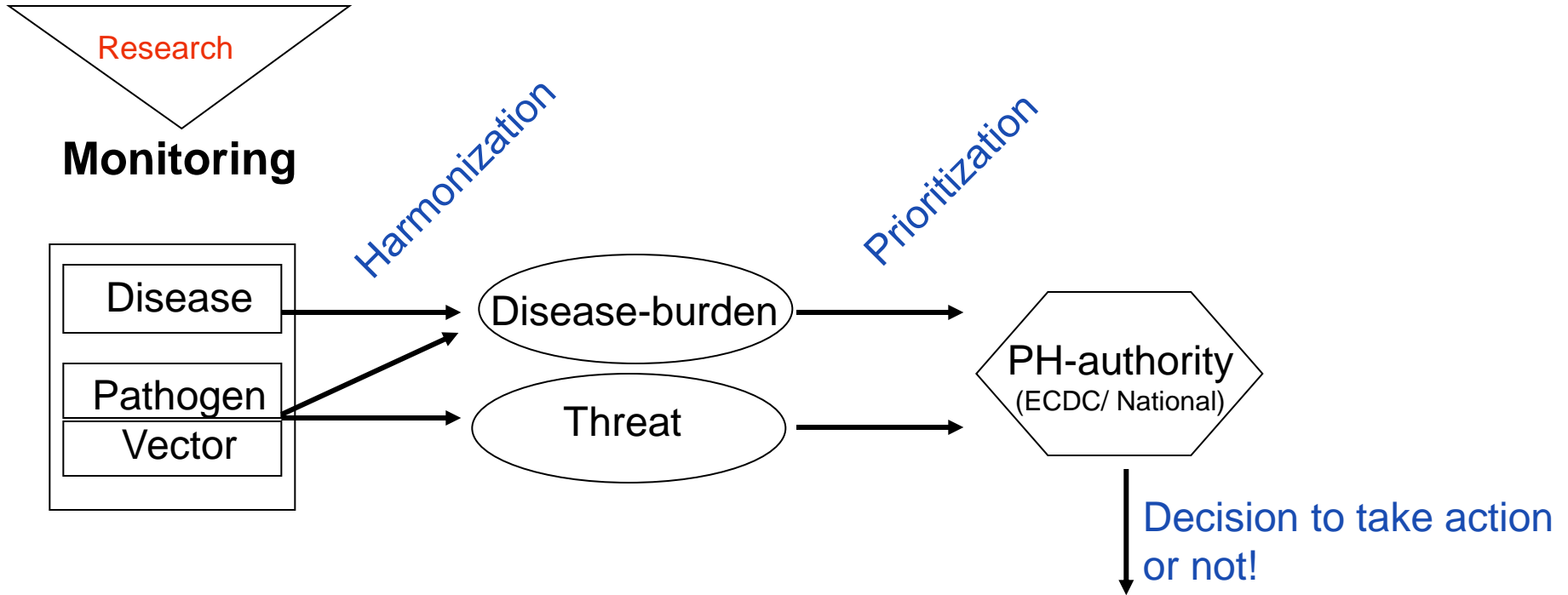
Monitoring

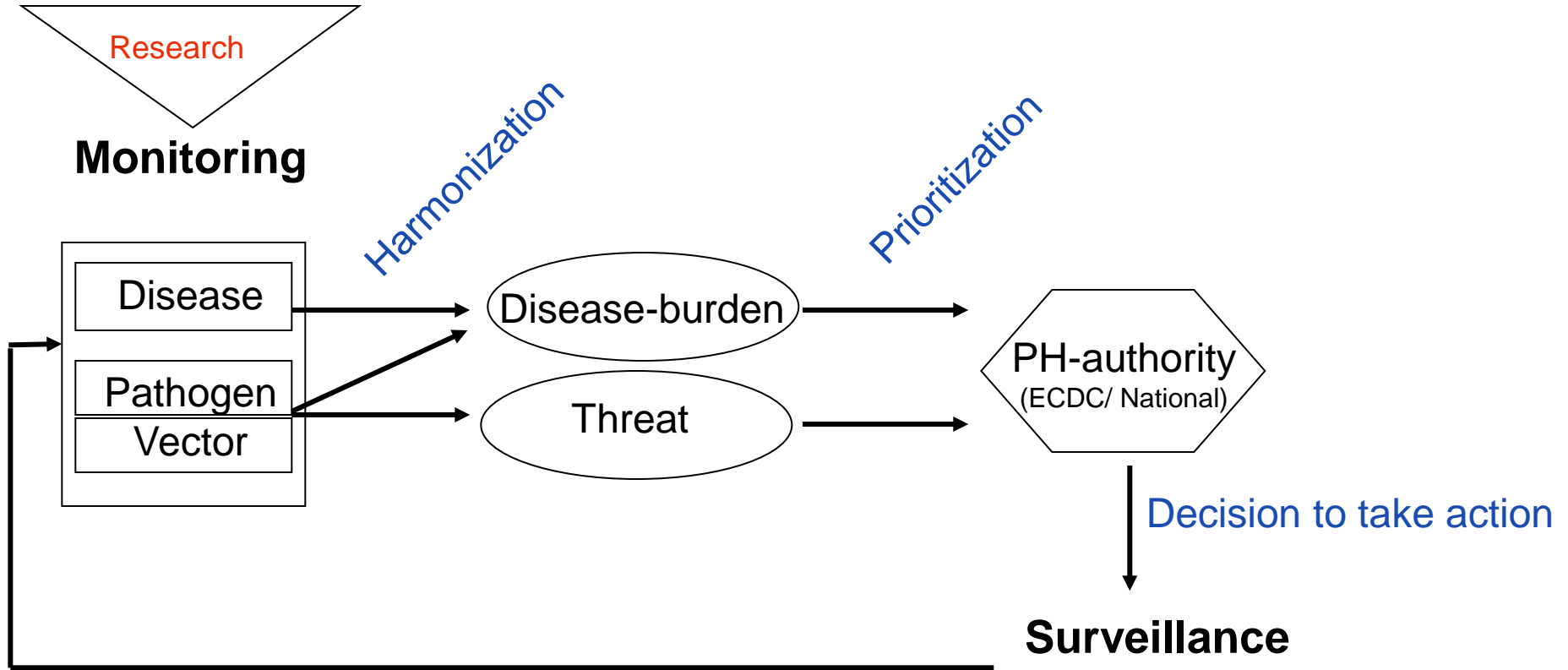


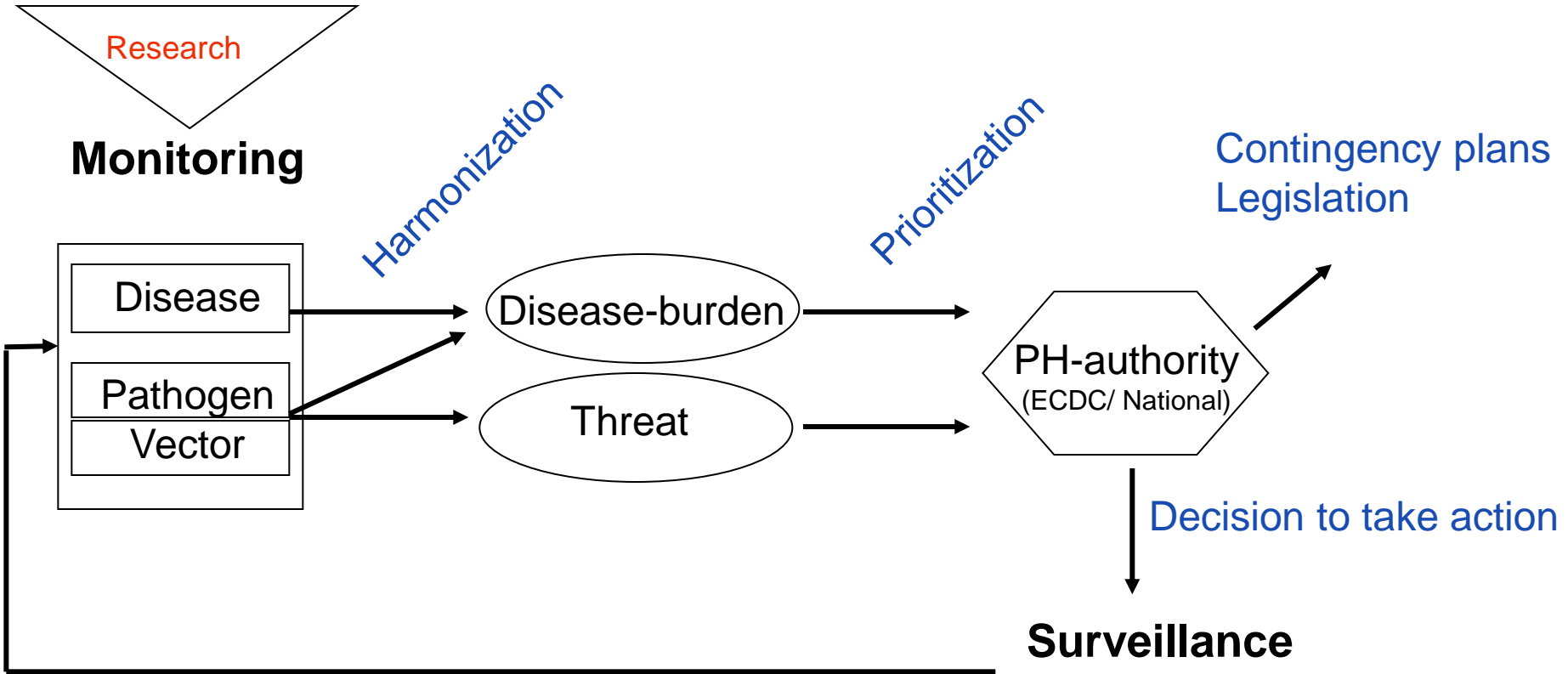


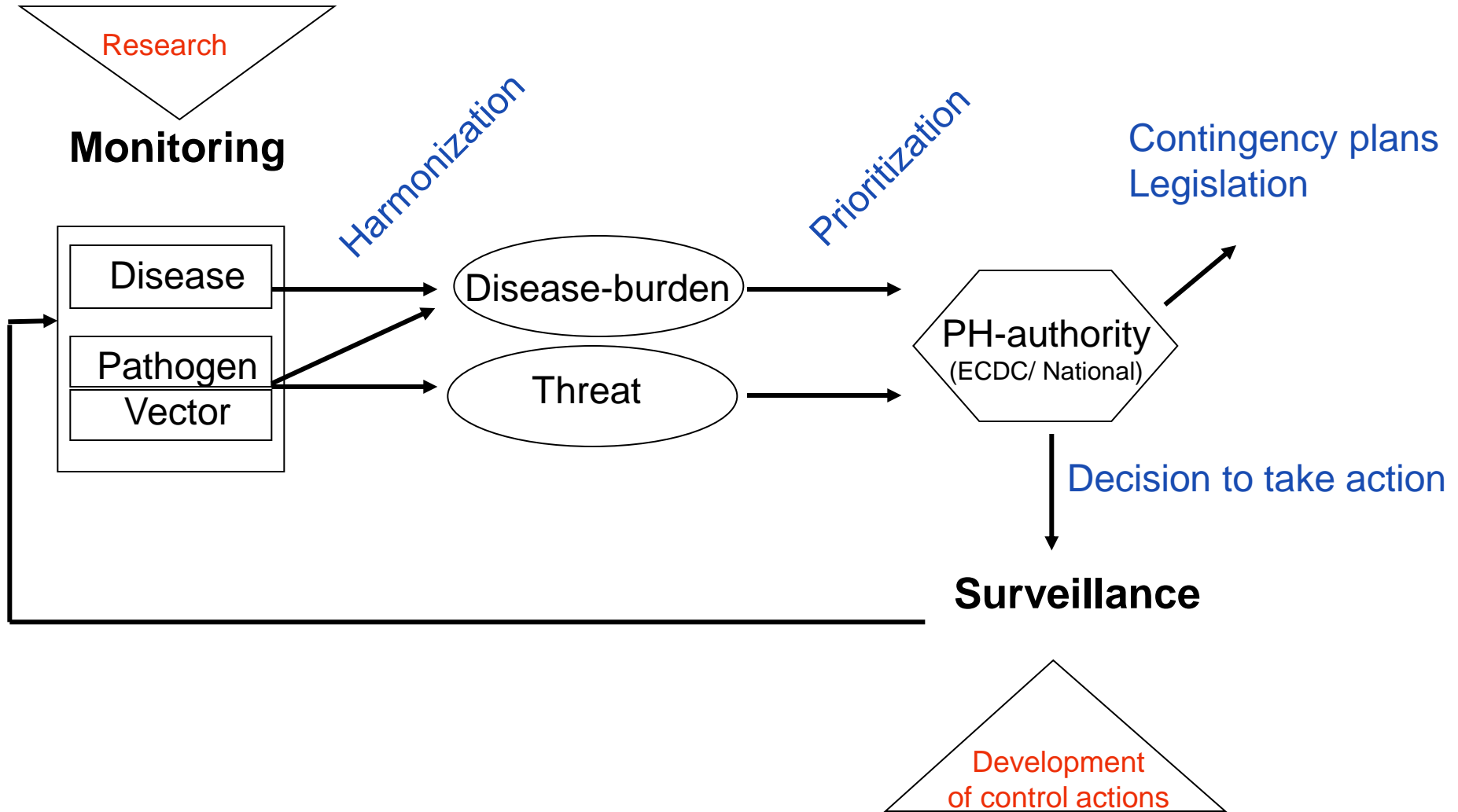


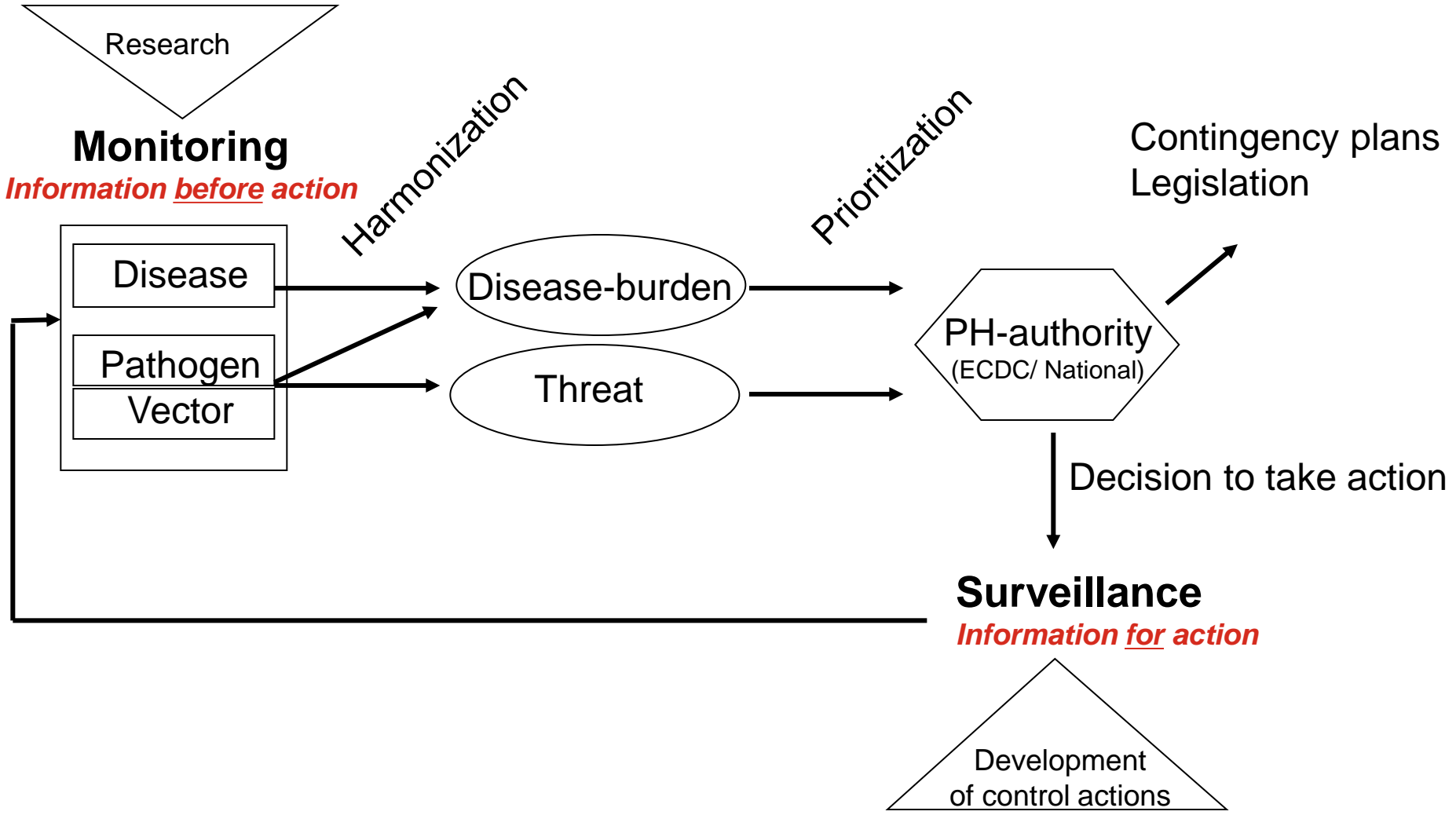














Monitoring

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

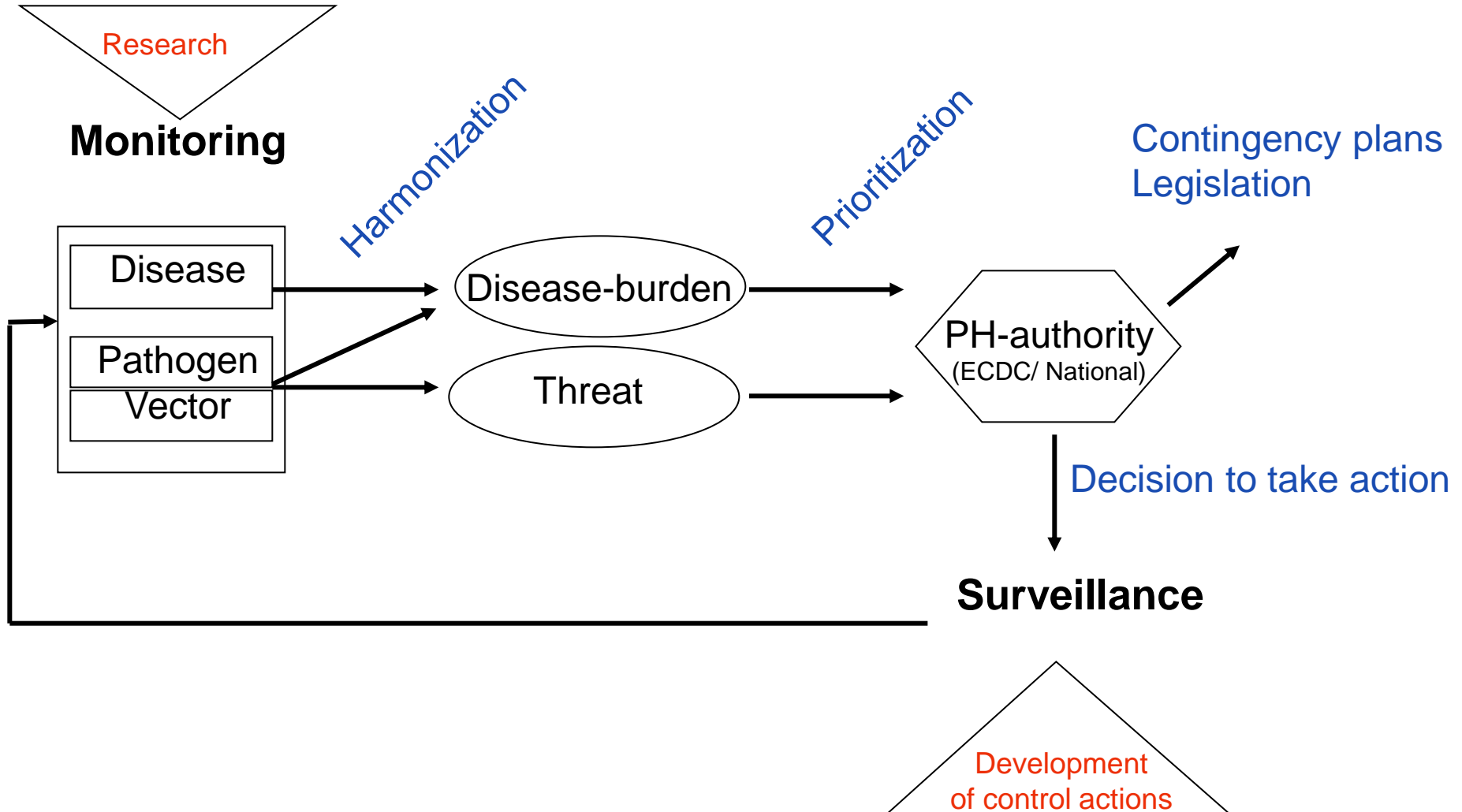
Different types of data input

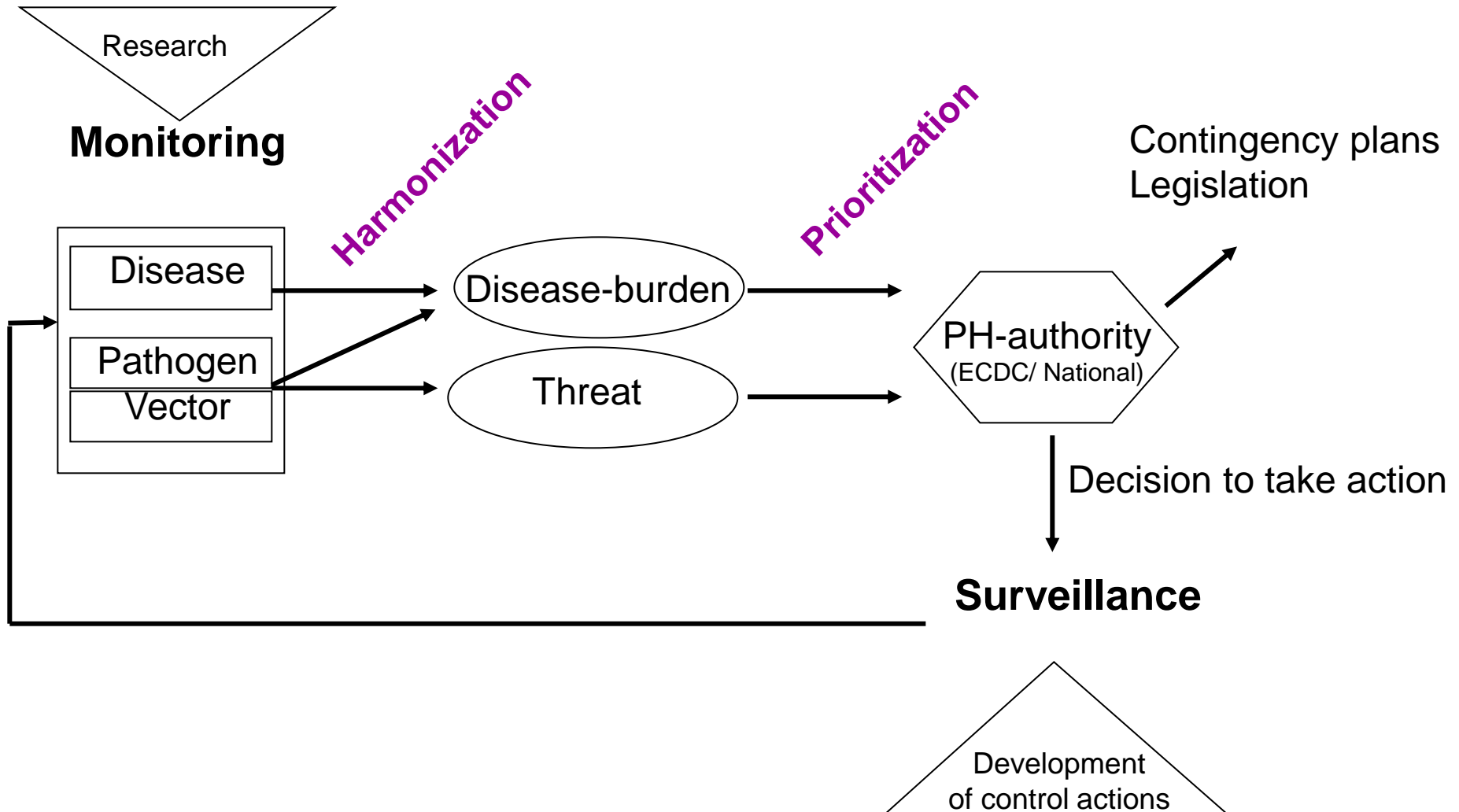
1. Germ data
