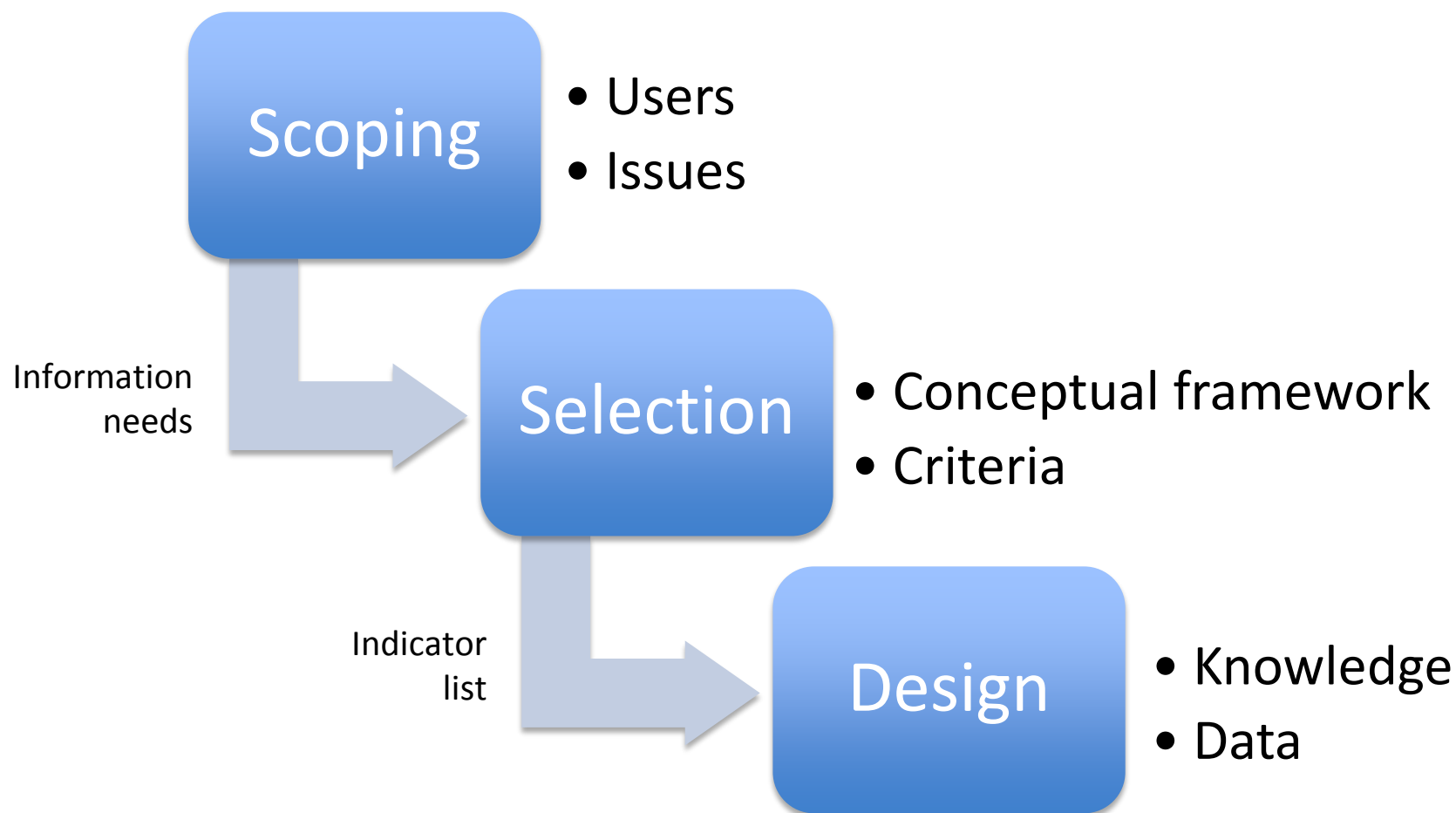
