Canine Rabies Control: CDC's Global Activities

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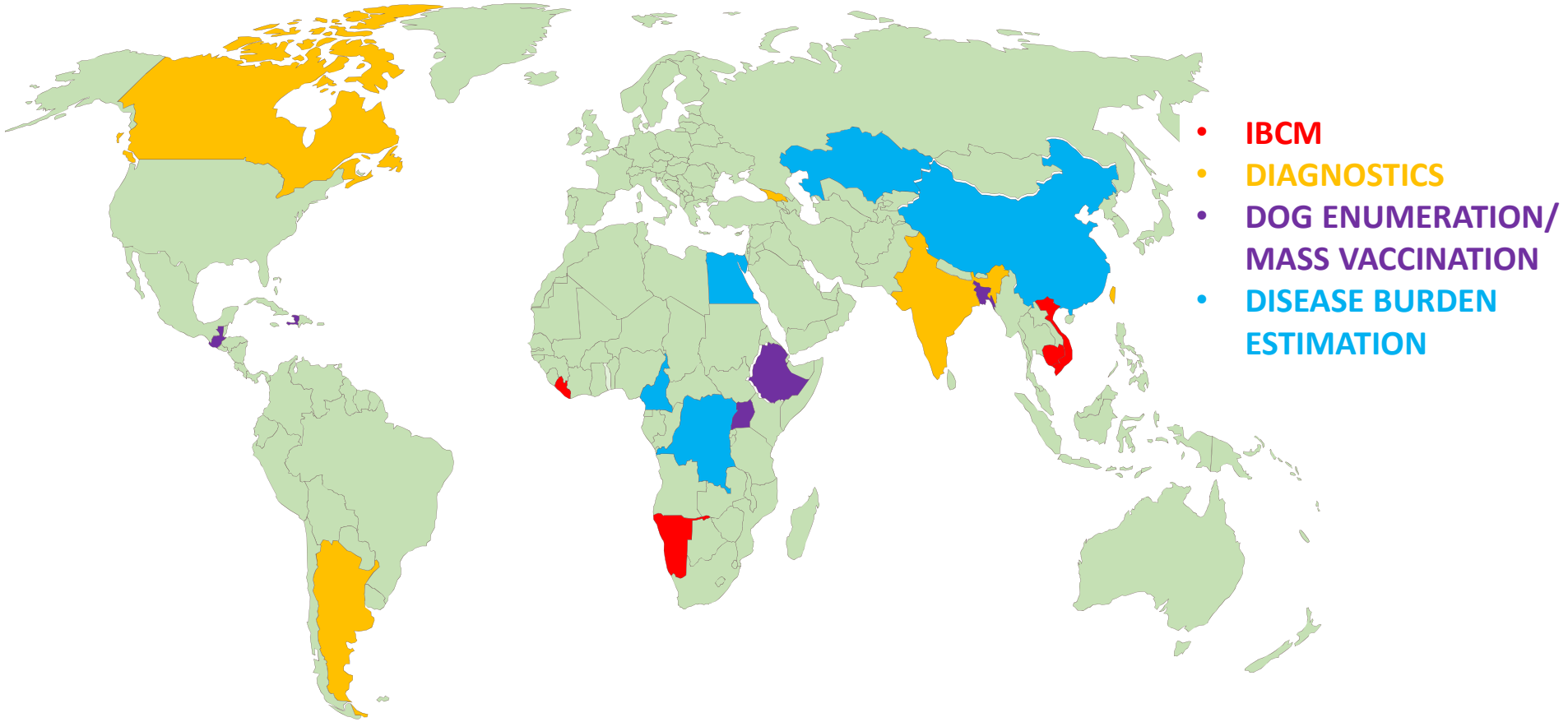
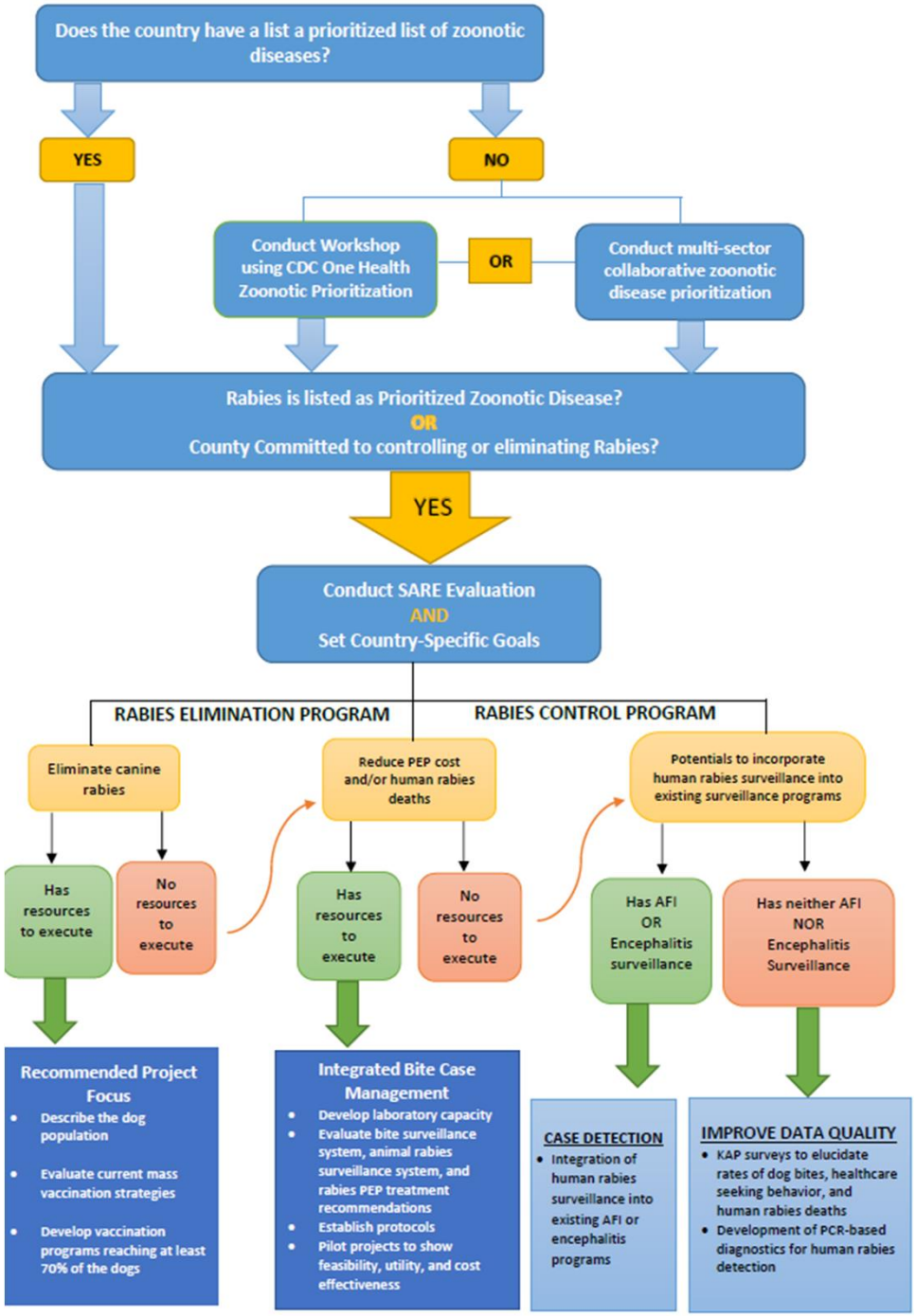
CDC Rabies Program: Canine Rabies Projects



