Optimizing Population Screening for Infectious Diseases

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Introduction: 2 challenges

1. Linking decisions to outcomes:

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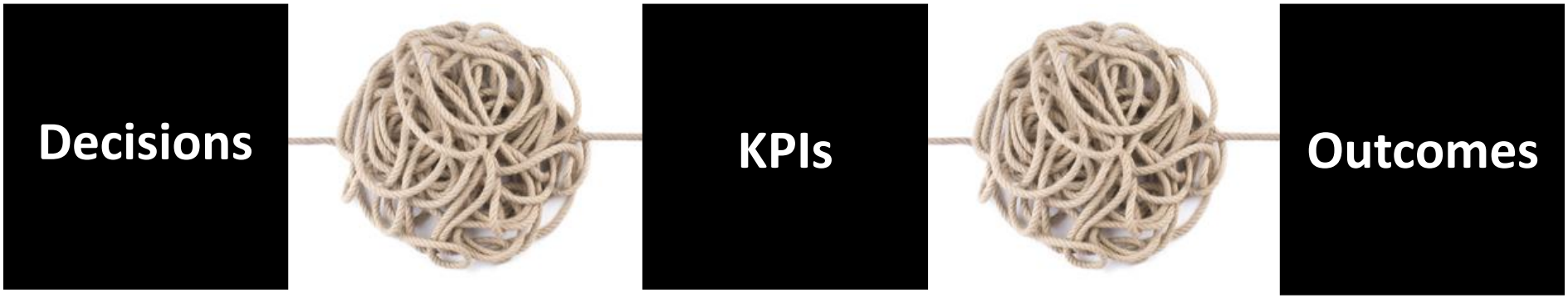
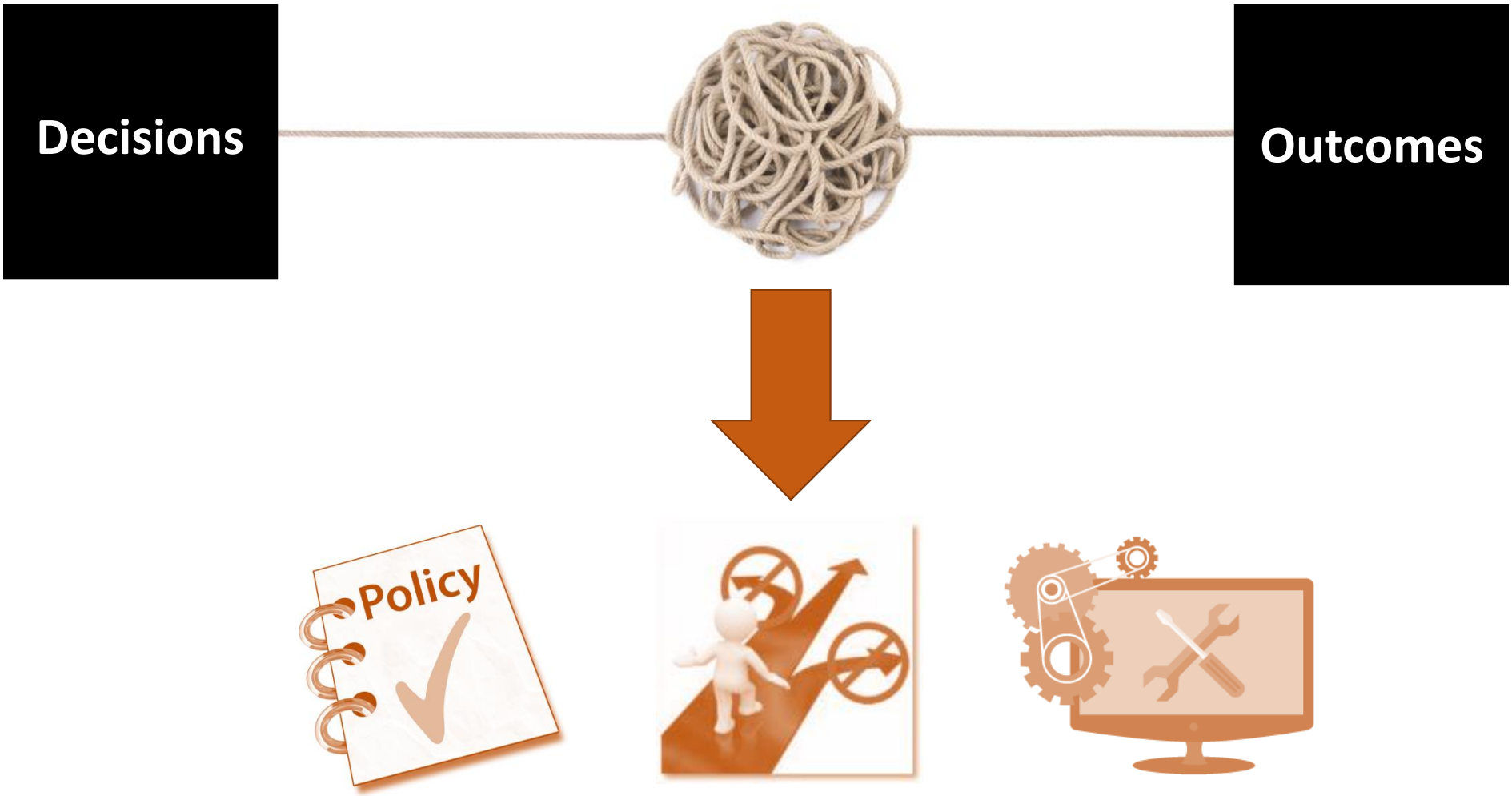