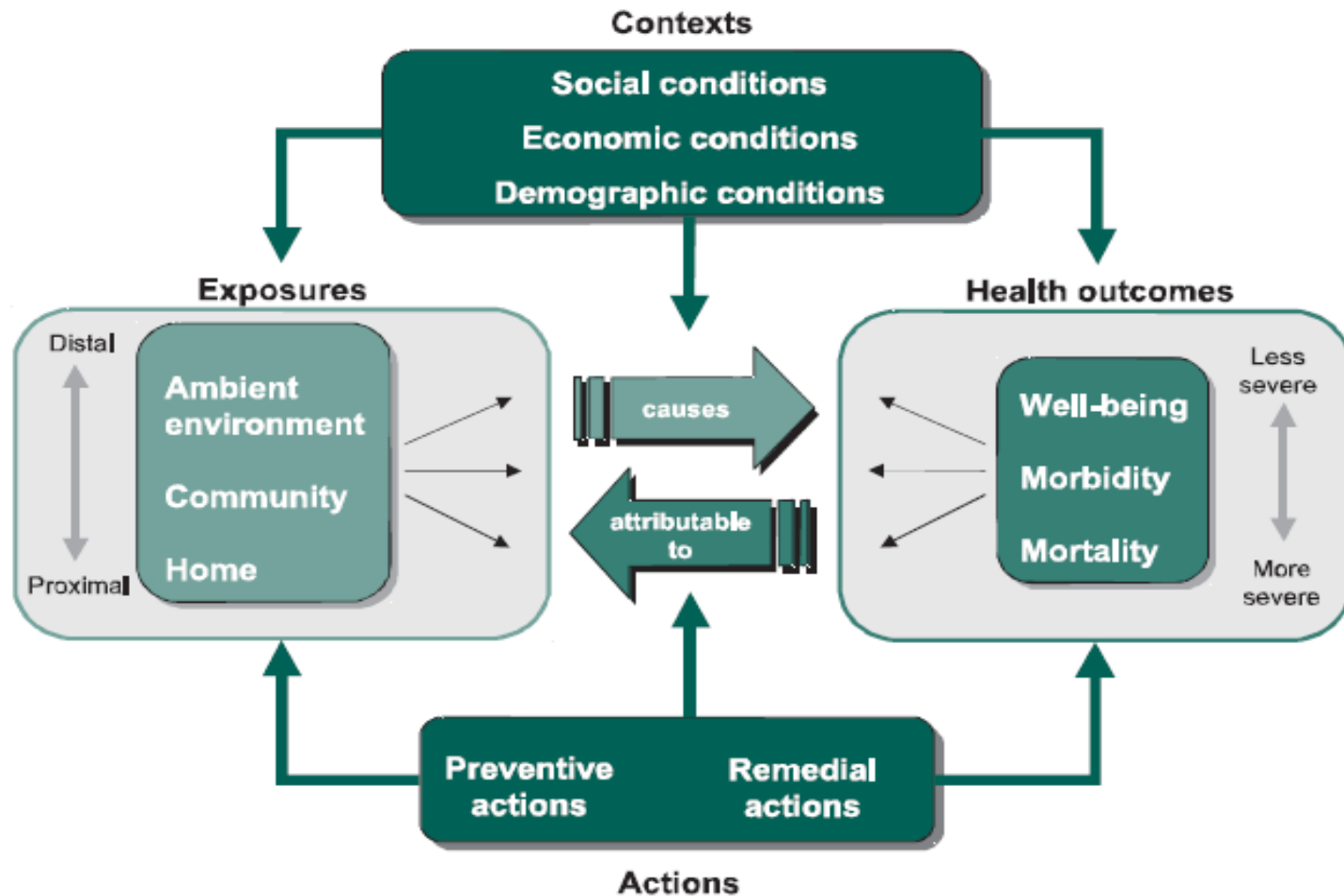