CDC tools for rabies control

1. Is rabies a priority disease?
   - One Health prioritization tool
2. What are the gaps in rabies control?
   - SARE tool
3. What are the country's rabies control goals?

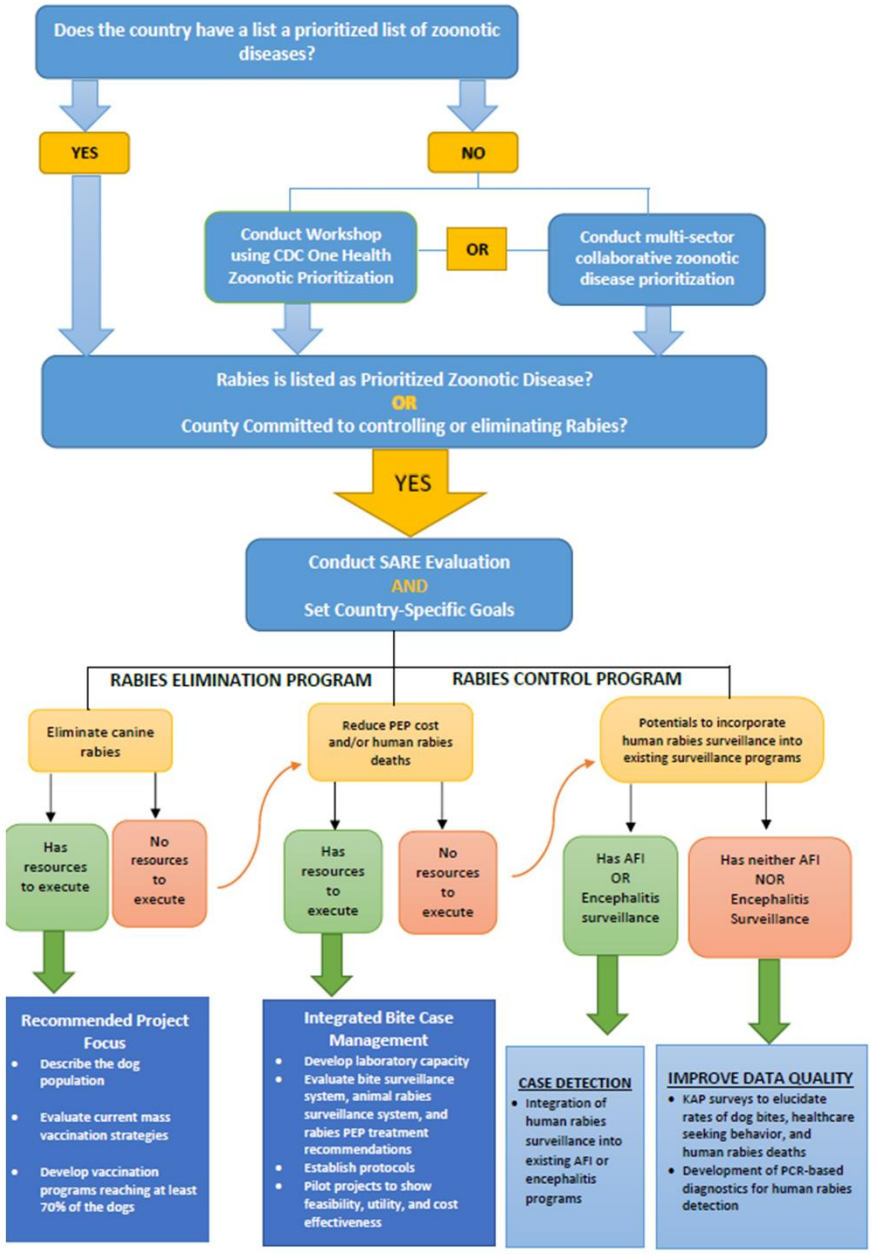


CDC tools for rabies control: Mass Vaccination

1. Is rabies a priority disease?
2. What are the gaps in rabies control?
3. What are the country's rabies control goals?

Elimination

1. National Planning
   a. CDC calculator tool
2. Mass Vaccination Planning & Budgeting
   a. CDC calculator tool
3. Dog Enumeration
   a. CDC protocol
4. Vaccinator Capacity and Vaccination Methodology Assessment
   a. CDC protocol