2. Serological data
3. Clinical data
4. Syndromic data
5. Risk data
 - Detecting risk factors e.g.

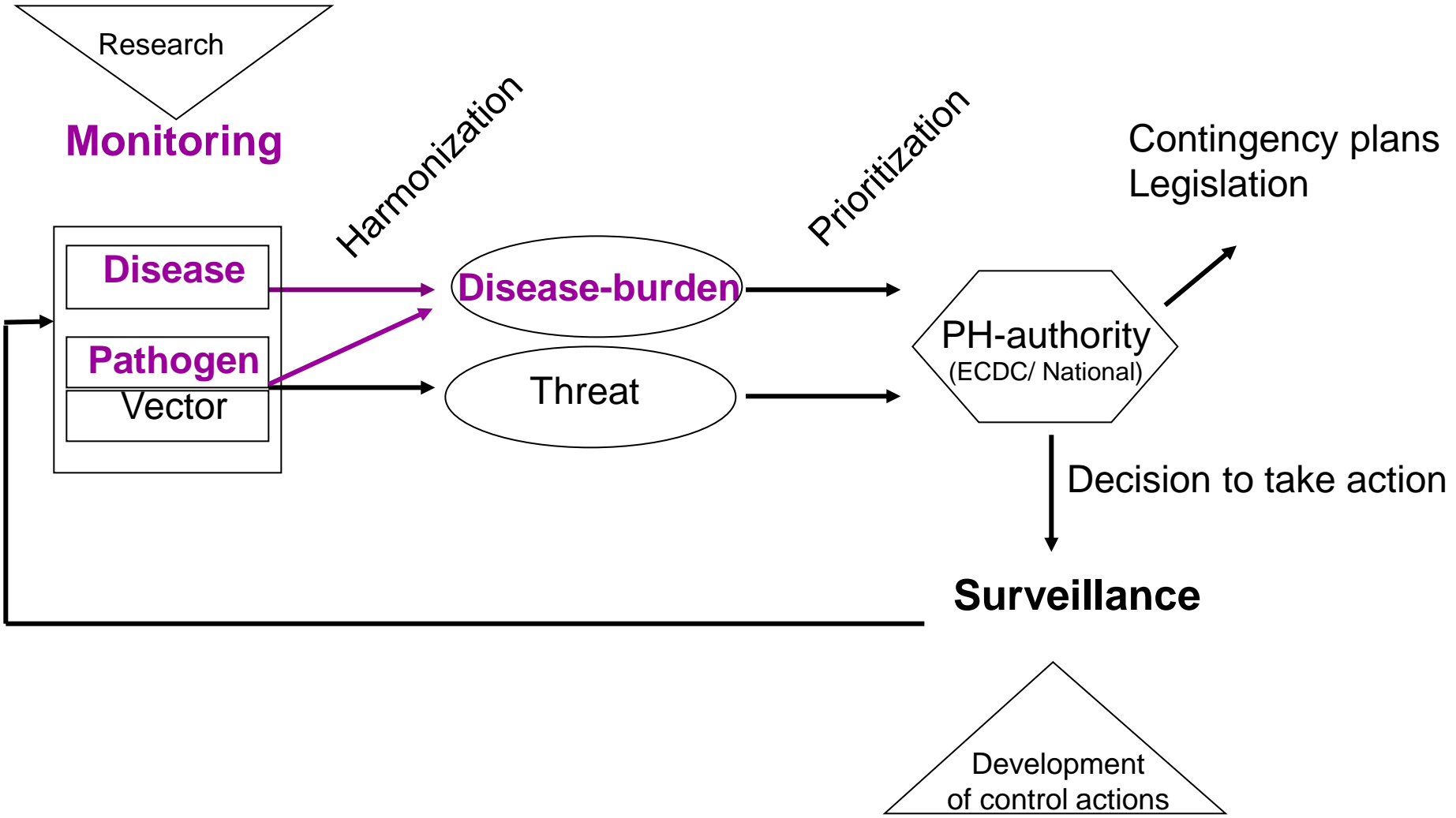
presence absence of vectors
human risk behaviour



3. Harmonization and priority setting









3. Harmonization and priority setting

Disease -> Disease burden

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

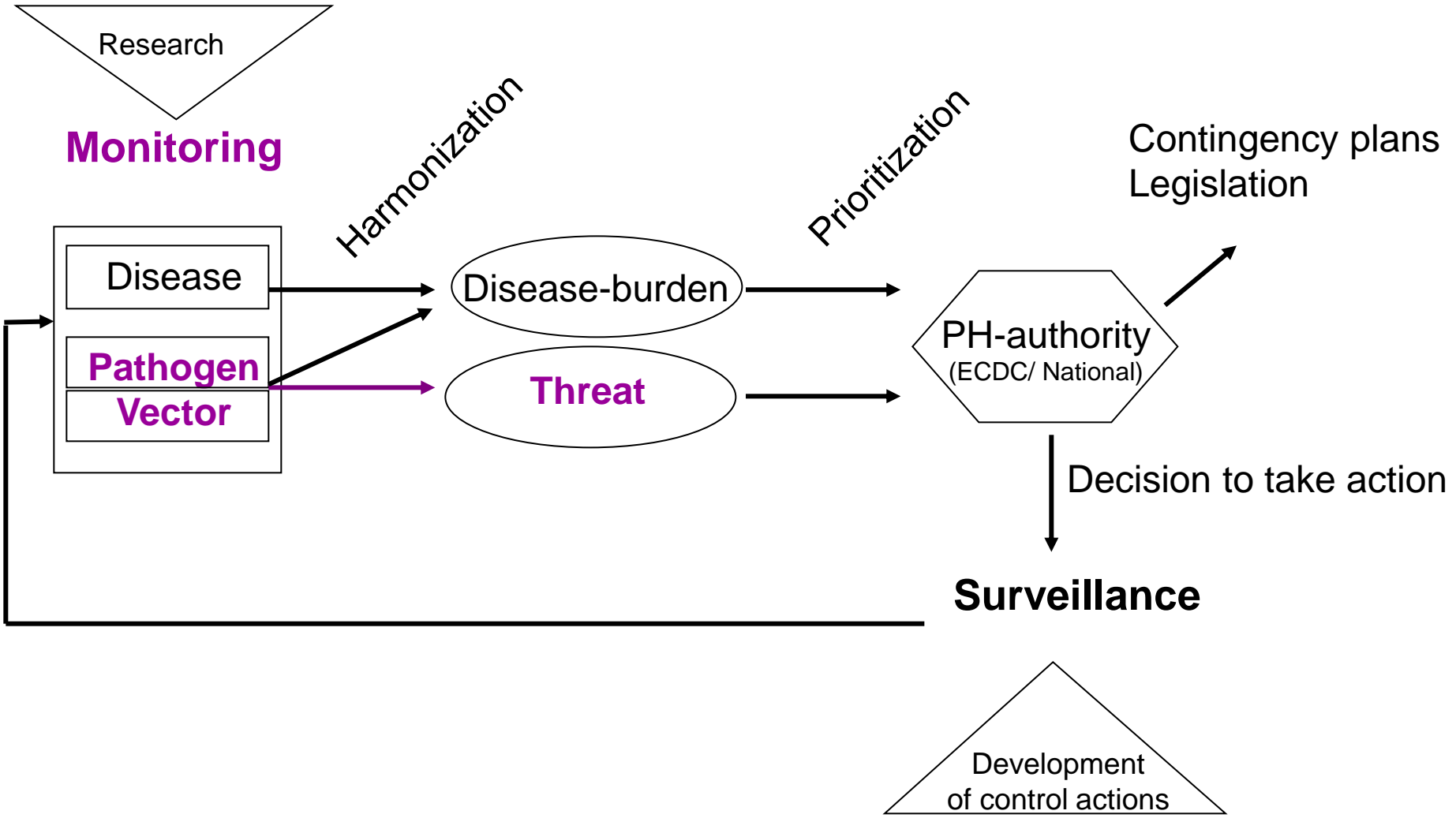
See two presentations later today:

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

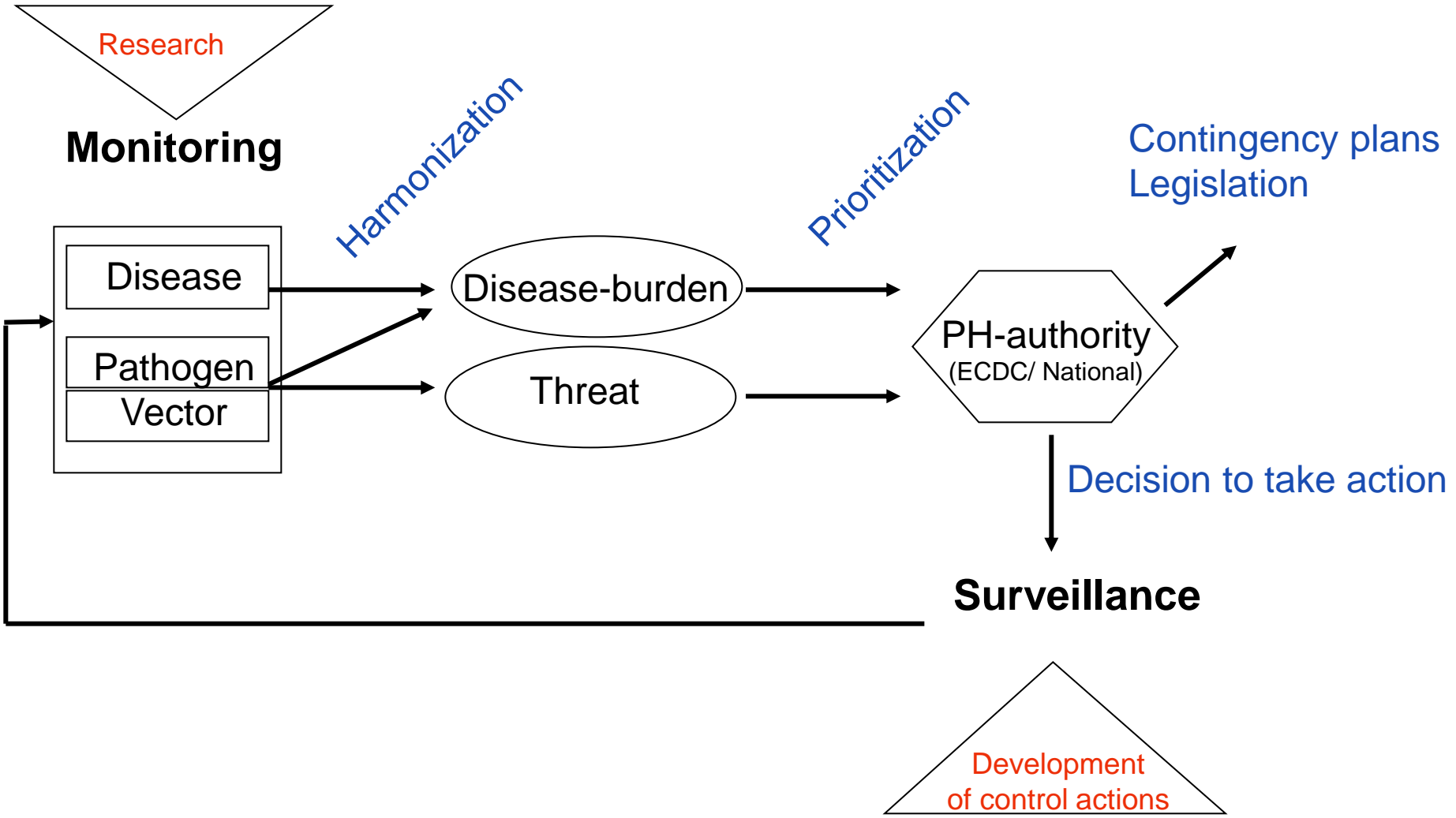
Priority setting

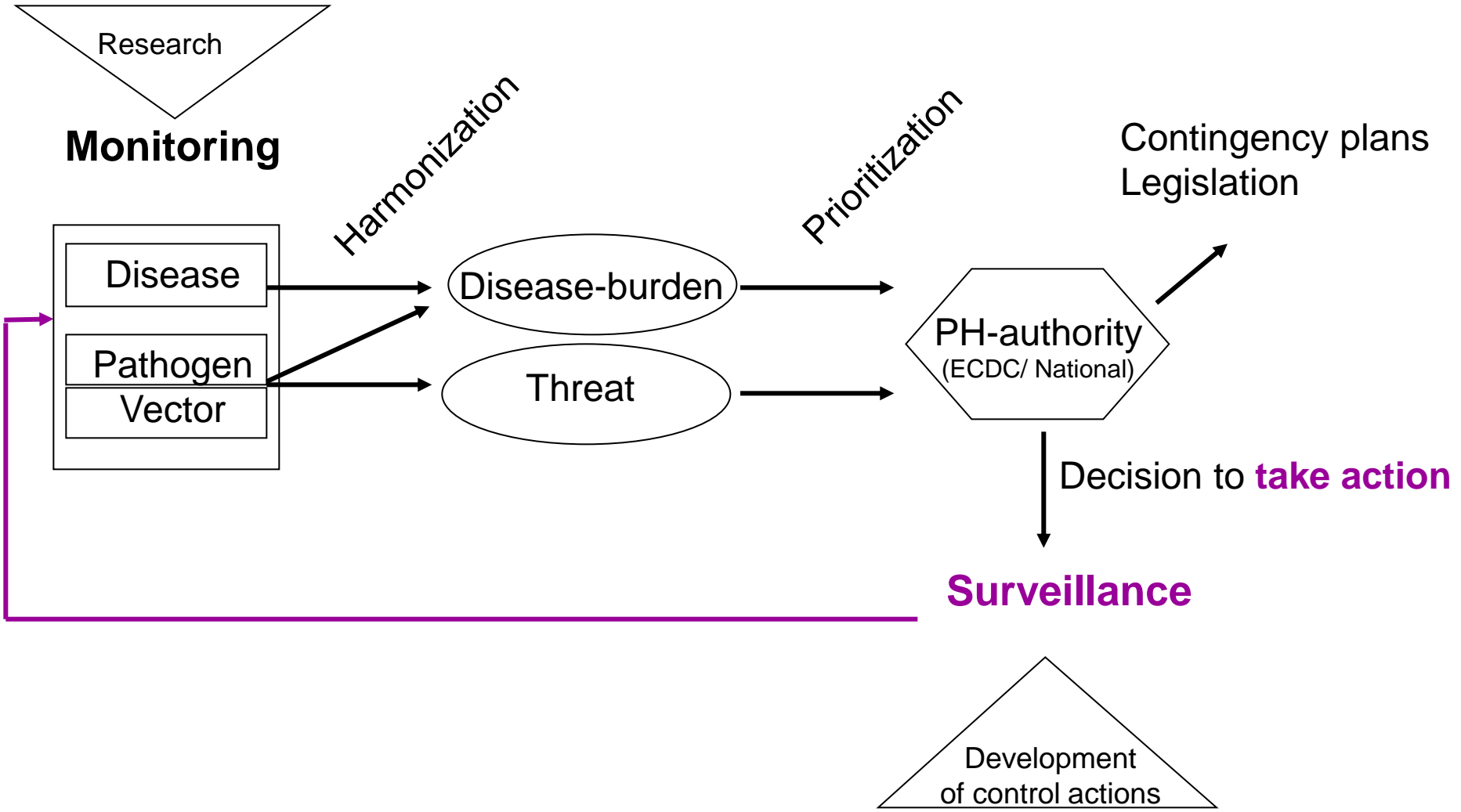
- Comparing threats is difficult

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/>



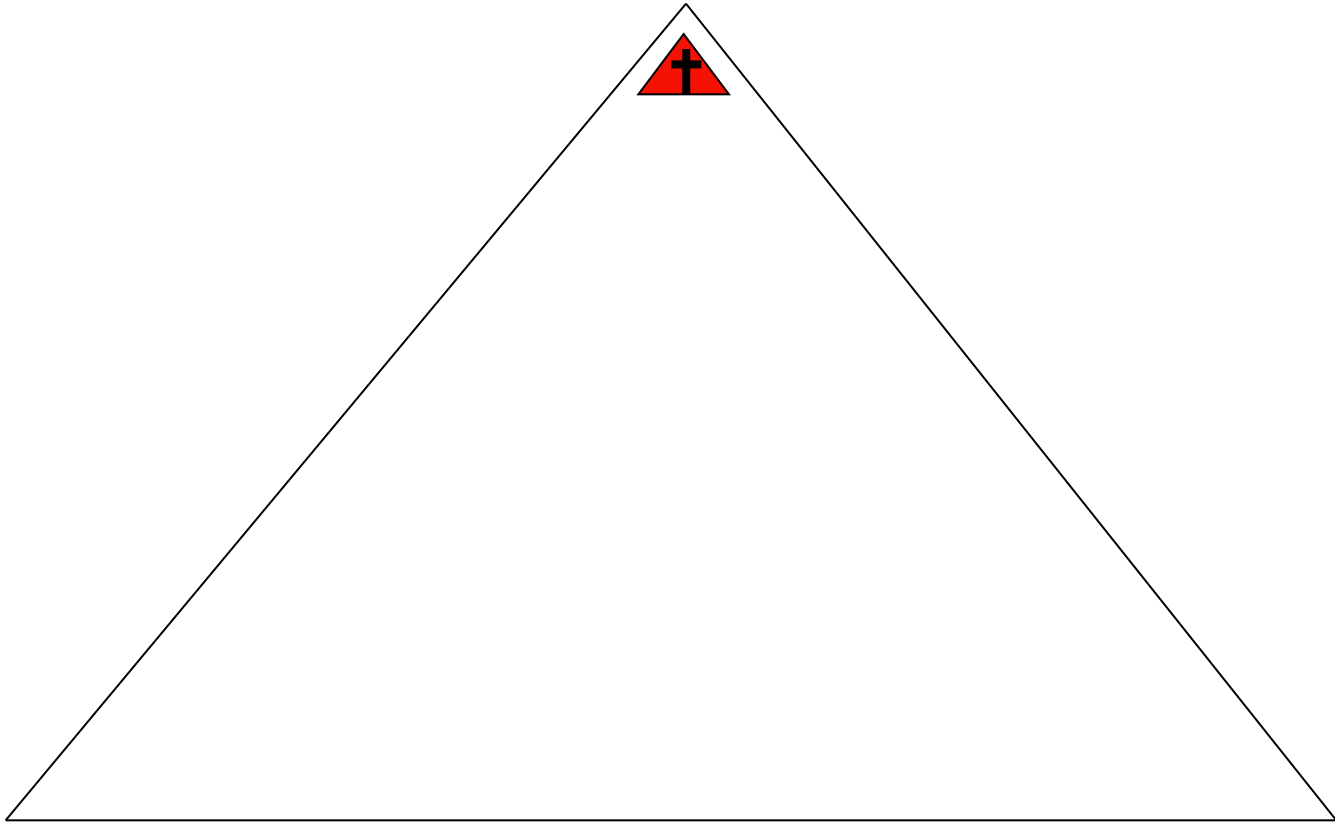
4. Surveillance and intervention

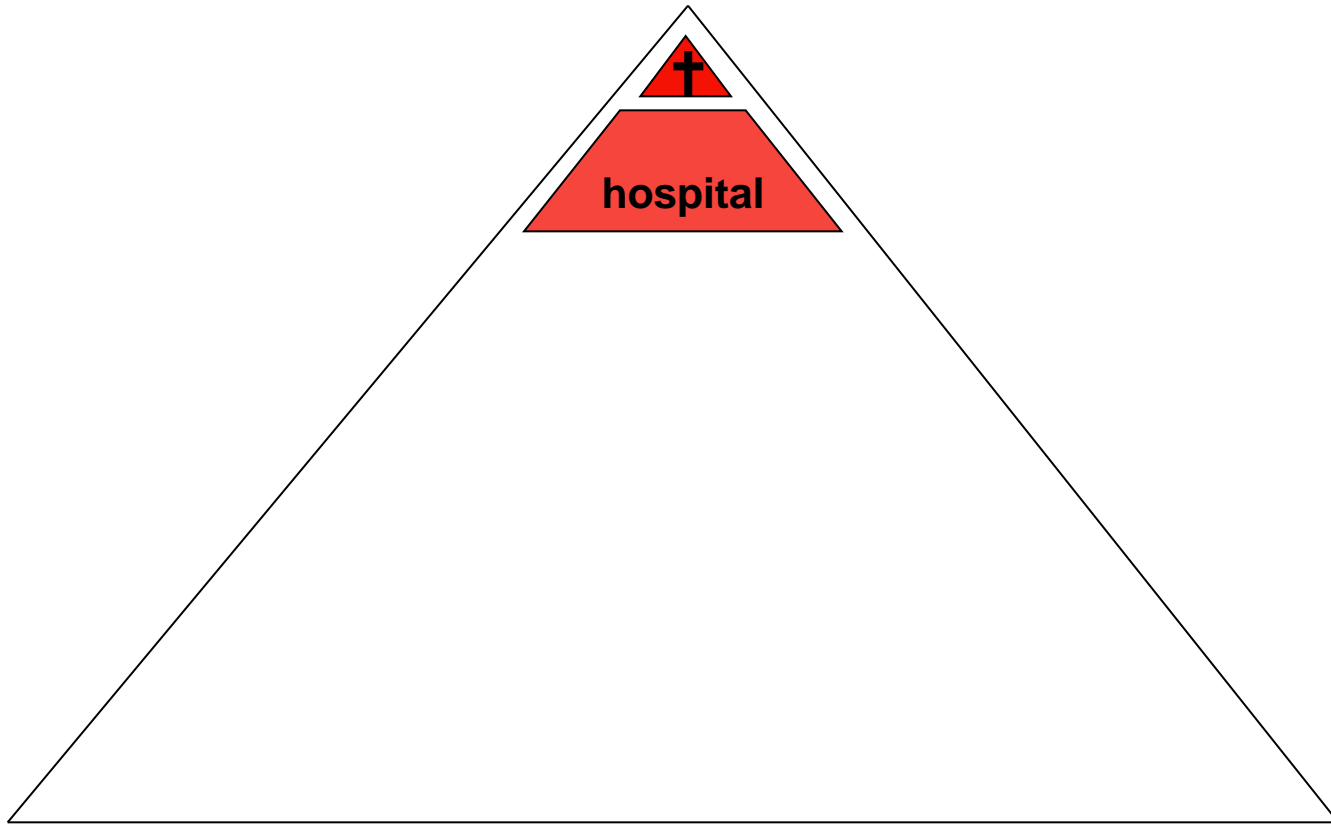


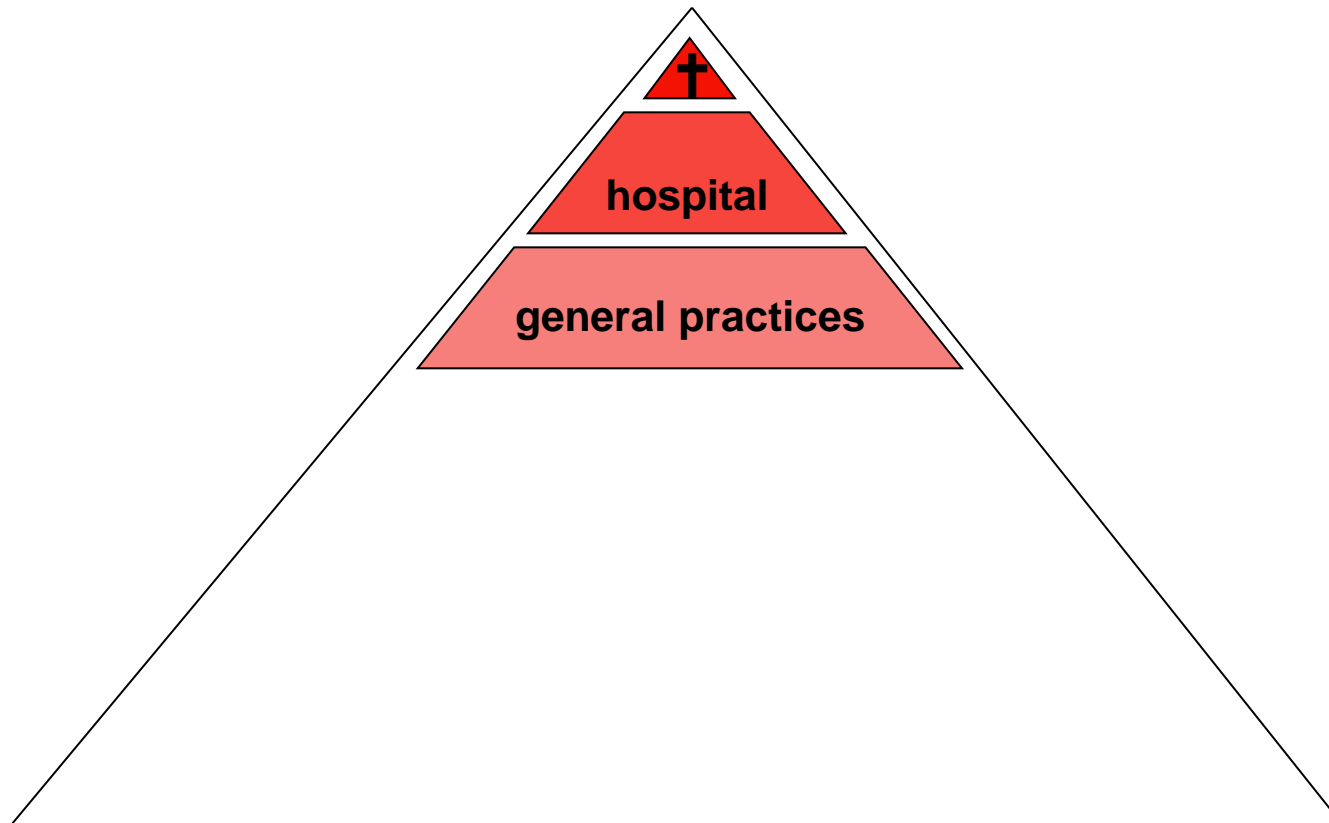


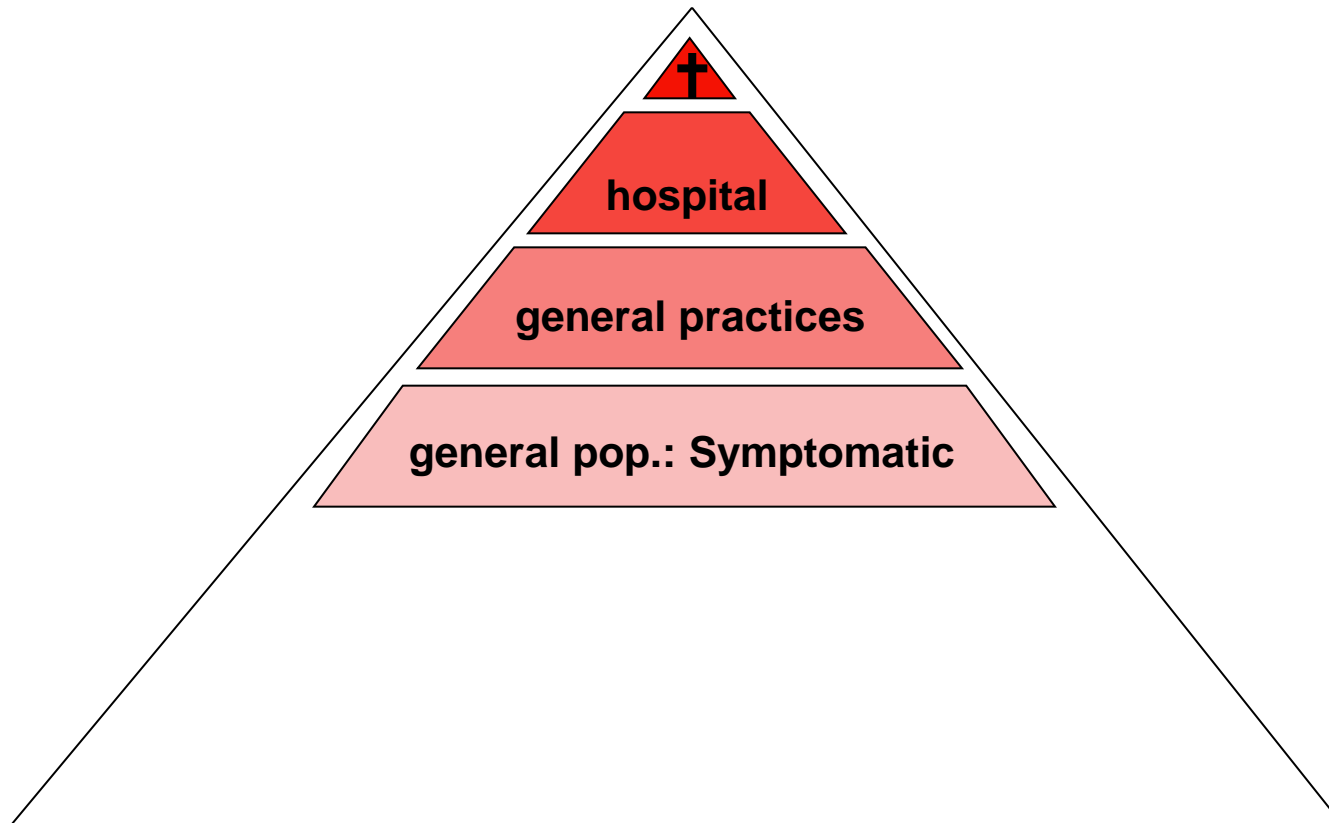


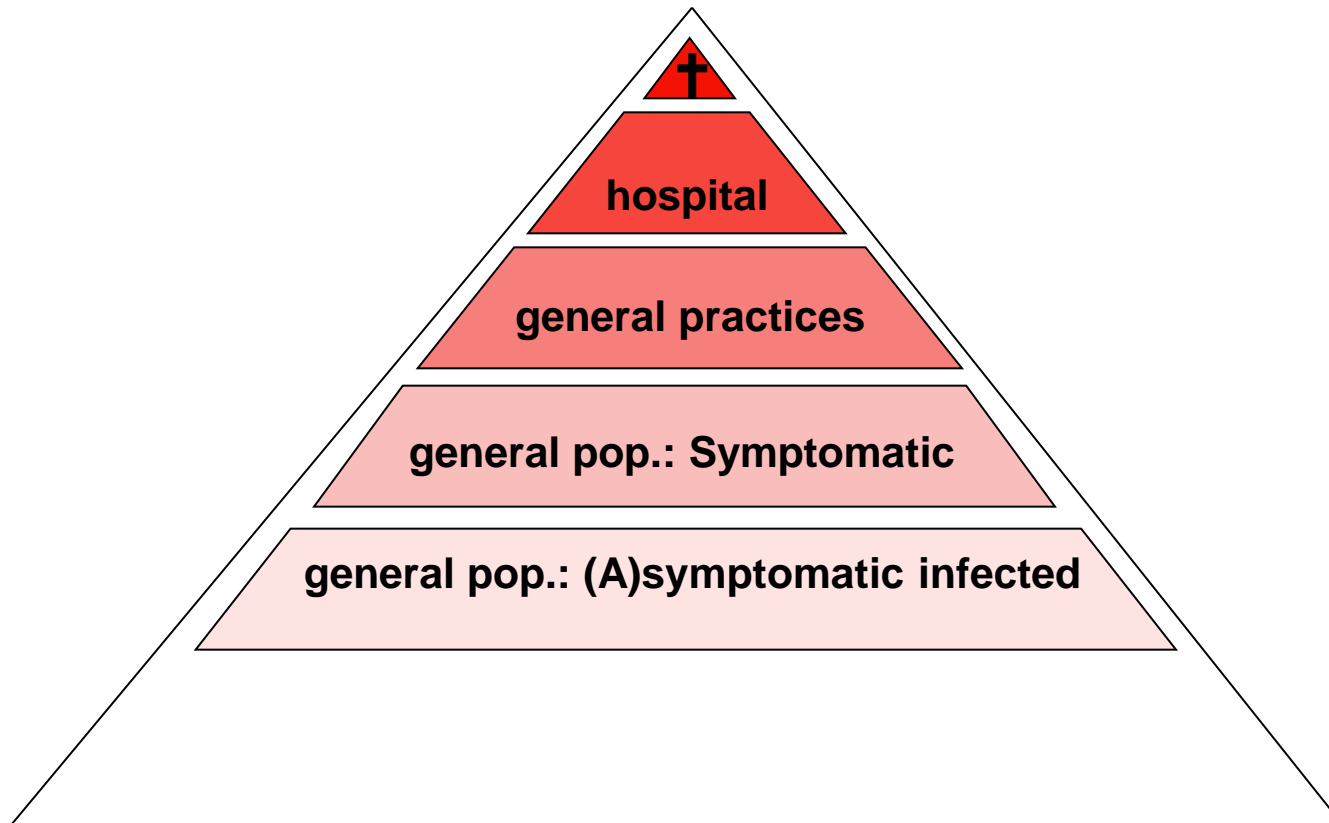
4. **Surveillance** and intervention