METHODOLOGY & BORDER HEALTH INDICATOR DEVELOPMENT

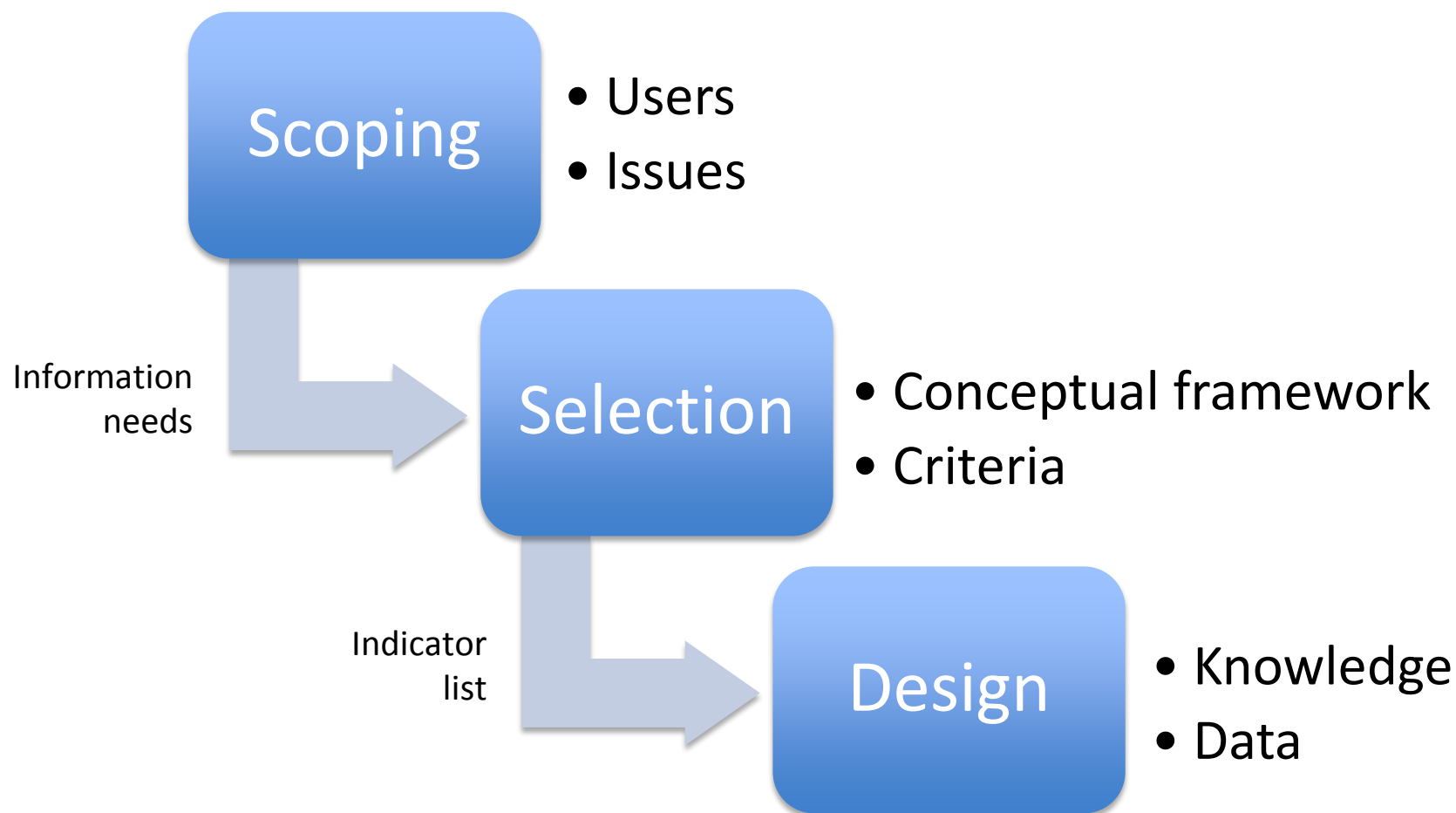
OVERVIEW



MULTIPLE EXPOSURES – MULTIPLE EFFECTS



OVERVIEW



SELECTION CRITERIA

Available
data

Scientifically
valid

Sensitive

Consistent

Comparable

Sound
measurement

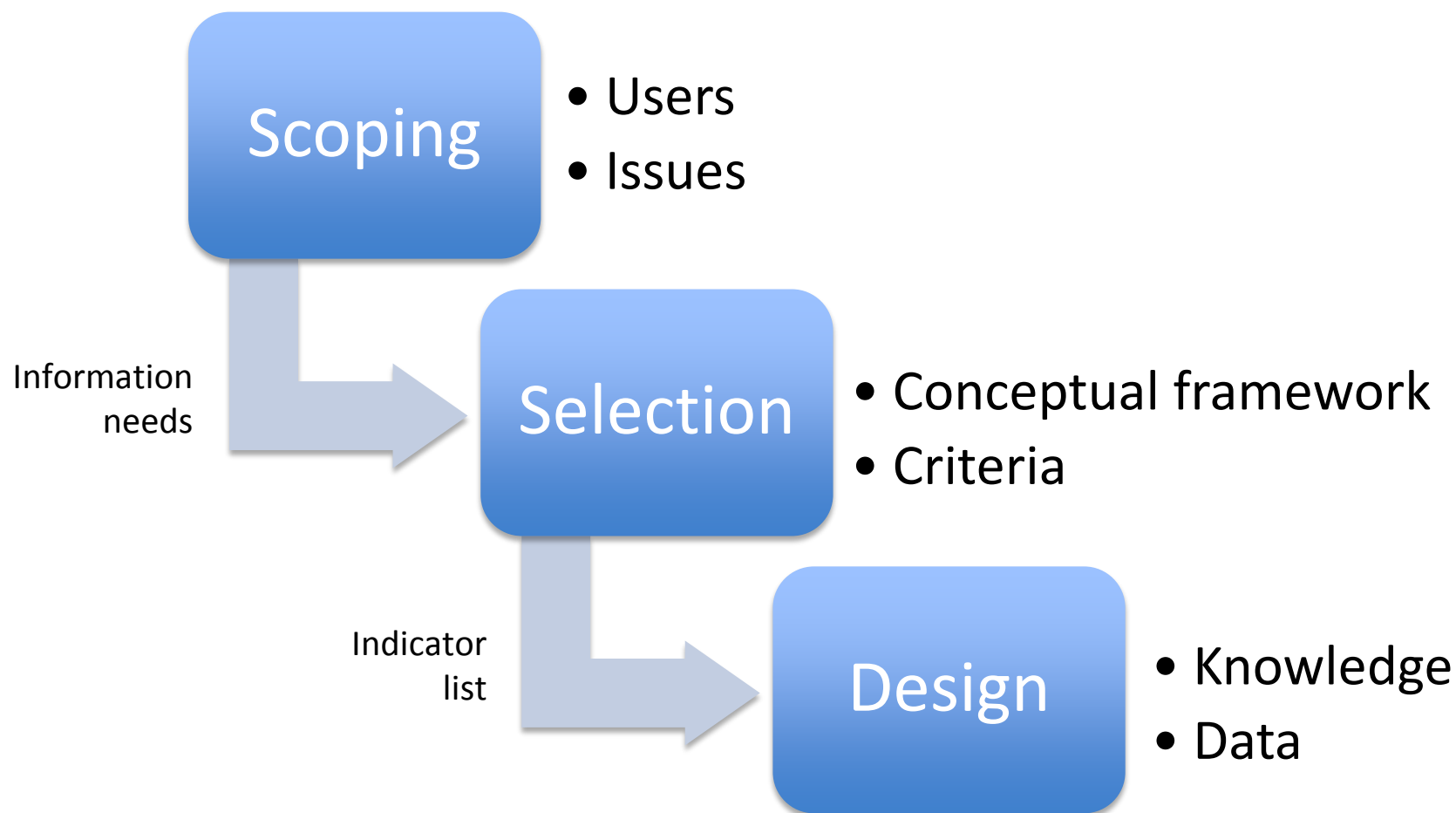
Intelligible

Able to be
disaggregated

Timely

Public health
impact

OVERVIEW



SCOPING

USERS

- Central Government
- Local Government
- Border agencies
- Interested individuals

BORDER HEALTH

- Priorities: Exotic human infectious diseases; Vector-borne diseases & mosquito movement
- Challenges: Large scope, data limitations

