

TOOLS TO ENABLE BETTER PLANNING OF MASS DOG VACCINATION PROGRAMS



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U.S. Centers for Disease Control and Prevention

Successful Elimination

- How many dogs do we have?
- How much vaccine will we need?
- How many vaccinators do we need?
- What infrastructure do we need?
- What advances do we need?



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						

Identifying global data sources

DATABASE

2015 COUNTRY
POPULATION

HUMAN
DEVELOPMENT
INDEX

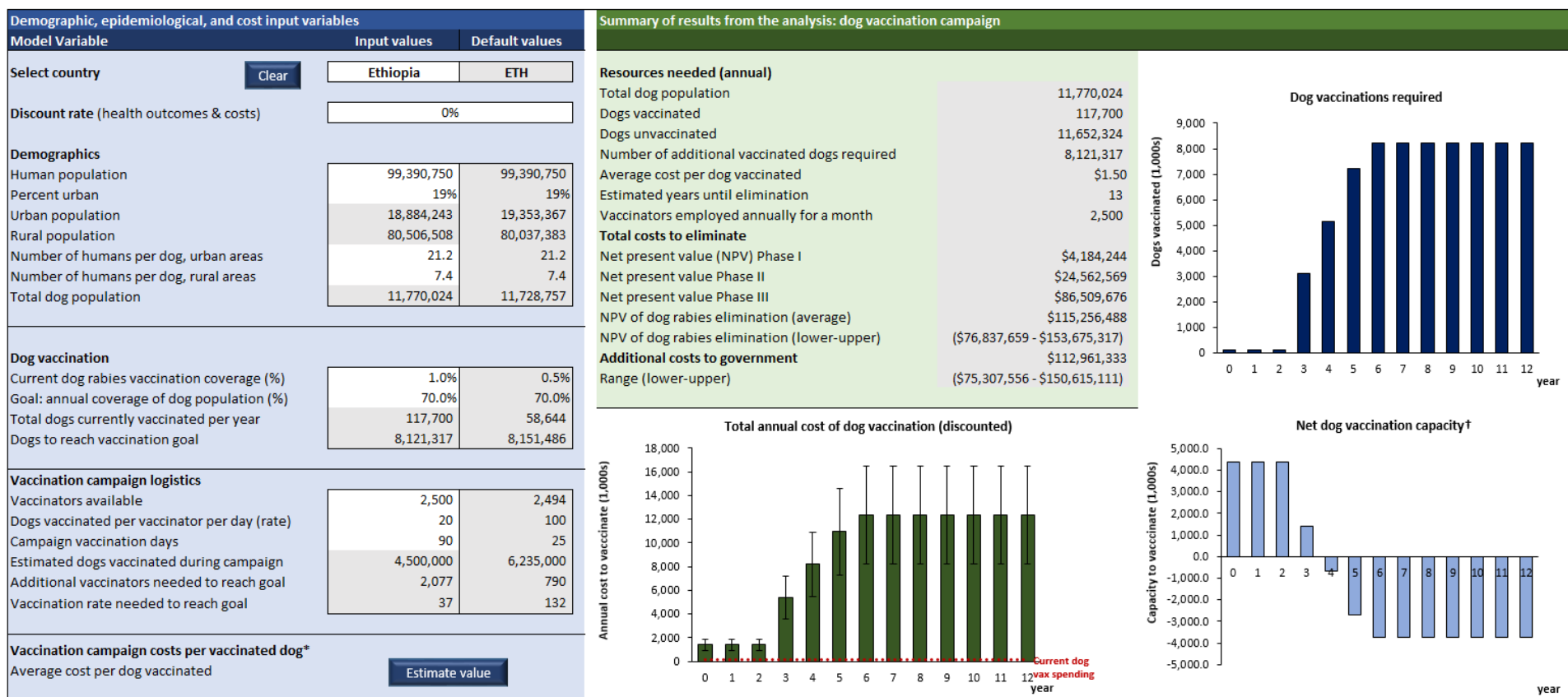
HUMAN:DOG
RATIOS (Knobel)