Mass Vaccination of Dogs: Design and Evaluation

Central Point

Door to Door

Capture/Vaccinate/Release

Oral Vaccination

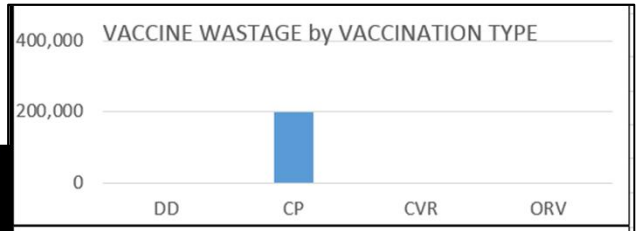
Vaccination Program Calculator

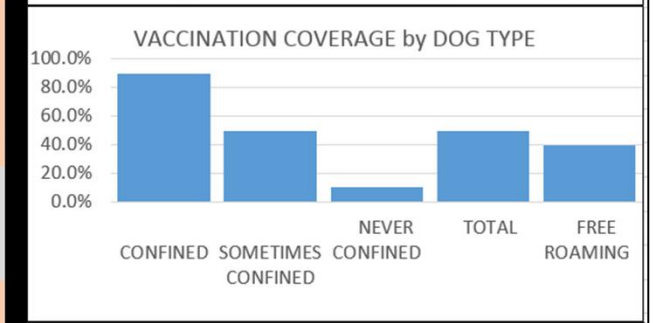
DEFINE YOUR VACCINATION PROGRAM

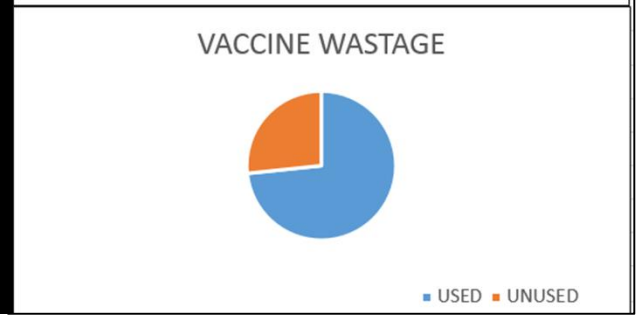
INPUT	Entered Value
Vaccination Goal (%)	70.0%
Dog Population (n)	1,100,000
Confined (%)	20.0%
Sometimes Confined (%)	60.0%
Never Confined (%)	20.0%
Vaccines Procured (n)	750,000
Vaccination Method	
Door to Door (% of doses)	15.0%
Central Point (% of doses)	85.0%
Capture, Vaccinate, Release (% of doses)	0.0%
Oral Vaccine Handouts (% of doses)	0.0%

Probability of Vaccination	Vaccination Method			
	DD	CP	CVR	ORV
Confined	*0.9*	0.9	0	0
Sometimes Confined	*0.5*	0.5	0.5	0.5
Never Confined	*0*	0.1	0.75	0.75

OUTPUT	Calculated Values		
Dog Population (n)	1,100,000		
Confined (n)	220,000		
Sometimes Confined (n)	660,000		
Never Confined (n)	220,000		
Vaccination Doses by Strategy	**PROCURED**	**USED**	**UNUSED**
Door to Door	112,500	112,500	0
Central Point	637,500	437,500	200,000
Capture, Vaccinate, Release	0	0	0
Oral Vaccine Handouts	0	0	0
Vaccination doses by Dog Type	**VAX**	**UNVAX**	**PERCENT**
CONFINED	198,000	22,000	90.0%
SOMETIMES CONFINED	330,000	330,000	50.0%
NEVER CONFINED	22,000	198,000	10.0%
TOTAL Dogs Vaccinated	550,000		
RESULTS	**DOGS**	**VAX**	**PERCENT**
TOTAL	1,100,000	550,000	50.0%
FREE ROAMING	880,000	352,000	40.0%
	PROCURED	**USED**	**UNUSED**
POTENTIAL VACCINE WASTAGE	750,000	73.3%	26.7%