SCOPING

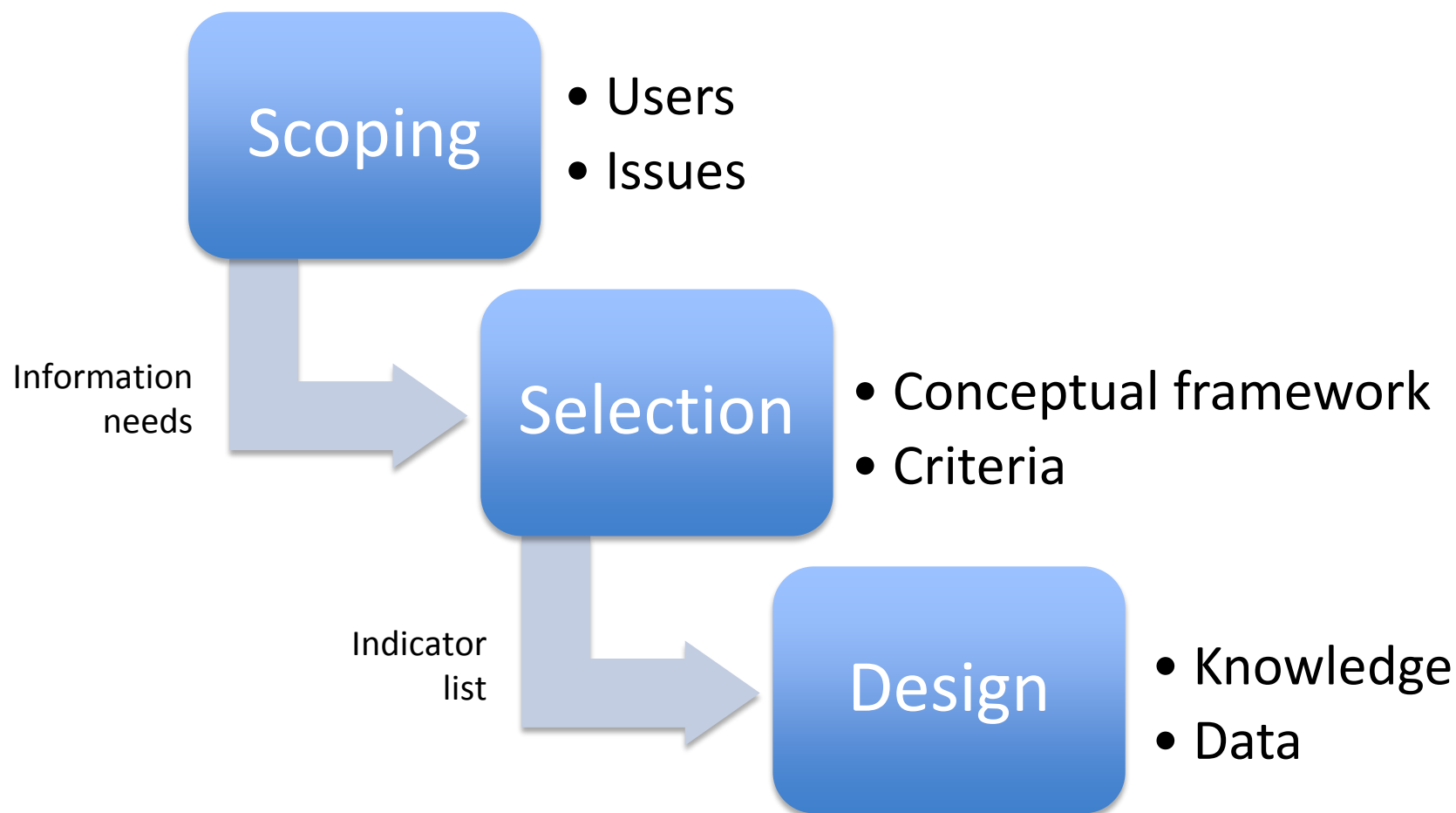
USERS

- Central Government
- Local Government
- Border agencies
- Interested individuals

PURPOSES

- To identify priority border health issues, and populations vulnerable to these
- To monitor the effectiveness of New Zealand's border health protection policies and activities
- To support border health decision-makers

OVERVIEW



GLOBAL CONTEXT

Population growth → closer human-animal interactions and disease emergence
Globalisation → transport and trade increases
Global Environmental Changes e.g. climate change, biodiversity loss
→ vector migration, disease emergence

PATHWAY 1: CROSS-BORDER MOVEMENT OF EXOTIC HUMAN DISEASES

PRE-BORDER

Overseas exotic notifiable diseases
of high-risk to New Zealand

Travel and migration to New
Zealand from exotic locations

BORDER

Exotic notifiable diseases
present at the New Zealand
border

POST-BORDER

Health outcome: Exotic notifiable
diseases in New Zealand
-cases & outbreaks
-potentially disproportionate
impacts on vulnerable groups
-indirect health effects, e.g.
movement restrictions, collapse
of essential services
Māori health impacts

PATHWAY 2: CROSS-BORDER MOVEMENT OF HIGH-RISK VECTORS/ PESTS

PRE-BORDER

Overseas high-risk human-disease
competent vectors/ pests

Trade (movement of high risk vessels
and cargo) to New Zealand

BORDER

High-risk human-disease competent
vectors/ pests present at the New
Zealand border

POST-BORDER

High-risk human-disease
competent vectors/ pests
introduced to New Zealand

Destruction of indigenous species

New Zealand climate change
facilitates internal spread of
vectors

PREVENTION & CONTROL ACTIONS