Introduction: 2 challenges

2. Transforming insight into better decisions:



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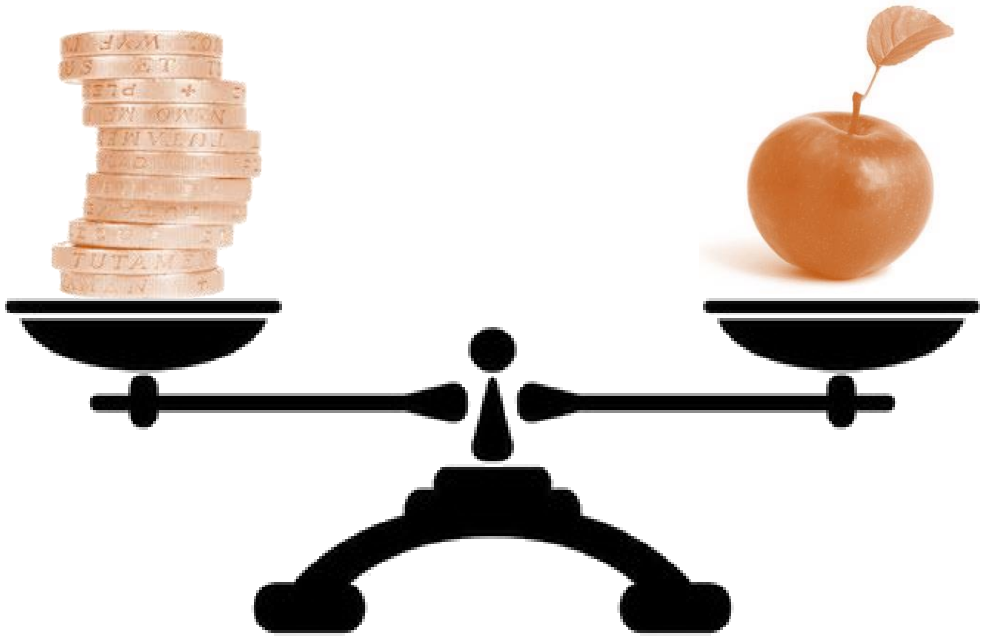