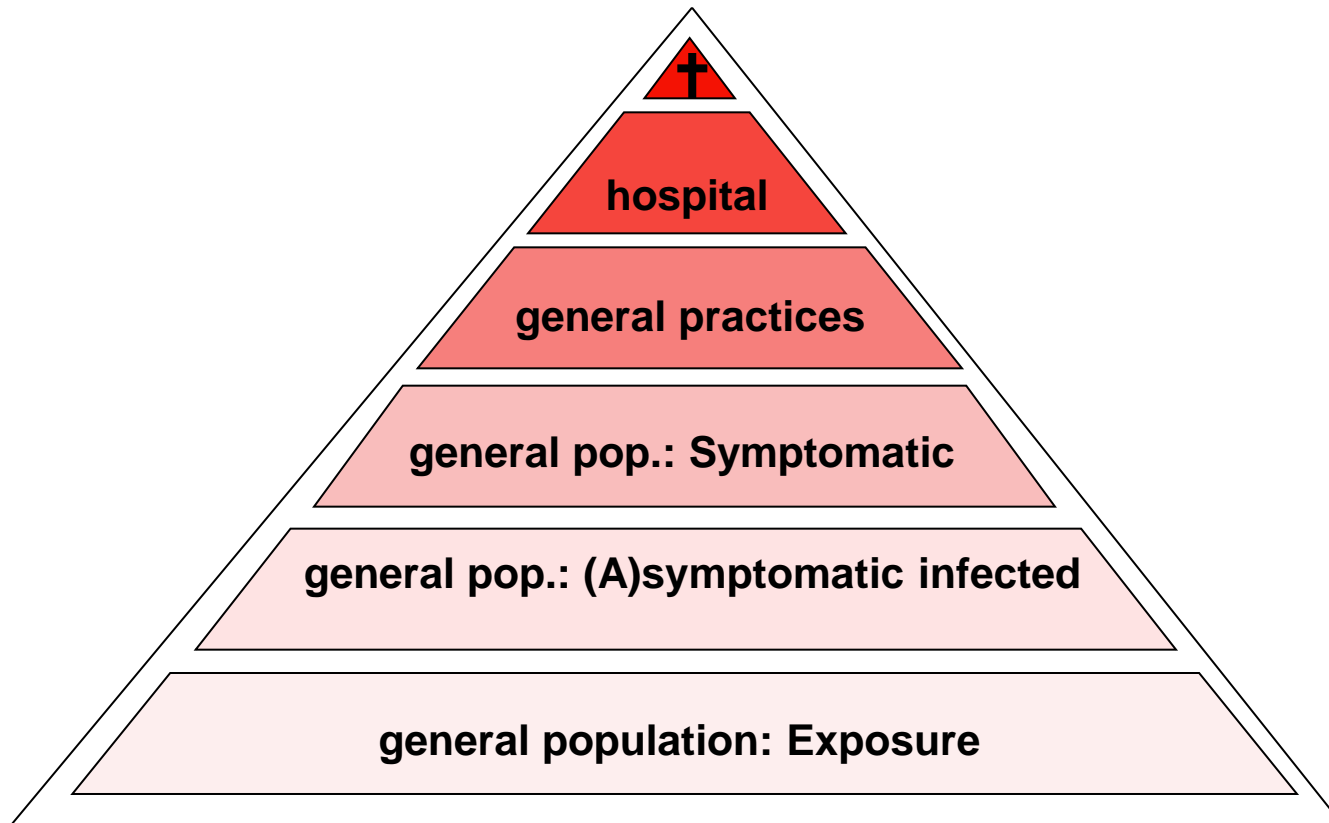


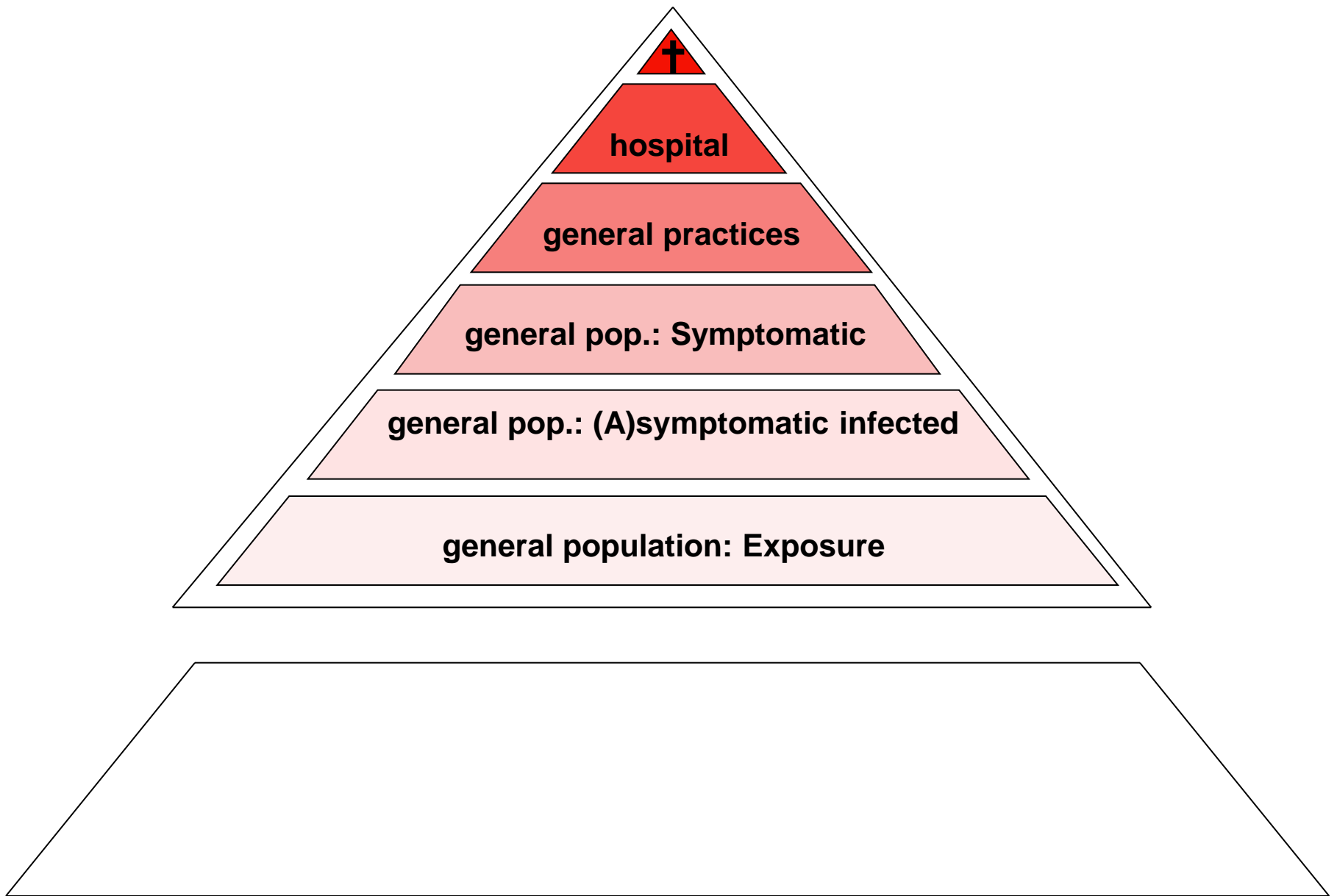


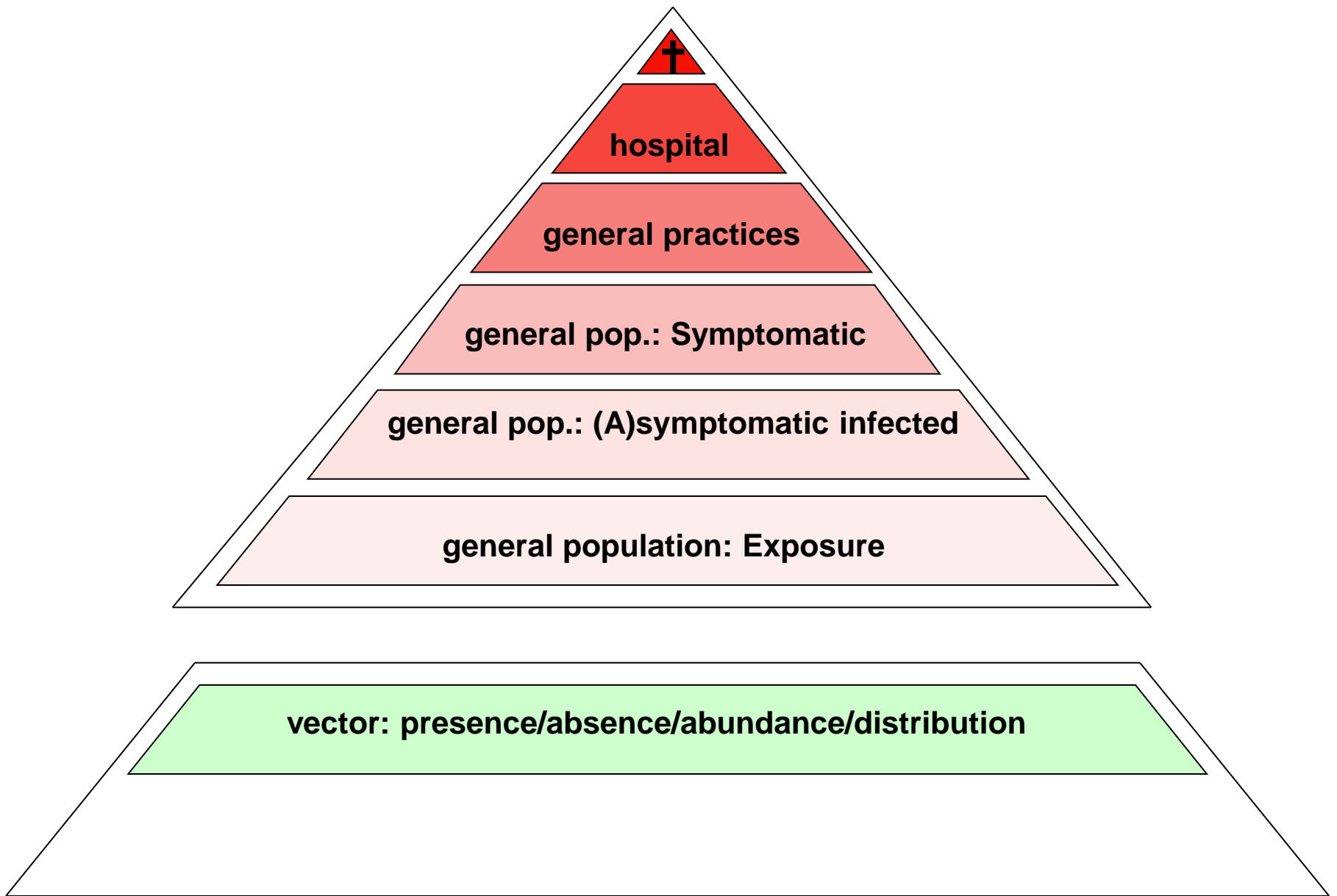


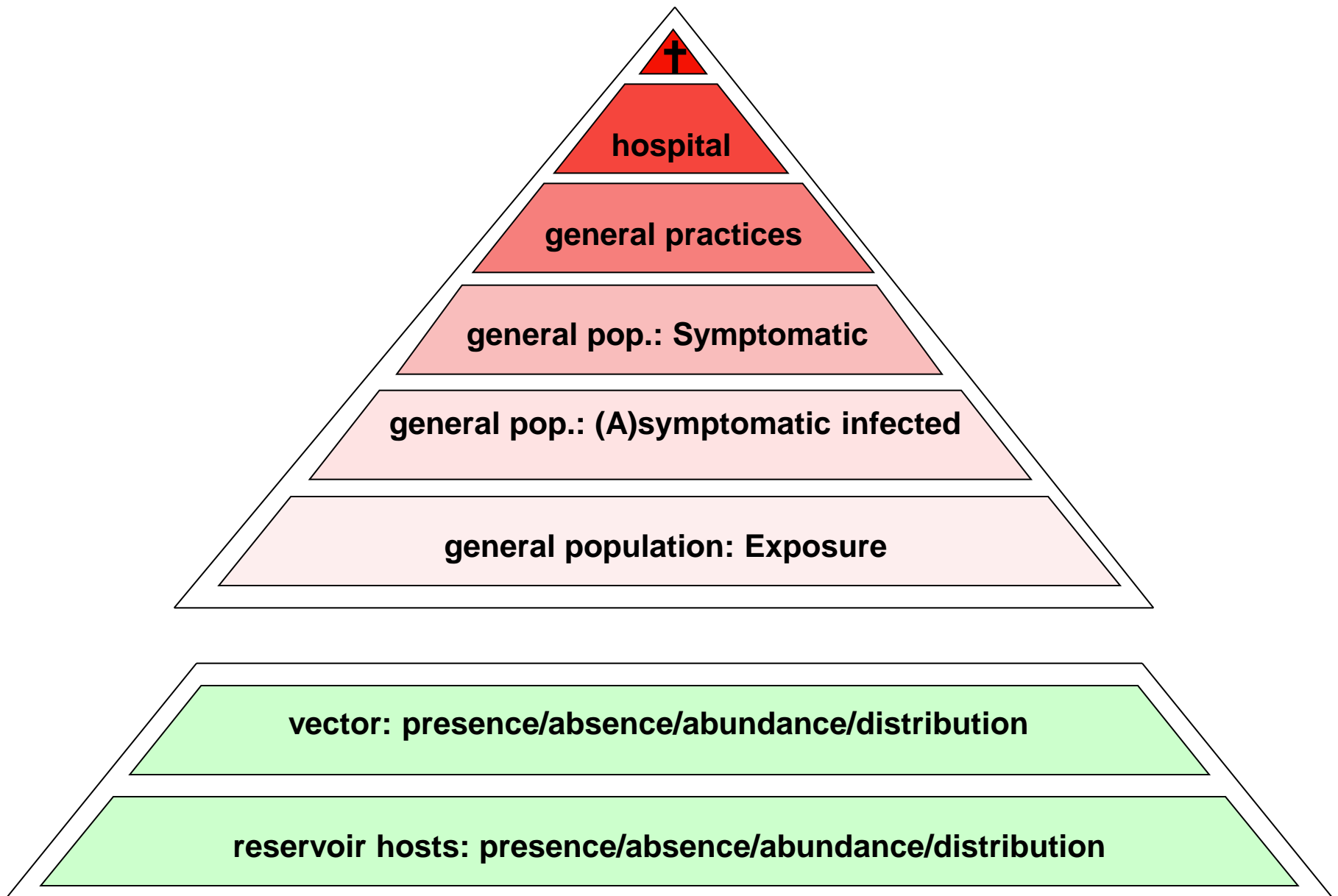


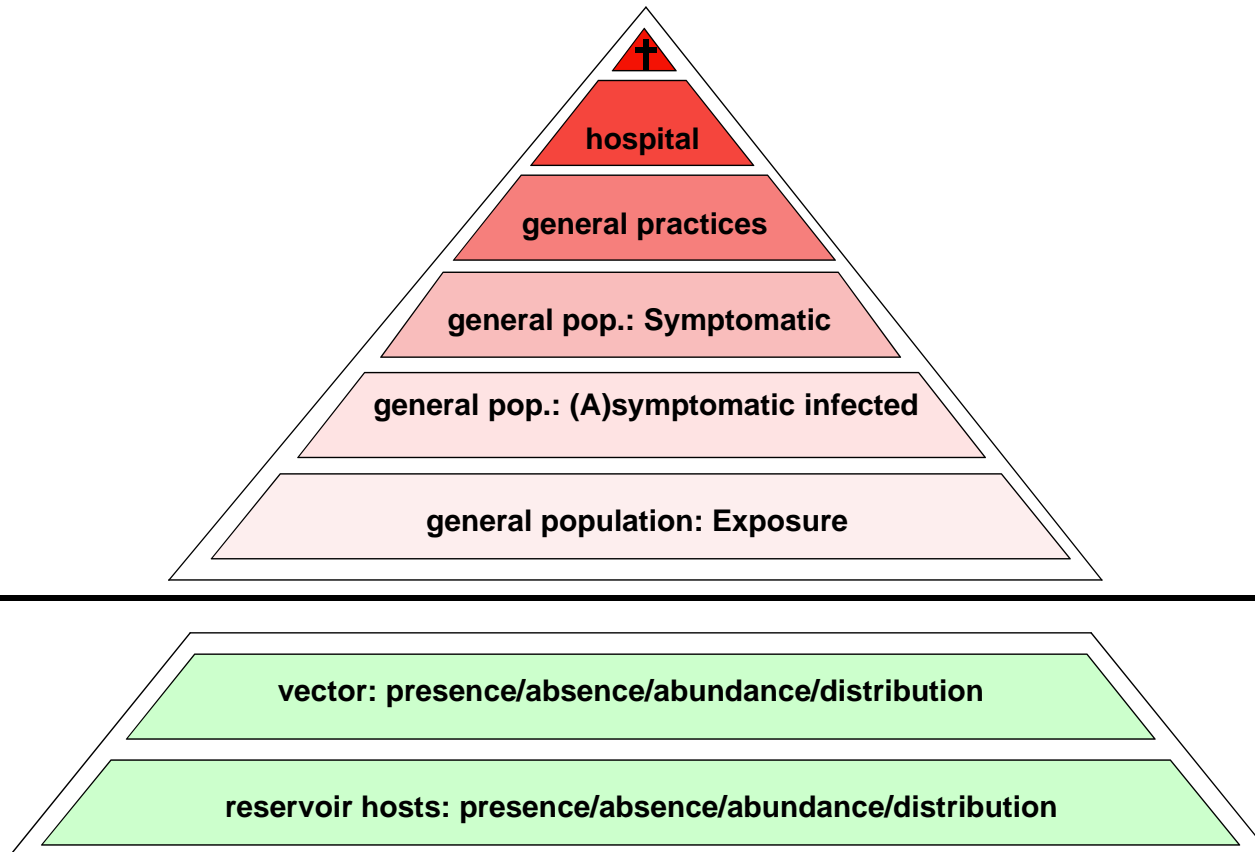


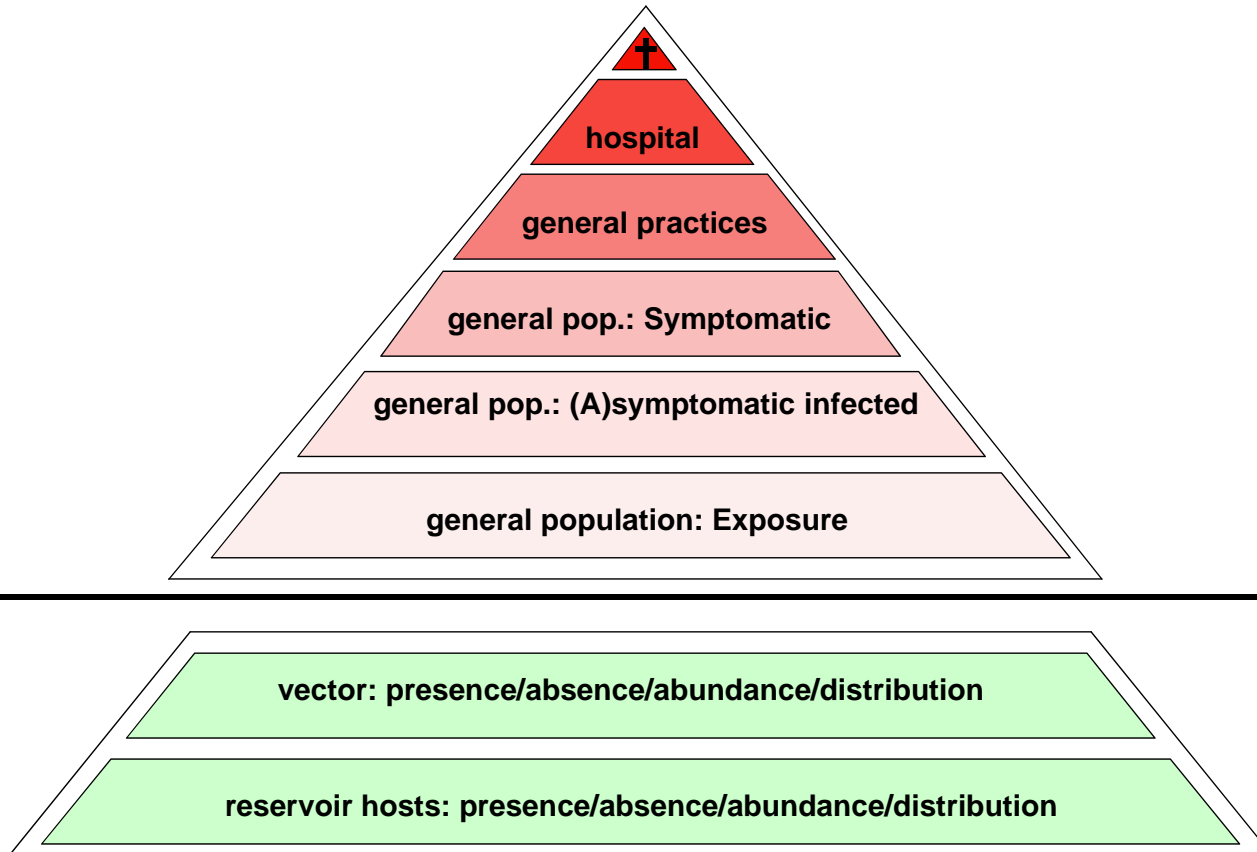




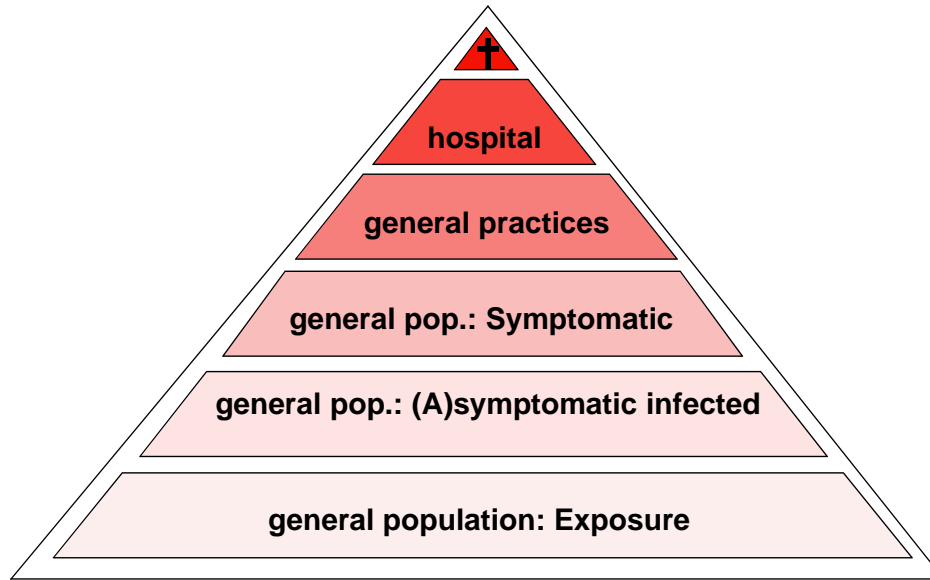




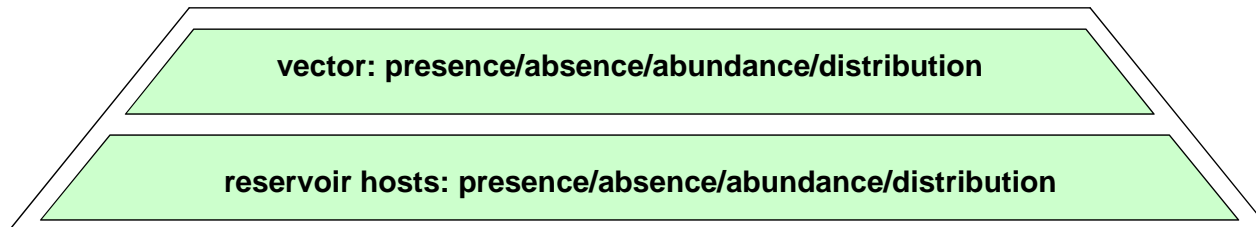




Disease burden

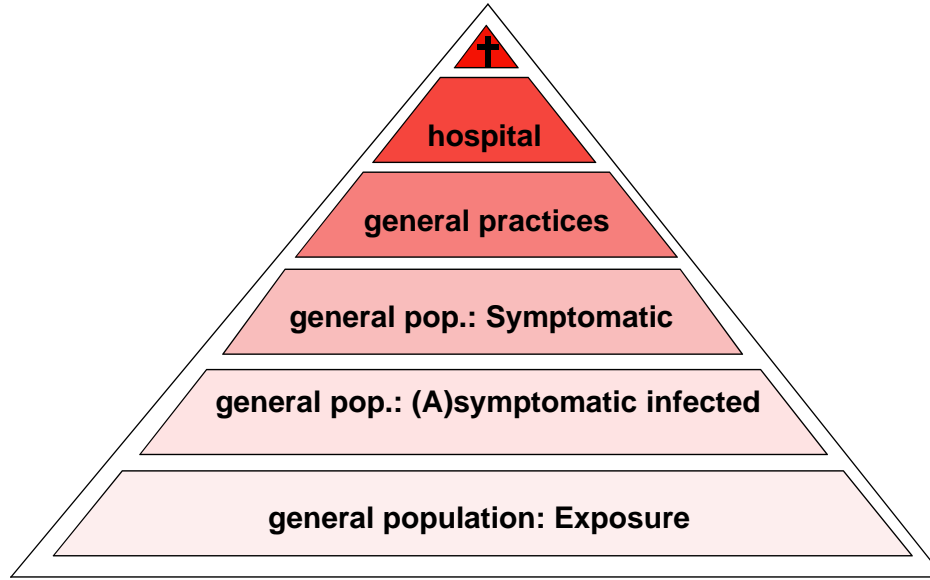


Threat

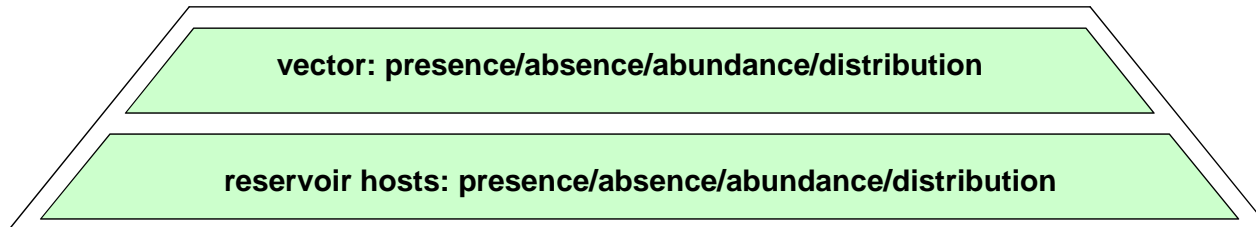


Surveillance

Disease burden

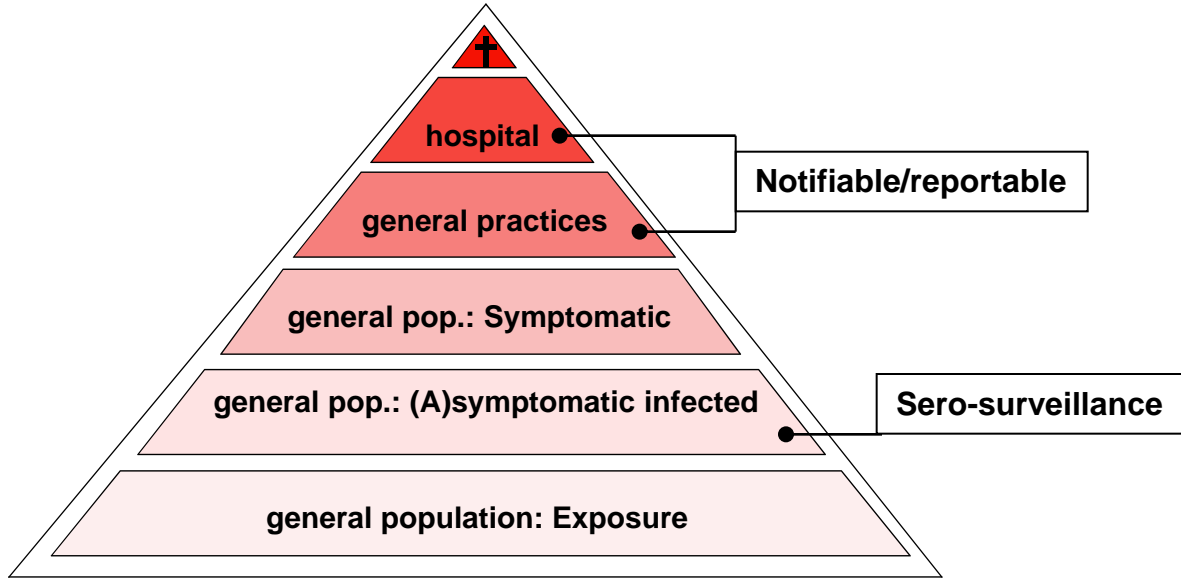


Threat