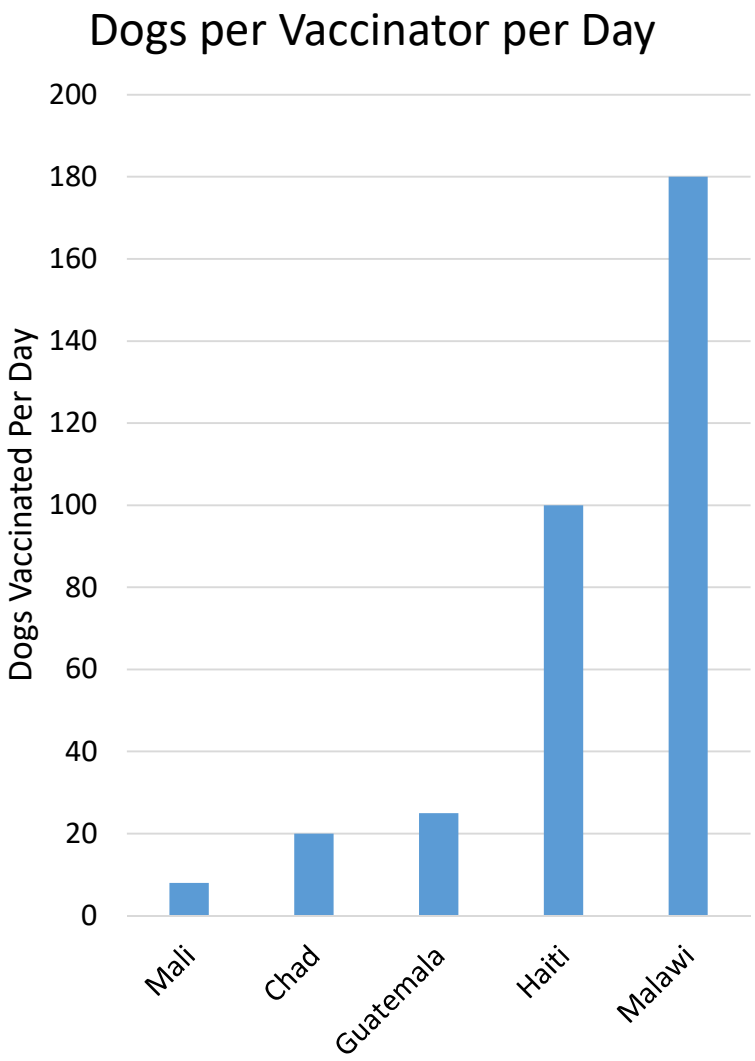




Dog Enumeration

- Global Dog Population: 687 million (11 people per dog)
- 122 countries with endemic dog rabies virus
  - 536 million dogs (78%)
  - Only 130 million were vaccinated in 2015 (24%)

Assessing Vaccinator Methods and Capacity



Methods

Central Point

Capture/Vaccinate/Release

Door to Door

Oral Vaccination

CDC tools for rabies control: Mass Vaccination

1. Is rabies a priority disease?
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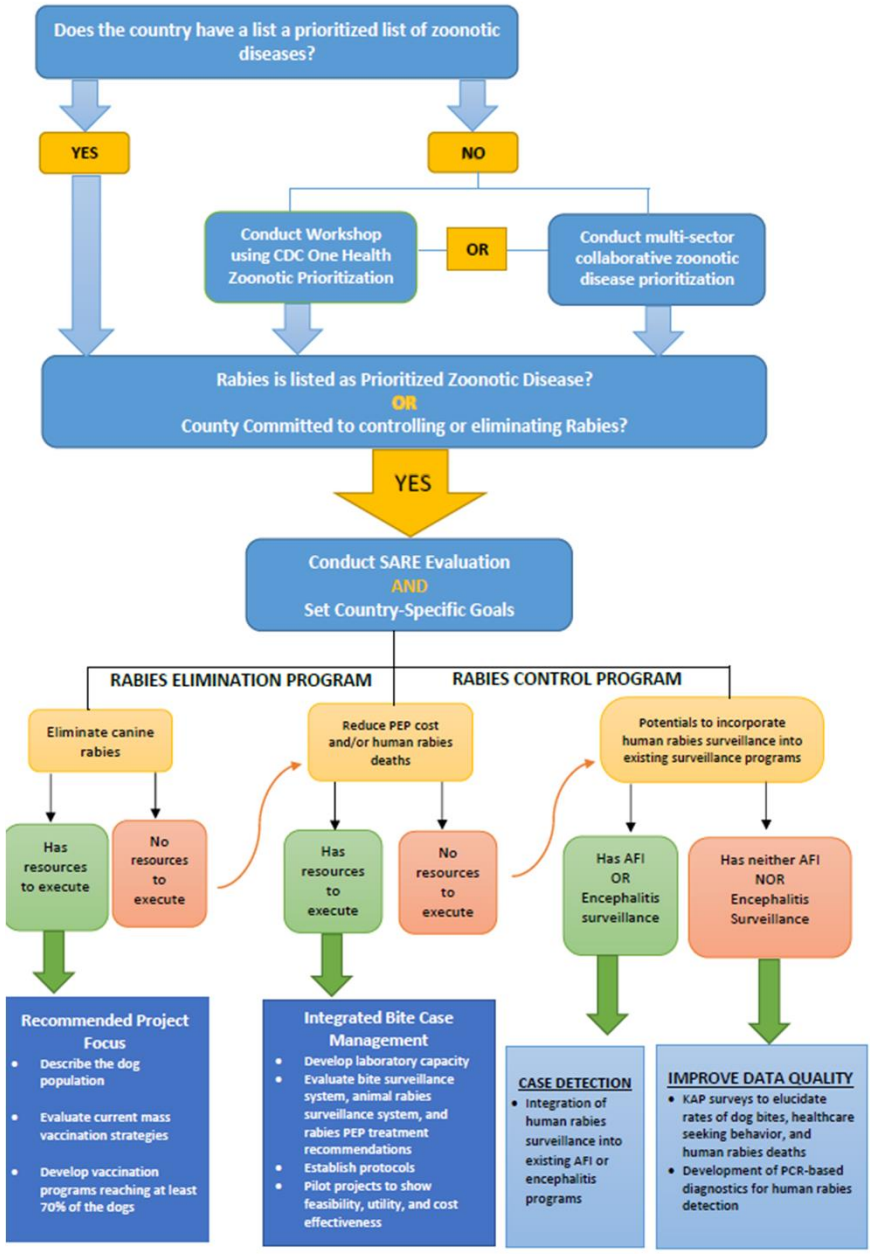
Enhanced surveillance