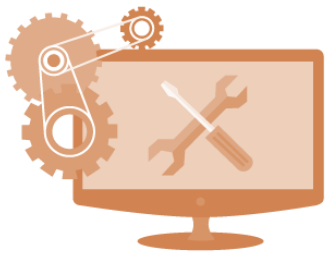

Problem Description

- Human African Trypanosomiasis (HAT; sleeping sickness):
  - Slowly progressing parasitic disease
  - Transmitted by Tsetse fly
  - WHO: 30000 cases

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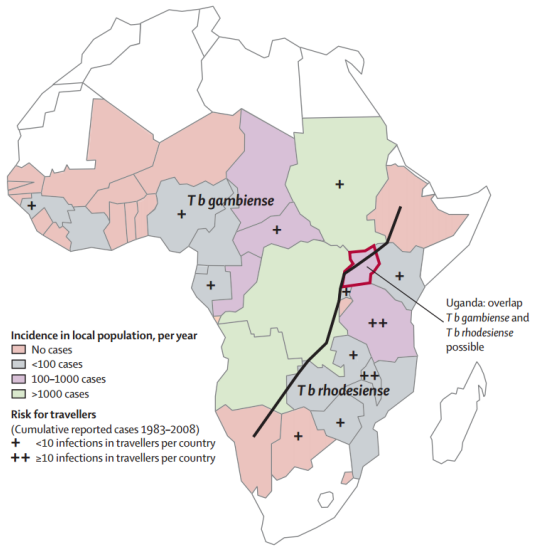
  - Transmitted by Tsetse fly
  - WHO: 30000 cases
- Two disease stages (both appr. 1.5 years):
  1. Symptoms absent or non-specific
  2. Neurological problems



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Population screening crucial:

- Infected people do not observe disease/ do not obtain care
- Source for infection of Tsetse
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Current strategy (DRC)

- 30 mobile screening teams

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Main research question:

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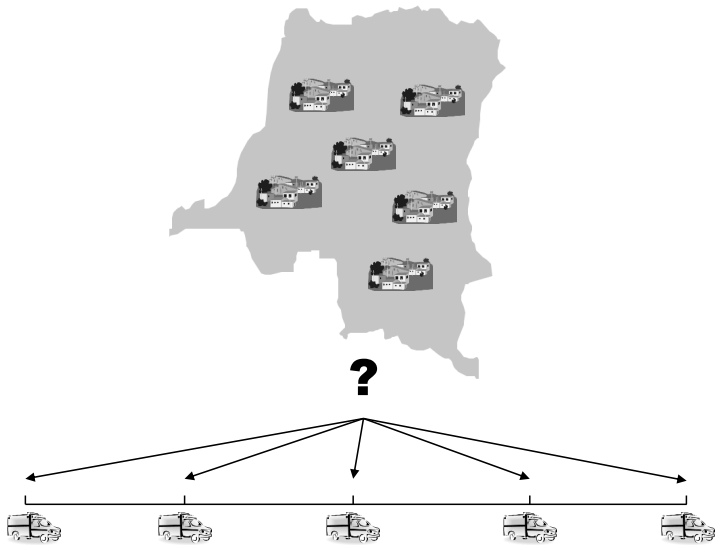
Main research question:

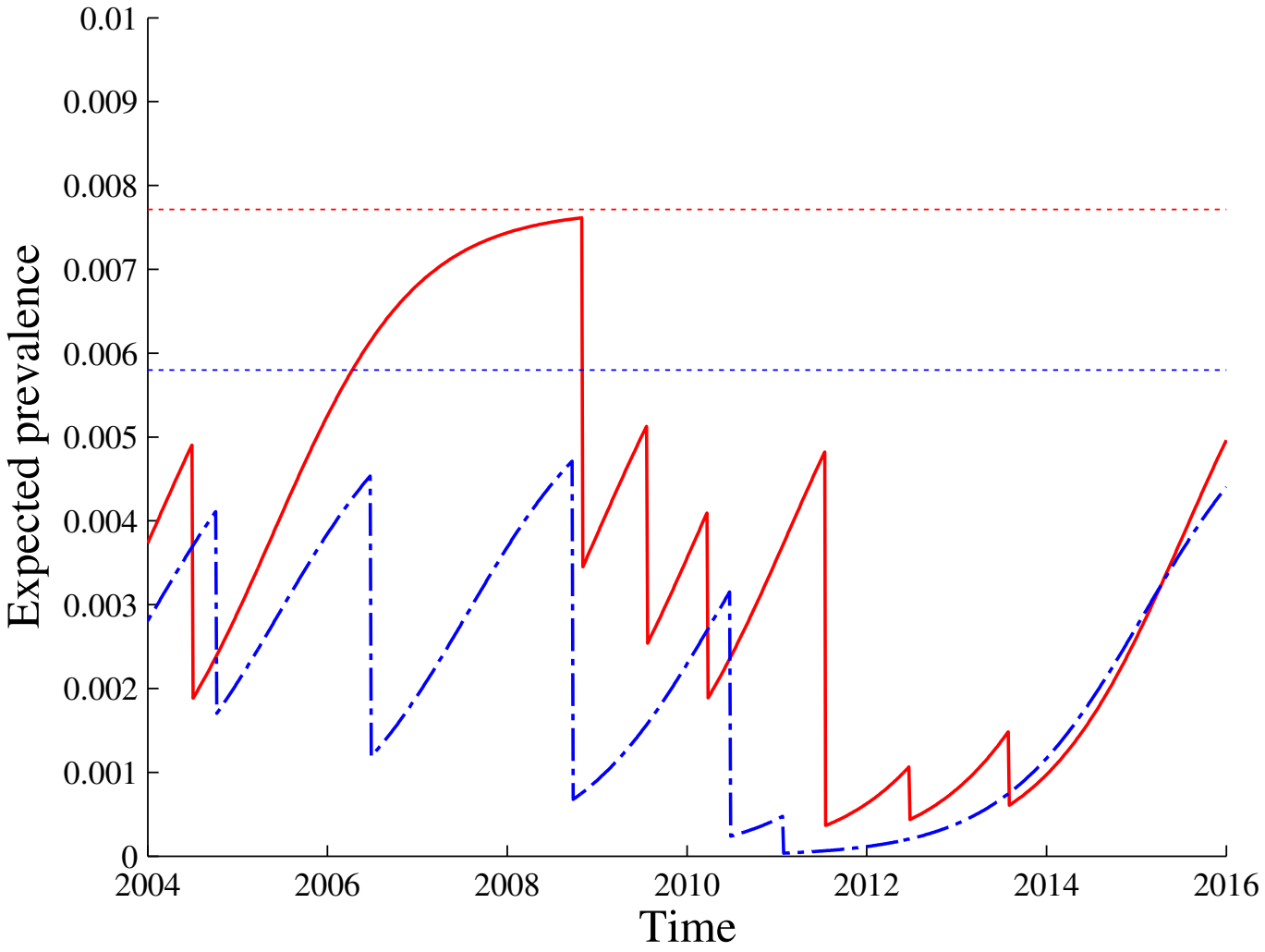
Given current screening capacity...

- *which villages to visit ...*
- *at what time interval ...*
- *to minimize the total average expected prevalence level?*