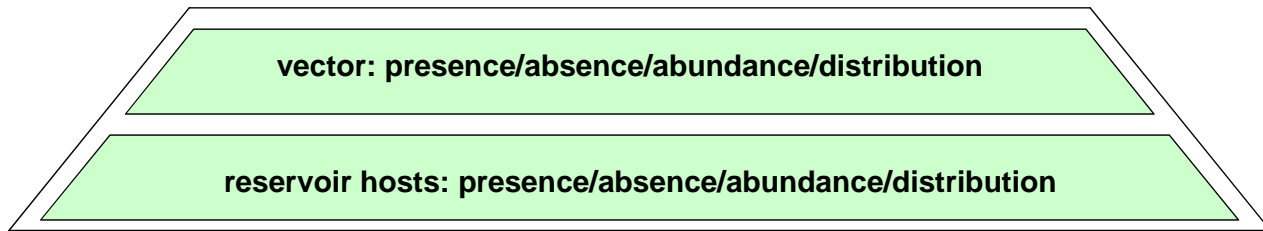


Surveillance

Disease burden



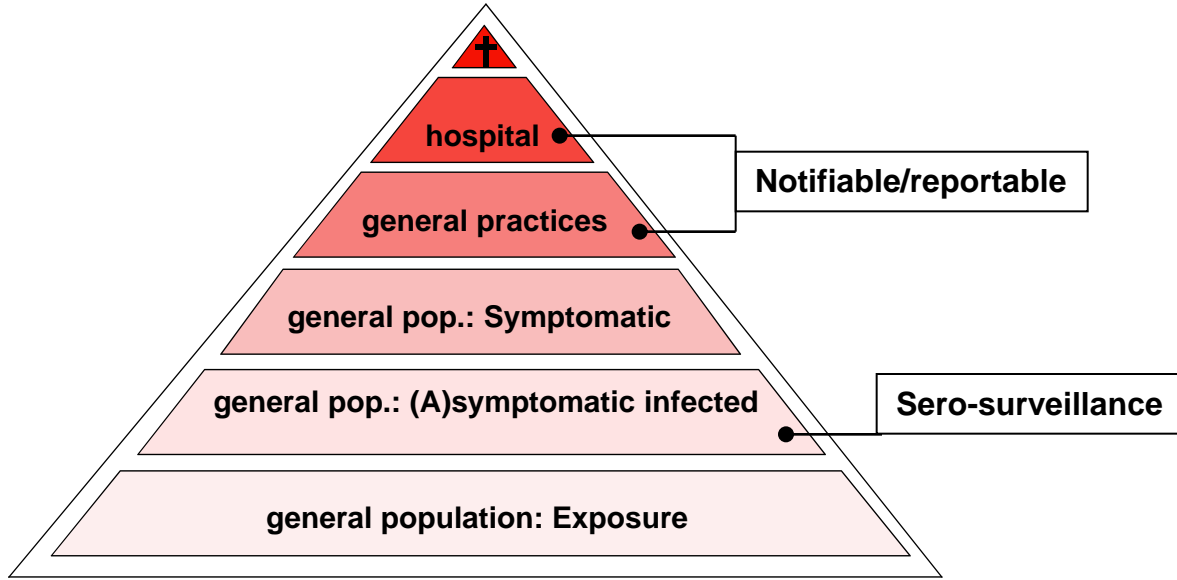
Threat



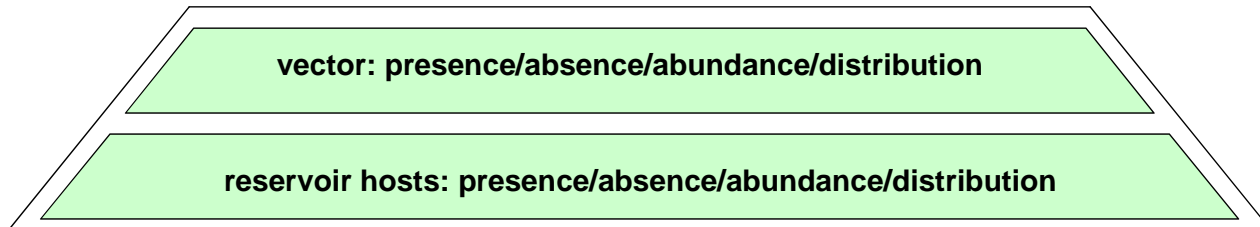
Intervention

Surveillance

Disease burden



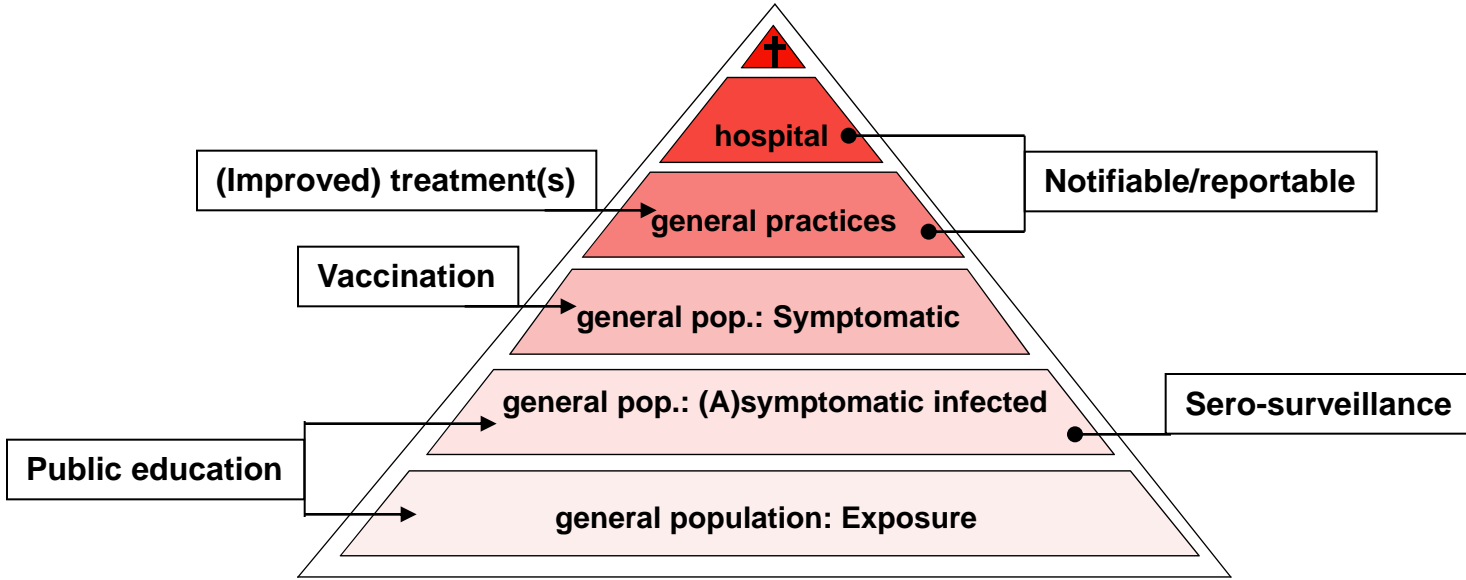
Threat



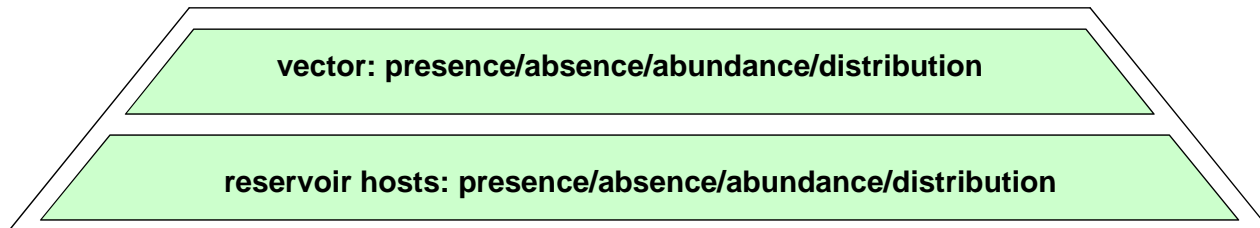
Intervention

Surveillance

Disease burden



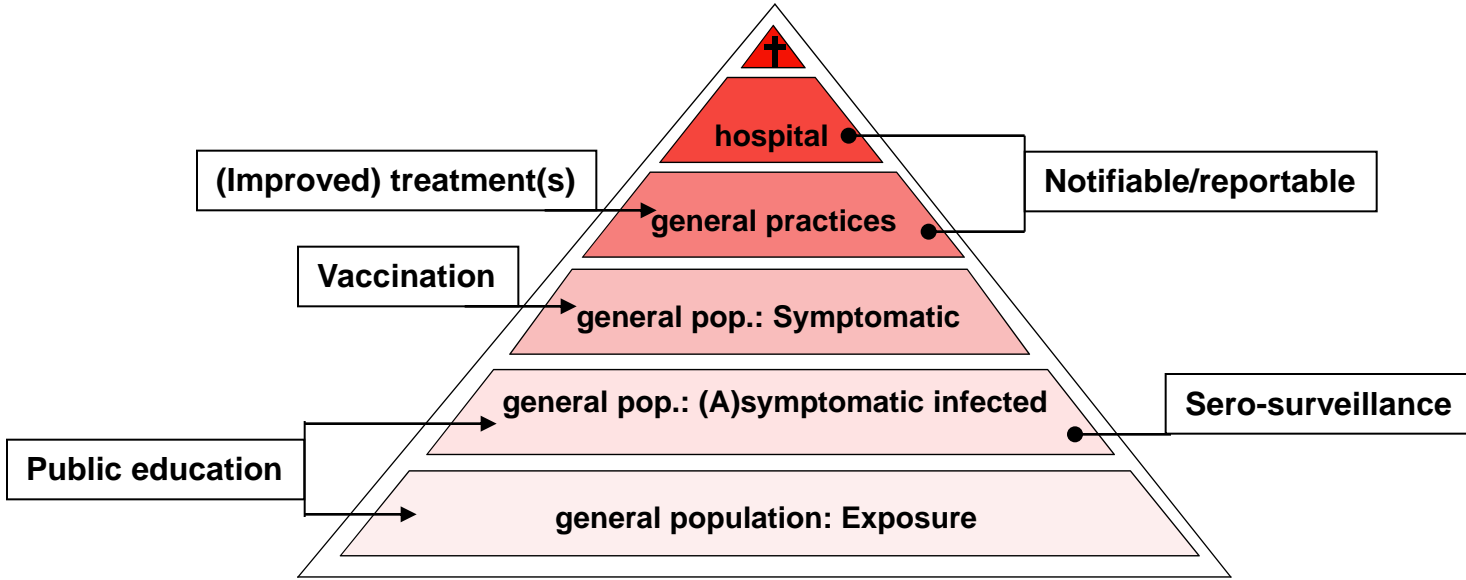
Threat



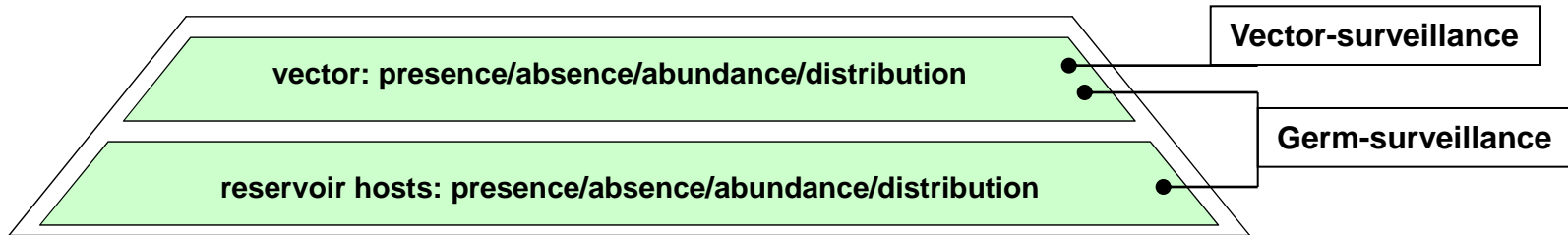
Intervention

Surveillance

Disease burden



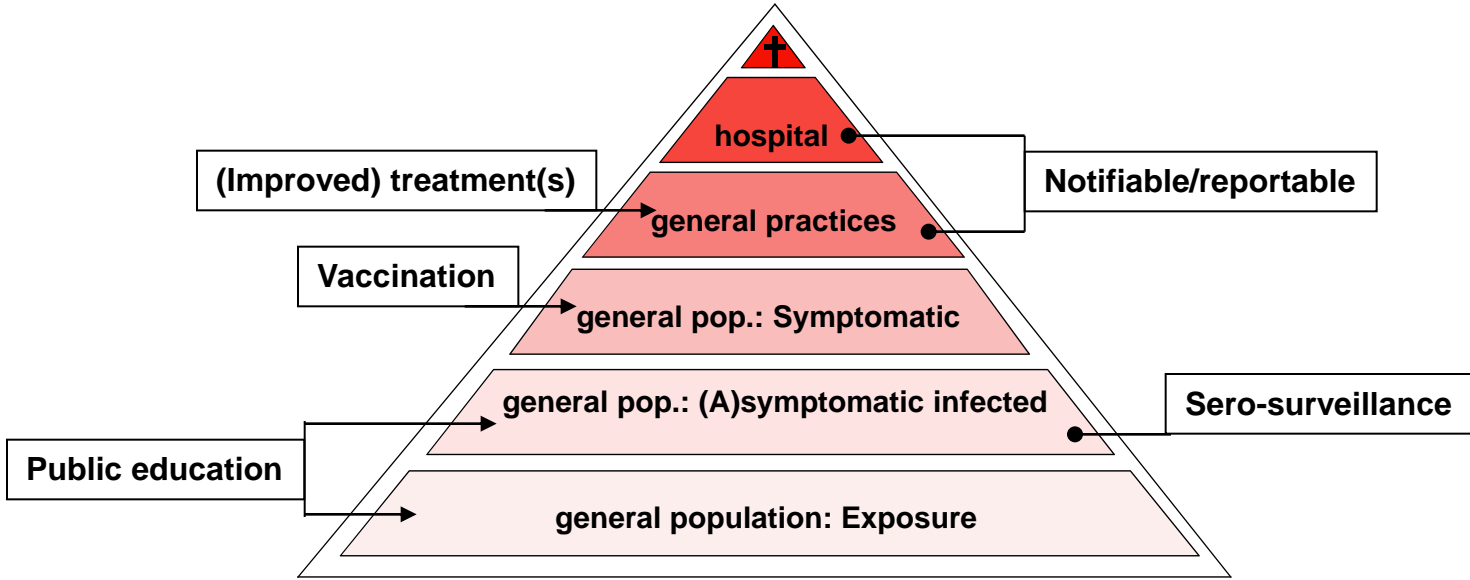
Threat