1. IBCM protocols
2. Laboratory diagnostic capacity protocols



Objective	Activities	Resource Created?	Available for Use?	Who to contact
Prioritize a list of zoonotic diseases	Conduct a One Health Zoonotic Disease Prioritization workshop	Yes; the OHZDP tool	Yes; implementation requires a trained facilitator	OHO or EISLB
Evaluate status of rabies control program	Conduct the SARE	Yes; an excel tool	Yes; implementation requires a trained facilitator	PRB
Improve canine rabies vaccination coverage to 70% and maintain coverage for 5 years	Estimate the economic impact of canine rabies control	Yes; an excel tool	Yes; pending embargo for publication , under revies	PRB
	Describe the dog population	Yes; a protocol	Yes; cleared	PRB
	Evaluate the current vaccination program	Yes; a protocol	Yes; cleared	PRB
	Develop the ideal vaccination campaign	Yes; an excel tool	Yes; under validation as more data is gathered	PRB
	Evaluate current laboratory capacity	Yes; a protocol	Yes; implementation requires a trained evaluator	PRB
	Establish laboratory capacity	Yes; protocols and training materials	Yes; requires rabies laboratory expert	PRB
Develop an Integrated Bite Case Management system to reduce unnecessary PEP usage and decrease human deaths	Evaluate current surveillance capacity	Yes; power point materials	Yes	PRB
	Establish IBCM protocols	Yes; a protocol	Yes; cleared	PRB
	Establish PEP treatment recommendations	Yes	Yes	PRB
	Implement pilot IBCM programs	Yes; a protocol	Yes	PRB
	Evaluate impact on healthcare seeking behaviors	Yes; a protocol	Yes	PRB
	Evaluate impact on health economics	Yes; an excel tool	Yes; limited availability and requests reviewed as received	PRB
Estimate the human rabies burden in the country	Read the Hampson paper that estimates rabies burden by country	Yes	Yes	PLOS NTD paper
	Utilize the Rabies Econ tool to estimate burden	Yes	Yes; pending embargo for publication	PRB
	Conduct community KAP to elucidate bite rates, healthcare seeking behavior, human deaths	Yes	Yes; limited availability as is currently under WHO and CDC review.	PRB
	Conduct a medical facility assessment	Yes	Yes; limited availability as is currently under WHO and CDC review.	PRB
	Establish a low-resource intense diagnostic method to detect human cases (PCR)	Yes; a protocol	Yes; Haiti protocol available for review and local adaptation	PRB
	Integrate human rabies into current AFI or encephalitis surveillance systems	No; easily achievable with consultation	N/A	EISLB or PRB

Repository for Canine Rabies Elimination Resources

- Evaluating rabies control programs
- Improving mass vaccination of dogs
- Developing integrated bite case management (IBCM) programs
- Estimating human rabies burden