Linking decisions to outcomes

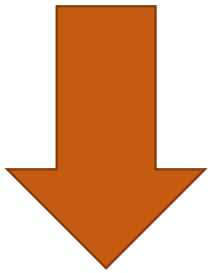
Link Between Decisions and Prevalence

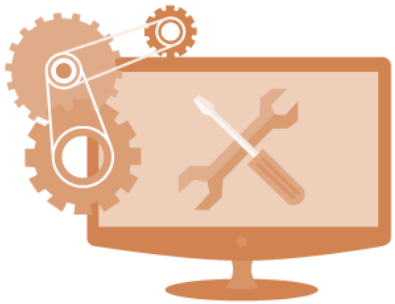


Transforming insight into better decisions

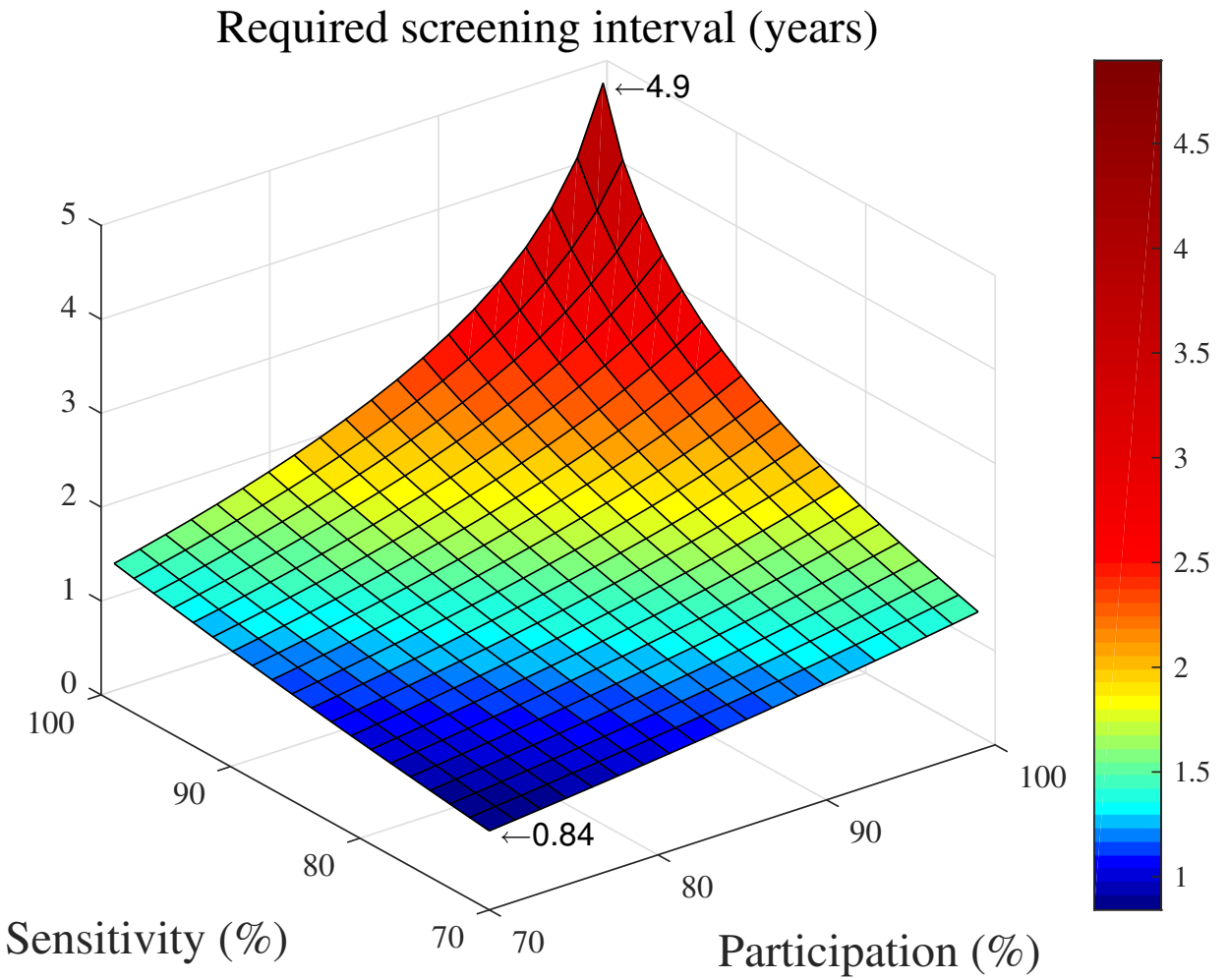
Decisions

Outcomes





Frequency required for expected eradication



Solution method for the general planning problem

Sophisticated methods:

- Column generation
- MIP
- Local optimization

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Simple policies:

- Equalizing
- Filtering
- Differentiation
- Burden level

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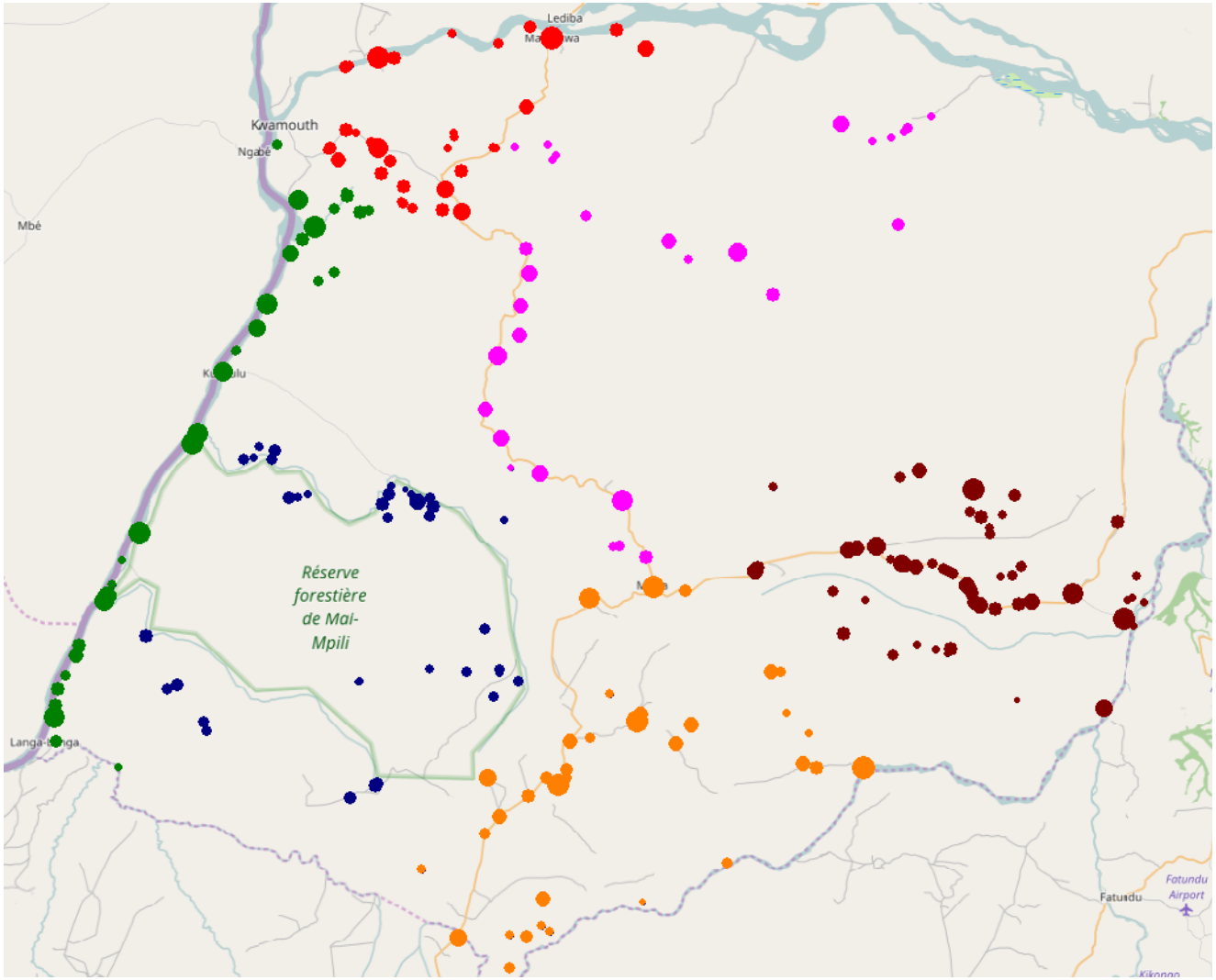