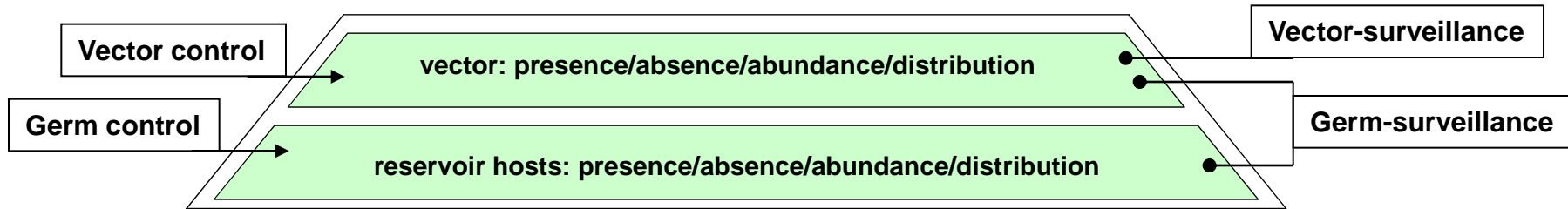
Intervention

Surveillance

Disease burden

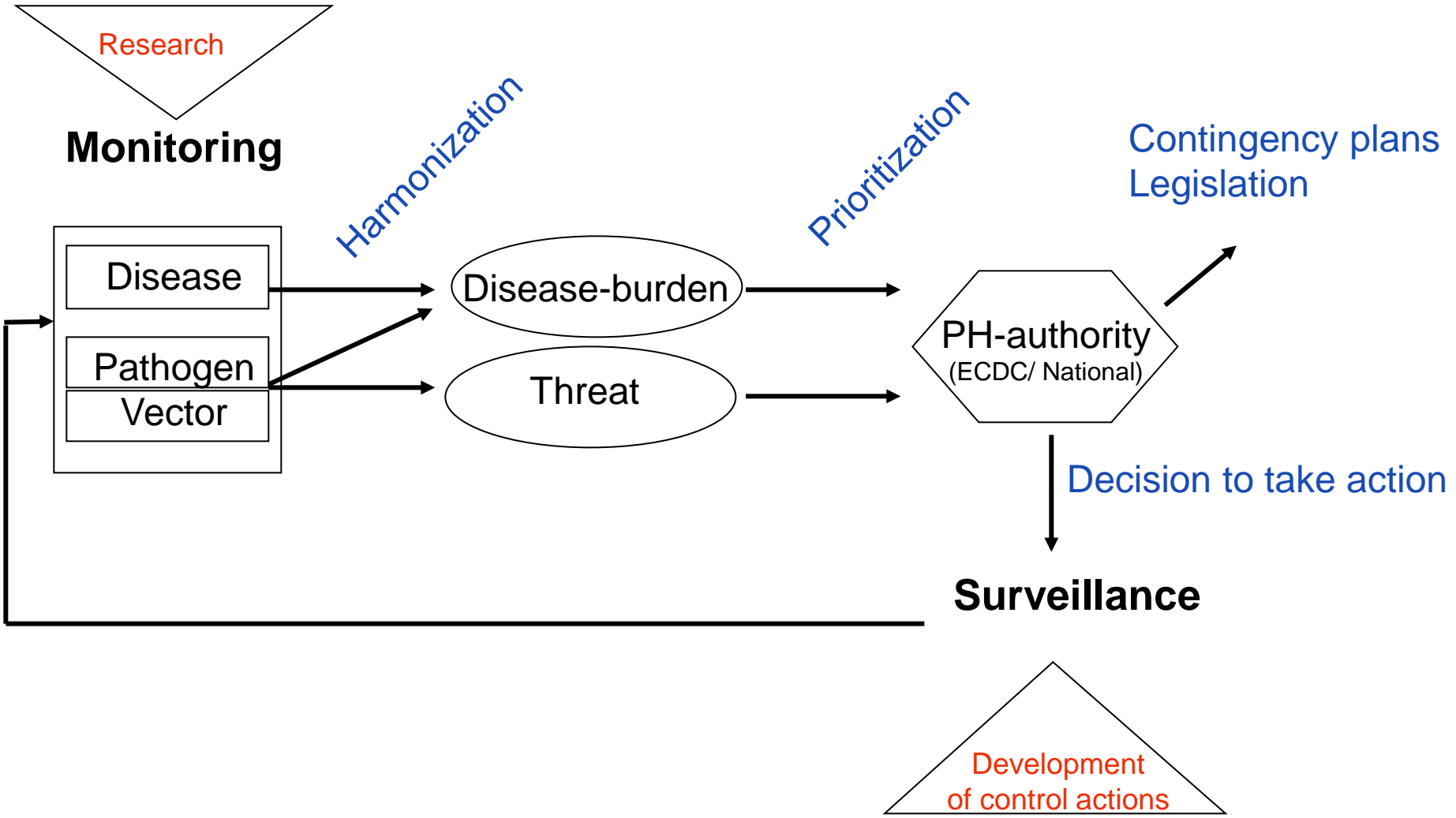


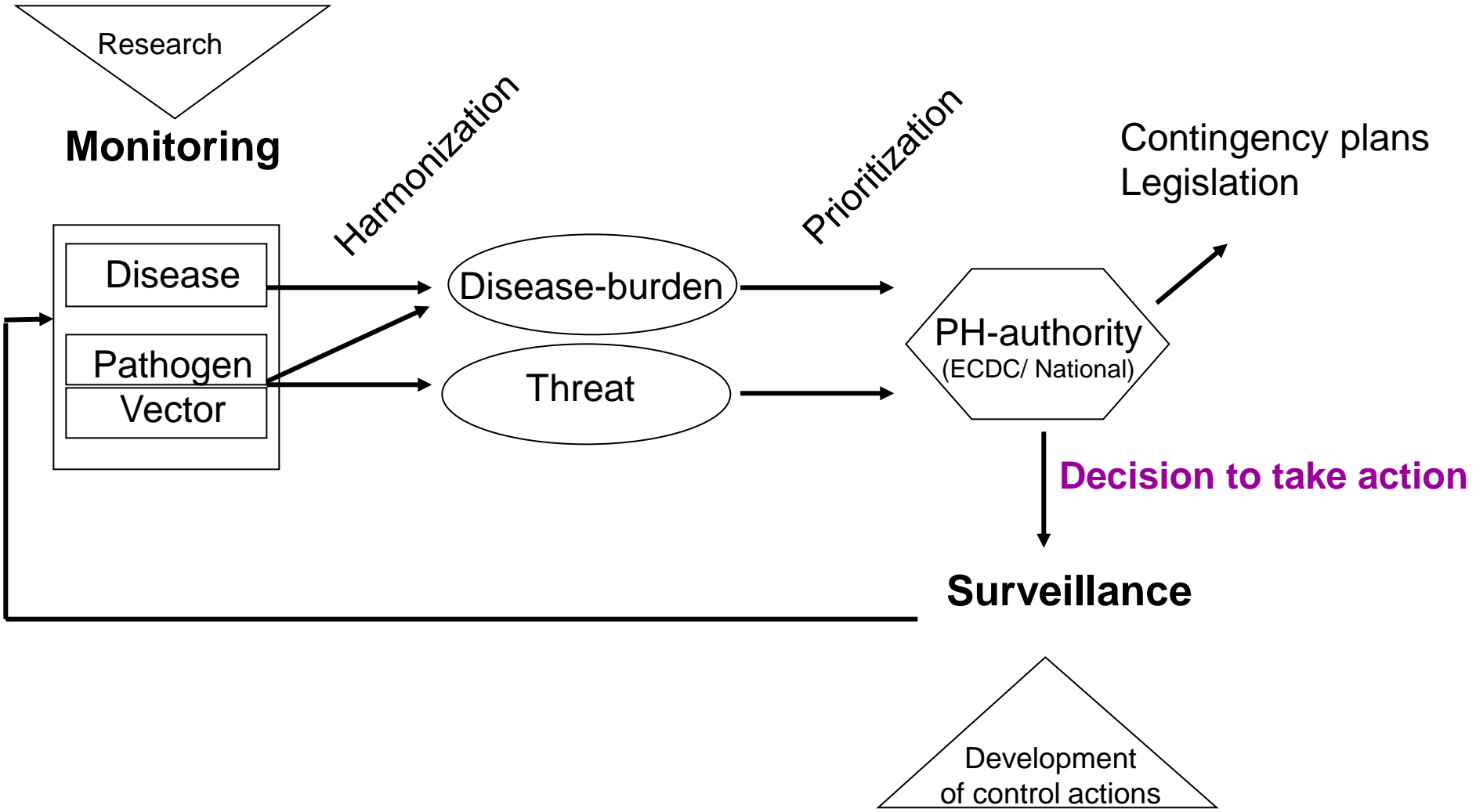
Threat

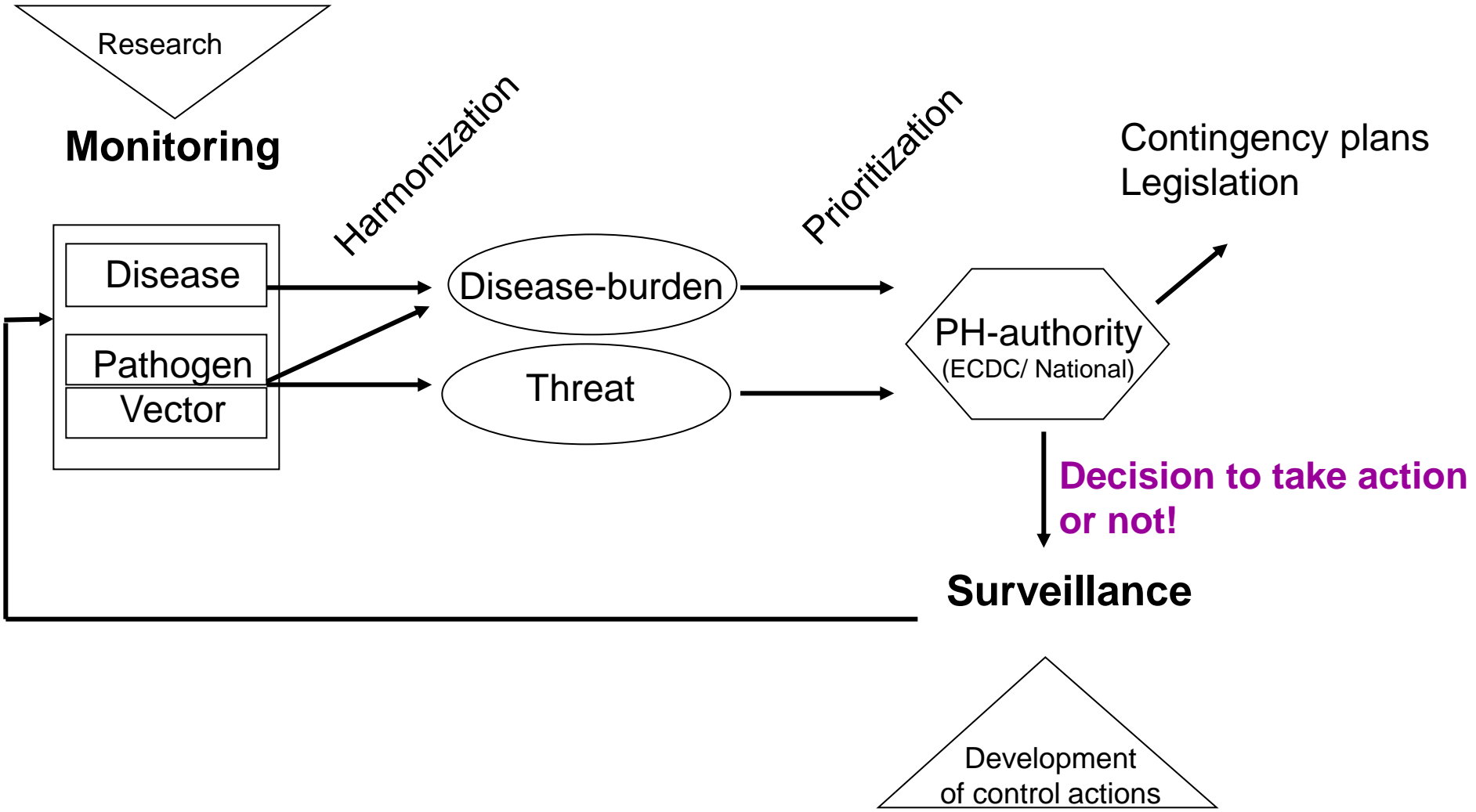


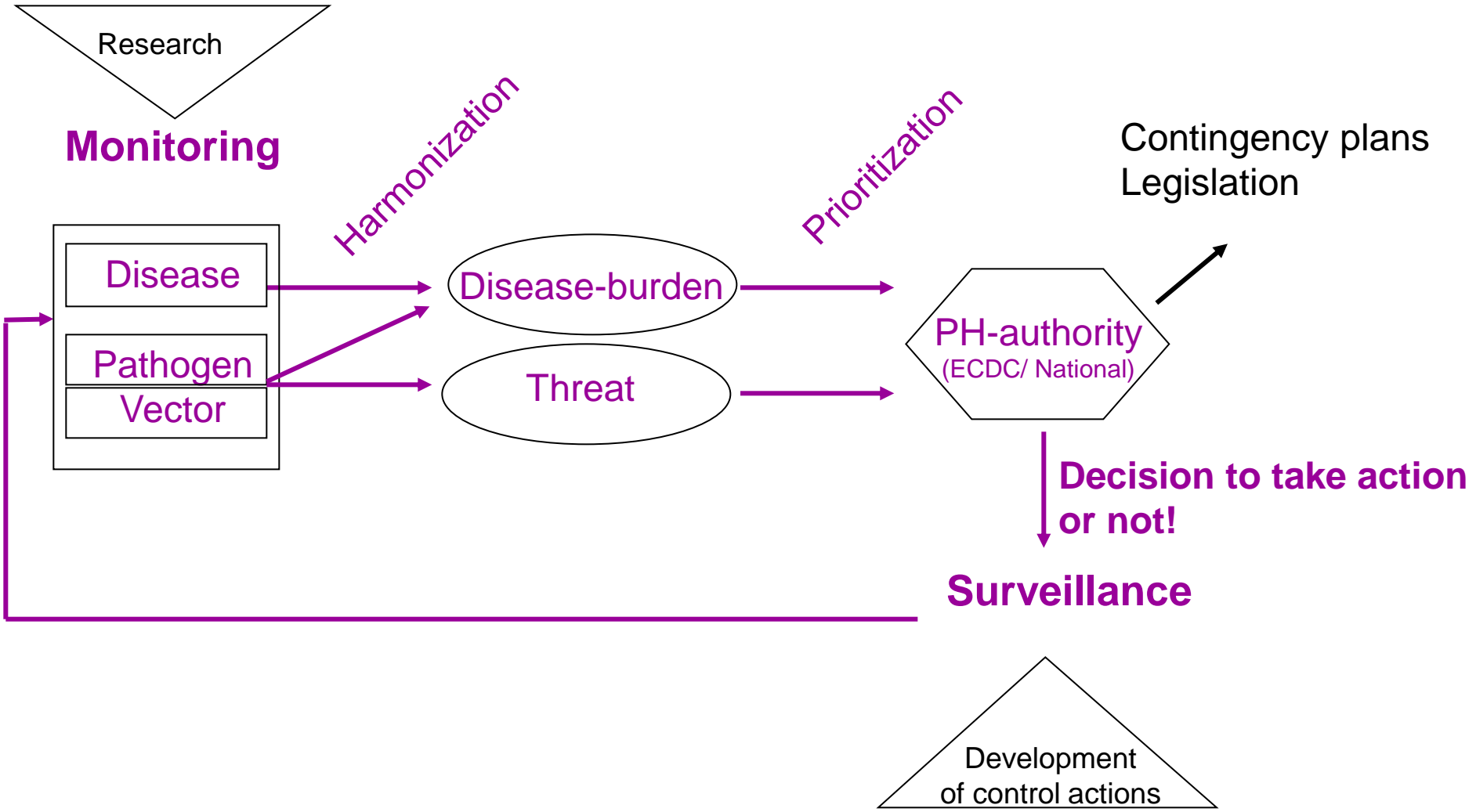


6. From monitoring to surveillance: Decision making











Qualitative data per member state



Qualitative data per member state

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

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



Questionnaire

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