e.g. Biosecurity Act 1993; Biosecurity Strategies 2003, 2015; Health Act 1956 and Health Regulations; International Health Regulations 2005; National human and animal disease surveillance, including at points of entry, and transitional facilities; Public and professional biosecurity and public health reporting mechanism (e.g. hotlines); Public health and biosecurity response capabilities.

PREVENTION
e.g. Travel advisories,
import standards

CONTROL
e.g. Port of entry
surveillance

CONTROL
e.g. Public health and
biosecurity responses

SELECTION

Indicator	Definition	Data source(s)	Environmental Health Indicator Selection Criteria									
			Available data	Scientifically valid	Sensitive	Consistent	Comparable	Methodologically sound measurement	Intelligible and easily interpreted	Able to be disaggregated	Timely	Public health impact
The Cross-Border Movement of Exotic Human Diseases												
Post-border health outcome: Imported exotic notifiable diseases in New Zealand												
Public Health Emergencies of International Concern (PHEIC) in New Zealand, and other priority exotic infectious disease of concern detected in New Zealand	Annual incidence of diseases classified as PHEICs and priority notifiable respiratory and vector-borne diseases (VBD) imported in to New Zealand (by DHB, ethnicity, origins of disease)	EpiSurv (ESR)	Y	Y	Y	Y	Y*	Y	Y	Y	Y	Y
Post-border exposure/ Māori health indicator: New Zealand indigenous species affected by exotic pests												
The presence and impact of exotic pests on New Zealand's indigenous species	Occurrence of invasive marine organisms, plants and animals; Impact of pests on indigenous species	Te taiao indicators (Statistics NZ and MfE)	Y	Y	N – trends not shown	Y	N/A	Y	Y	Y	Variable	Does not represent problem complexity
Border exposure/action: Exotic notifiable diseases intercepted at the New Zealand border												
Exotic disease events at the New Zealand border	Number of infectious disease responses by	Annual Border Health Return	Y	Y	N	N	?	N	Y	Y	Y	Y