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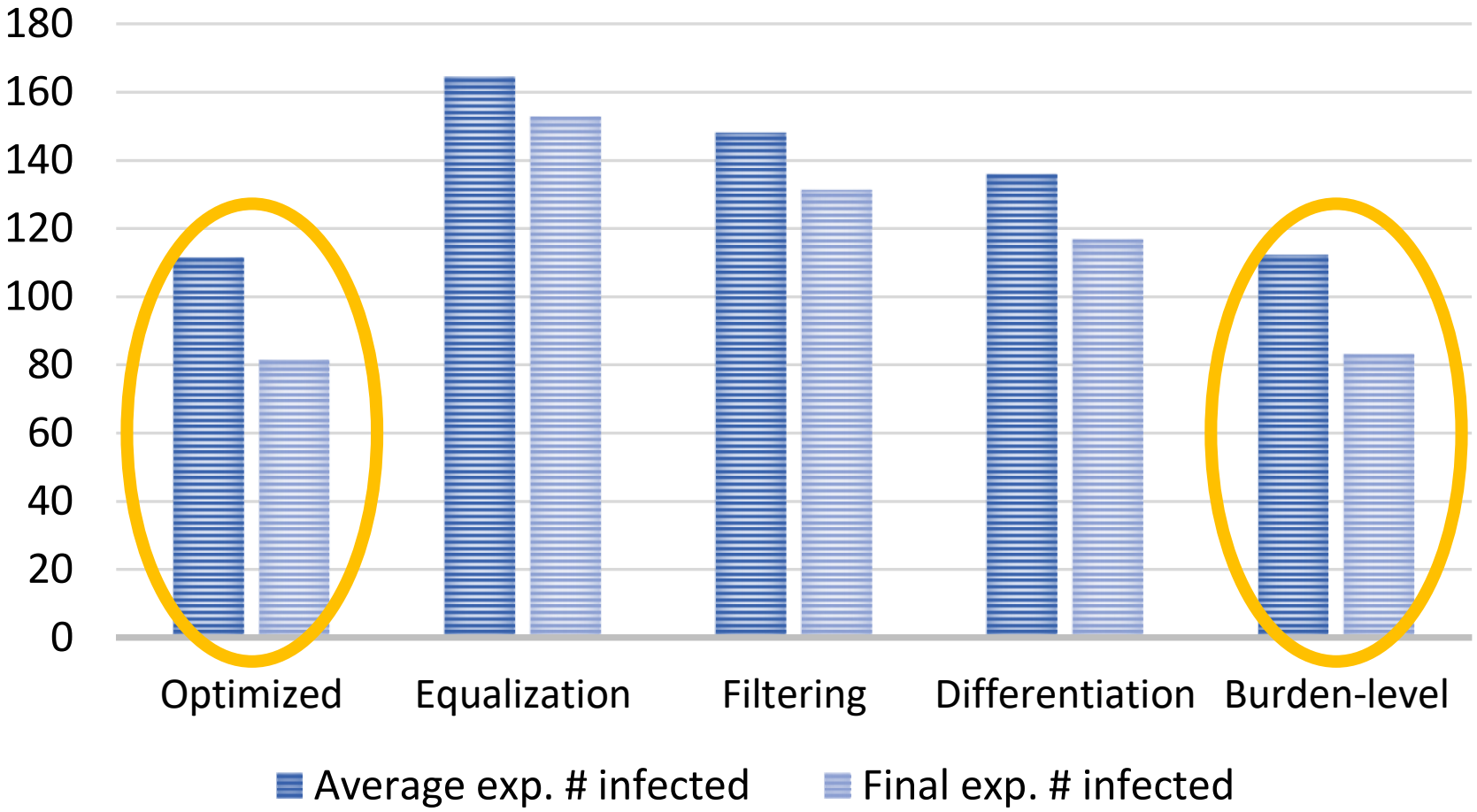

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- can be complex
- becomes easier (more data)
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Translating the link into decisions...

- can be essential
- can benefit both policy makers and people on the ground
- does not always require advanced tools