Qualitative data per member state

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

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

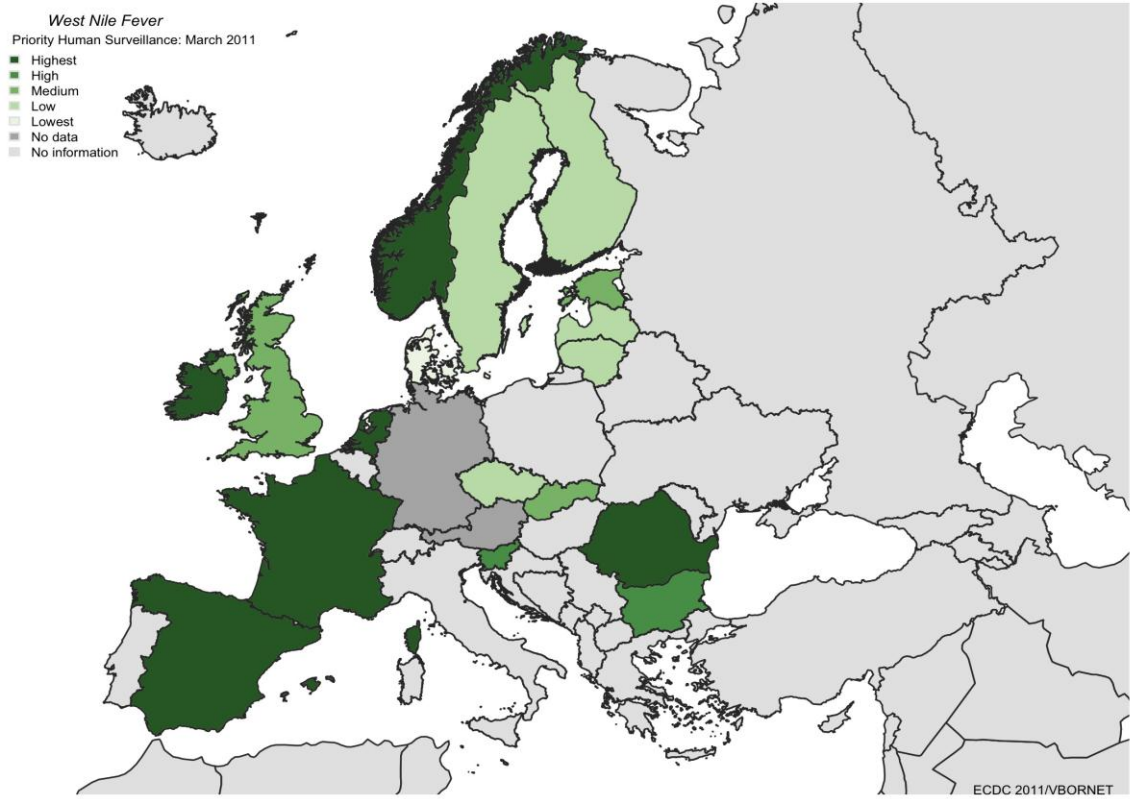


Qualitative data per member state

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

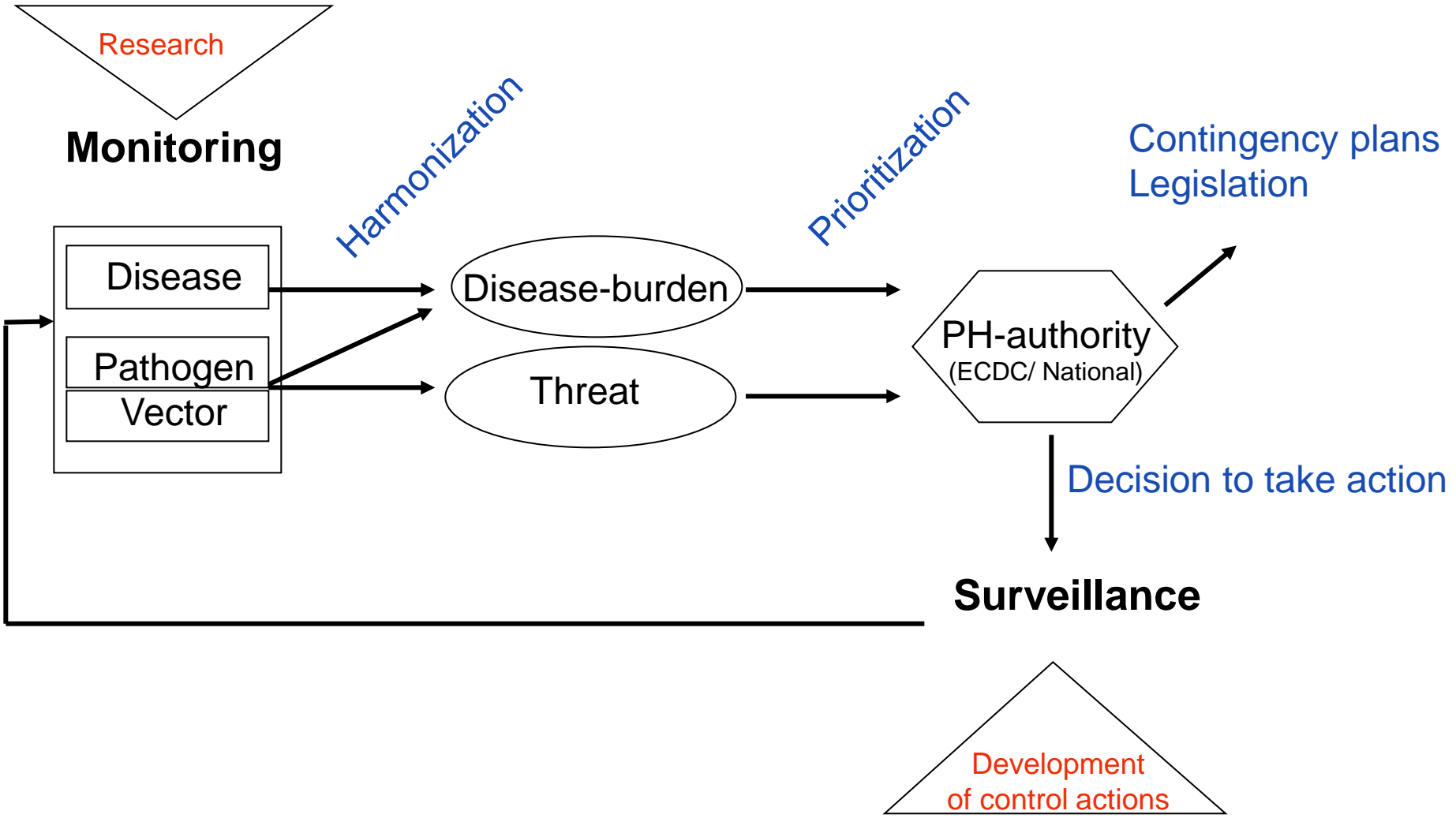


Qualitative data per VBD per member state





Quantitative data per VBD per member state





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

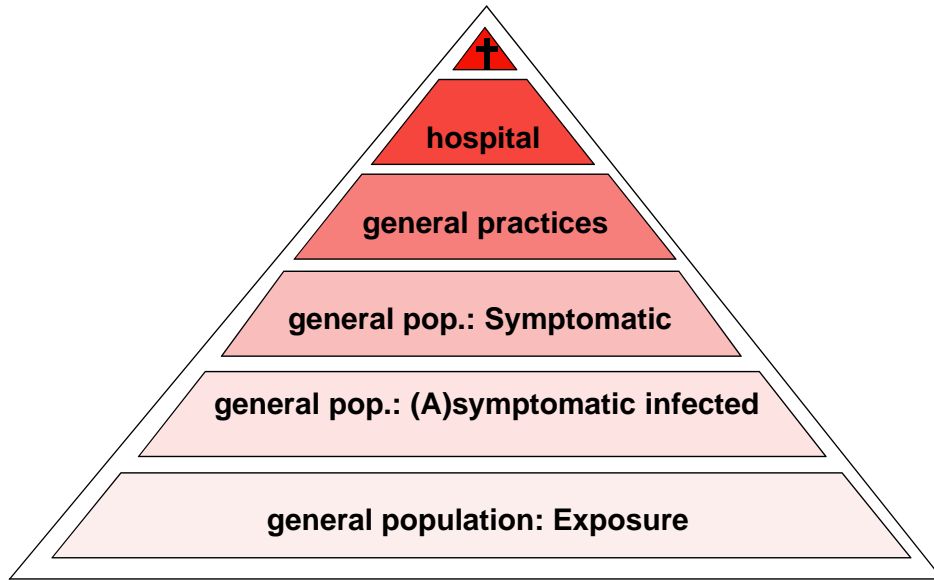