SELECTION

Human pathway

- **Post-border:** Annual frequency of border health priority disease notifications in New Zealand
- **Pre-border:** Annual overseas distribution of border health priority disease outbreaks, with focus on the Asia-Pacific

Vector pathway

- **Post-border:** Annual number of exotic mosquito species known to be established in New Zealand
- **Border:** Annual frequency of high-risk pests intercepted at New Zealand's border

HIGHLIGHTS:

- No cases of any 'Public Health Emergency of International Concern' of priority border health concern, in cases of mosquito-borne diseases more than do often within the Asia-Pacific region.
- All mosquito-borne diseases were diagnosed at the time of arrival.
- There were age, gender, ethnic and regional differences.

Exotic diseases are bad for border health. This indicator explores how New Zealand health and border services can pose a greater risk because New Zealanders are not immune to the diseases.

- New Zealanders are not immune to the diseases.
- they spread easily
- they can cause severe illness
- they are difficult to treat
- High-risk exotic diseases include:
 - any disease classified as a 'Public Health Emergency of International Concern' (WHO) - these pose a high international concern
 - severe respiratory diseases with high mortality
 - and specific vector-borne diseases that cause fever, joint pain, bleeding, and other symptoms

No 'Public Health Emergency of International Concern' During 2011-15, there were two 'Public Health Emergencies of International Concern' (WHO) of these diseases reported.

No severe exotic respiratory diseases During 2011-15, there were no cases of these diseases reported.

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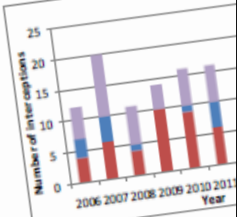
HIGHLIGHTS:

- On average, there were nine border interceptions each year from overseas, 2006-15. Most (>80%) interceptions were of high-risk mosquito species of public health concern.
- Fifteen types of high-risk mosquito species of public health concern were intercepted. They are capable of spreading disease.
- Most (73%) intercepted suspected mosquitoes originated from Australia was by far the biggest source by country.
- Most suspected mosquitoes came by sea and air.

Foreign pests, particularly mosquitoes, are bad for border health. Insects, especially mosquitoes, are experts at hitchhiking in puddles on ships. Exotic mosquitoes are high risk for spreading mosquito-borne diseases (e.g. Dengue Fever, Malaria). Various international activities help prevent pests from entering New Zealand. Frequent spraying with insecticide, and freight cargo surveillance takes place at New Zealand's border. Mosquitoes to prevent them from establishing, where they are coming from, and how they are spread.

Suspected mosquito interceptions of foreign origin

A total of 149 interceptions of suspected foreign origin between 2006 and 2015 (Figure 1)



Data Source: NZ BioSecure, 2016a

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HIGHLIGHTS:

- No new exotic mosquitoes were introduced.
- As of 2015, there are three long-established exotic mosquito species in New Zealand.
- The Southern Saltmarsh Mosquito (*Aedes albopictus*) was eradicated in 2010.

Exotic mosquitoes can be bad for our health. Exotic mosquitoes can spread mosquito-borne diseases (e.g. Dengue Fever, Malaria) by biting infected people. These diseases are a major cause of illness and death in some tropical and subtropical territories. Mosquito-borne diseases are a major cause of illness and death in some tropical and subtropical territories. Mosquito-borne diseases are a major cause of illness and death in some tropical and subtropical territories.