CDC tools for rabies control: Mass Vaccination

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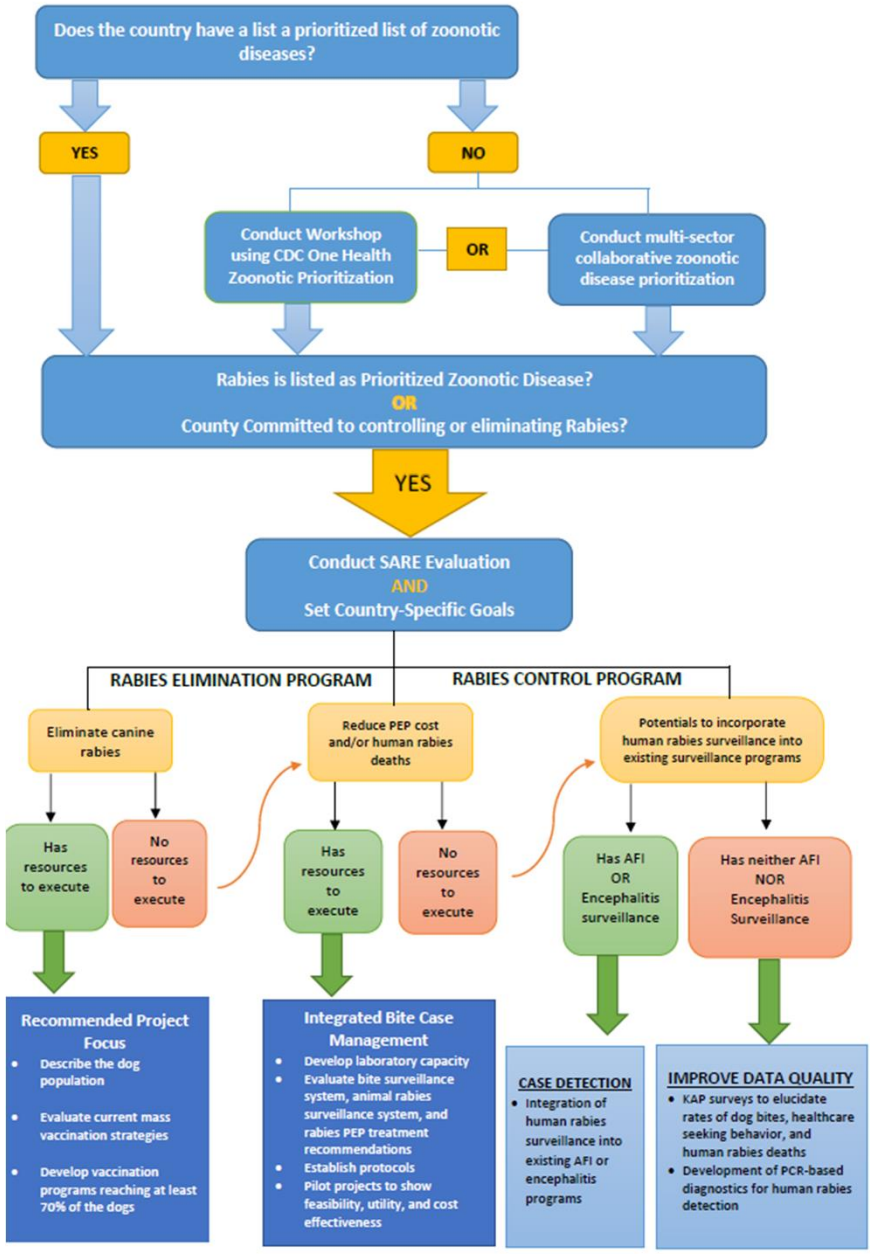
Burden assessments

1. Community risk assessments
2. Health facility assessments
3. Vaccine distribution assessments



Why do some vaccination programs fail?

- Lower development index
- Unknown Dog Populations
- Dog types
  - Many free roaming dogs in developing countries
- Vaccination campaign designs
  - Are Central Point clinics going to achieve 70% coverage?
- Vaccinator efficiency is low
- People are unaware of campaigns
  - Cited by 25% of residents in Mali
- People are unable to handle their dogs
  - Cited by 16% of residents in Mali

Questions?

Figure 1. Global Dog Rabies Elimination Pathway (GDREP): Phases for a dog rabies elimination program based on 70% dog population vaccination coverage.

Implementation Phase:	**Phase I: Preparation**			**Phase II: Scale-up dog vaccination**			**Phase III: Sustained 70% dog vaccination**						
Program year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Expected dog vax coverage:	<18% (current rate)			18% - 35%	35% - 53%	53% - 70%	≥70%						
Activities achieved	Field studies Workforce training Strengthening lab capacity			Pilot implementation Scaling-up vaccination coverage Logistical improvements Operational equipment			Mass vaccination of dog Surveillance to establish disease burden and assess progress						
Cost estimates:	Current vaccination coverage Infrastructure improvements*			Expected vaccination coverage Infrastructure improvements*			Vaccination of 70% of the dog population						