clear guidelines, description and 'formula' to calculate

1. Disease burden
2. Threat

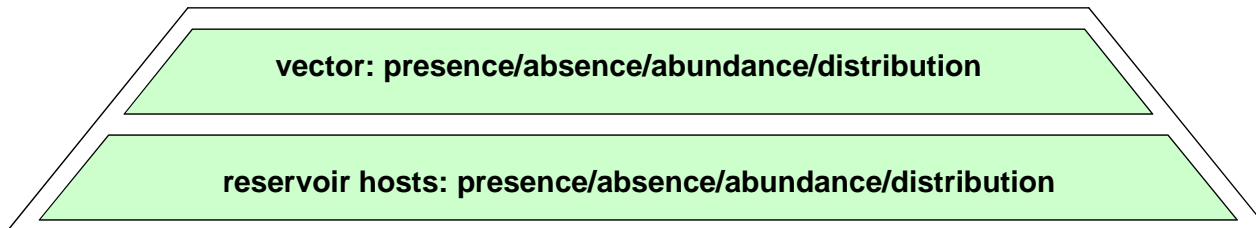
are needed.

Role for National Public Health Authorities and/or ECDC?

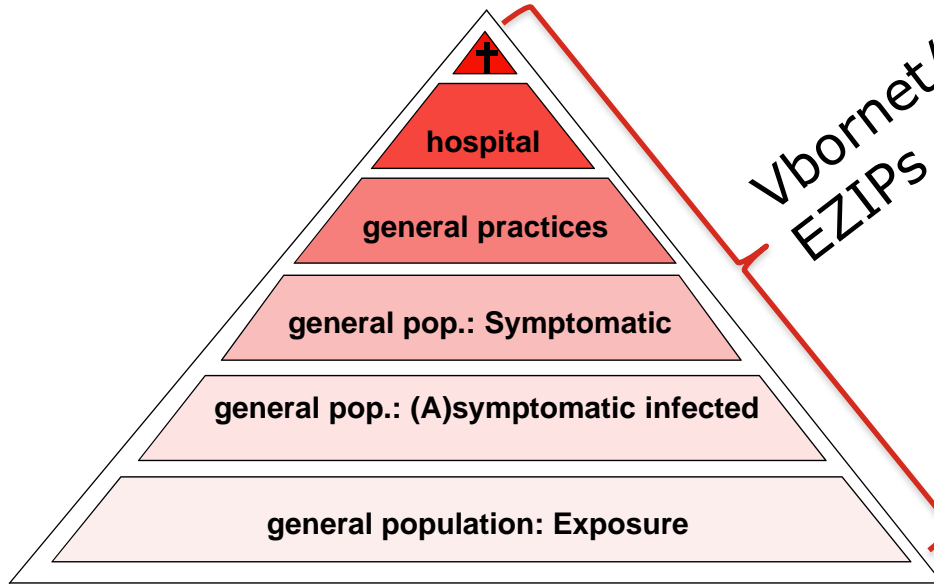
Disease burden



Threat



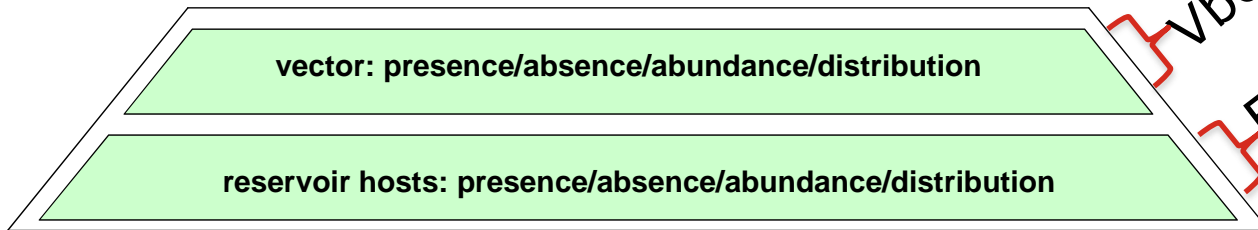
Disease burden



Vbordnet/BCode/
EZIPS

Others?

Threat



Vbordnet/ VecMap
EDENnext



Thanks

Acknowledgements

coauthors on the strategic paper:

Hein Sprong,

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C. Reusken

Vbornet consortium