The introduction of high-risk exotic mosquito-borne disease outbreaks considered less likely to spread serious diseases. Mosquito-borne diseases are a major cause of illness and death in some tropical and subtropical territories.

No new exotic mosquito species. No new mosquito species were introduced to New Zealand in 2015 (NZ BioSecure 2016).

Table 1: New exotic mosquito species

Exotic mosquito species have established in New Zealand
<i>Aedes albopictus</i>
<i>Aedes albopictus</i>
<i>Culex quinquefasciatus</i>
Southern Saltmarsh (<i>Aedes albopictus</i>)

Source: NZ BioSecure

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Overseas Infectious Diseases of Priority Concern

HIGHLIGHTS:

- The number of international diseases of particular border health concern to New Zealand increased, 2011-15.
- Polio and Ebola Virus Disease were each alerted as a 'Public Health Emergency of International Concern' by the World Health Organization in 2014 and 2015.
- Four types of serious respiratory virus were reported between 2011 and 2015.
- Mosquito-borne diseases spread internationally, 2011-15.

Overseas exotic diseases are harmful to New Zealand's health

- High-risk exotic diseases, potentially harmful to New Zealand's health, are those which:
 - spread easily
 - New Zealand people are particularly vulnerable to (e.g. non-immune)
 - can cause severe illness
 - are difficult to treat

Exotic diseases overseas can be spread to New Zealand by New Zealand travellers, visitors and immigrants. International air travel can spread diseases very quickly across borders. Monitoring high-risk exotic diseases overseas is therefore important. It can tell us about the possible exposures of New Zealand travellers, visitors and immigrants to diseases, and help target our disease prevention and control work.

Table 1: Reported distribution of Ebola and Polio, 2011-15

Year	Ebola	Polio
2011	Africa: Uganda	Africa: Chad, Cote d'Ivoire
2012	Africa: Uganda, Democratic Republic of Congo	Asia: China, Pakistan
2013		Africa: Niger
2014		Africa: Cameroon, Kenya, Somalia, South Sudan
2014*	Africa: Guinea, Liberia, Mali, Sierra Leone, Democratic Republic of Congo, Nigeria	Middle East: Syrian Arab Republic
2015*	Americas: USA	Africa: Cameroon, Equatorial Guinea, Madagascar, South Sudan
	Europe: Spain, UK	Middle East: Iraq, Syrian Arab Republic
		Asia: Lao People's Democratic Republic, Myanmar

*Years Ebola and Polio were alerted as a 'Public Health Emergency of International Concern', Source: WHO 2016a

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Two diseases were alerted as a 'Public Health Emergency of International Concern' between 2011-15

Polio and Ebola Virus Disease were each classified as a 'Public Health Emergency of International Concern' by the WHO during 2014 and 2015 (WHO 2016a). There were no alerts between 2011 and 2013.

Ebola Virus Disease can cause fever, internal bleeding and death. It is transmitted from animals (e.g. bats in parts of Africa) before spreading between humans. A large outbreak began in 2014 and affected more than 28,000 people in West Africa (CDC 2016a). A few cases were imported to high-income countries (Table 1) but disease spread within these countries was rare (WHO 2016a). Before 2014, outbreaks were small and contained within remote African areas (WHO 2016a). Increasing population size, movement, urbanization, and less developed public health capacities in West Africa, contributed to the recent emergency.

Polio is a viral disease which can cause severe neurological disability and sometimes death. It is preventable, and there is a global goal to eradicate it from the world using the polio vaccine (WHO 2016c). Between 2011 and 2014, the international spread of polio increased (WHO 2016a). Key regions affected were Africa, the Middle East, and Asia (Table 1).



September 2016



Kia ora