DOG VACCINATION
COVERAGE
(Hampson)

OIE VETERINARY
CAPACITY

Country	Continent	Cluster	World Bank Human Population	Percent Urban	Human Development Index	Canine Rabies Haamp	Canine Rabies	Entire Country Affected	Urban Population Affected	Rural Population Affected	Total Population Affected	Urban H:D Ratio (Data)	Rural H:D Ratio (Data)	Urban H:D Ratio (Known)
Afghanistan	Asia	Eurasia	32,526,562	26.703	0.398	1			8,685,568	23,840,994				7.5
Albania	Europe	EasternEurope	2,889,167	57.407	0.739	1			1,658,584	1,230,583				6.5
Algeria	Africa	North Africa	39,666,519	70.727	0.698	1			28,054,939	11,611,580				21.2
Angola	Africa	Congo Basin	25,021,974	44.05	0.486	1			11,022,160	13,999,794				21.2
Argentina	Americas	Southern Cone	43,416,755	91.751	0.797	1			39,835,307	3,581,448				7.5
Armenia	Europe	EasternEurope	3,017,712	62.673	0.716	1			1,891,291	1,126,421				6.5
Azerbaijan	Europe	Eurasia	9,651,349	54.62	0.731	1			5,271,567	4,379,782				6.5
Bahrain	Asia	Middle East	1,377,237	88.775	0.806	1			1,222,642	154,595				7.5
Bangladesh	Asia	Asia 3	160,995,642	34.277	0.5	1			55,184,476	105,811,166				7.5
Belarus	Europe	EasternEurope	9,513,000	76.667	0.756	1			7,293,332	2,219,668				6.5
Benin	Africa	West Africa	10,879,829	43.95	0.427	1			4,781,685	6,098,144				21.2
Bhutan	Asia	Asia 3	774,830	38.644	0.522	1			299,425	475,405				7.5
Bolivia	Americas	Andean	10,724,705	68.512	0.663	1			7,347,710	3,376,995		4.6		7.5
Bosnia and Herzegovina	Europe	EasternEurope	3,810,416	39.767	0.733	1			1,515,268	2,295,128				6.5
Botswana	Africa	SADC	2,262,485	57.444	0.633	1			1,299,662	962,823				21.2
Brazil	Americas	Brazil	207,847,528	85.687	0.718	1			178,098,311	29,749,217				7.5
Bulgaria	Europe	EasternEurope	7,177,991	73.948	0.771	1			5,307,981	1,870,010				6.5
Burkina Faso	Africa	West Africa	18,105,570	29.859	0.331	1			5,406,142	12,699,428				21.2
Burundi	Africa	Congo Basin	11,178,921	12.057	0.316	1			1,347,843	9,831,078				21.2
Cote d'Ivoire	Africa	West Africa	22,701,556	54.18	0.4	1			12,299,703	10,401,853				21.2
Cambodia	Asia	Asia 2	15,577,899	20.723	0.523	1			3,228,208	12,349,691				7.5
Cameroon	Africa	West Africa	23,344,179	54.381	0.482	1			12,694,798	10,649,381				21.2
Central African Republic	Africa	Congo Basin	4,900,274	40.037	0.343	1			1,961,923	2,938,351				21.2
Chad	Africa	West Africa	14,037,472	22.471	0.328	1			3,154,360	10,883,112				21.2
China	Asia	China	1,371,220,000	55.614	0.687	1			762,590,291	608,629,709				48.3
Colombia	Americas	Andean	48,228,704	76.436	0.71	1			36,864,092	11,364,612				7.5
Congo	Africa	Congo Basin	4,620,330	65.38	0.533	1			3,020,772	1,599,558				21.2
Croatia	Europe	EasternEurope	4,224,404	58.964	0.796	1			2,490,878	1,733,526				6.5
Cuba	Americas	Caribbean	11,389,562	77.074	0.776	1			8,778,391	2,611,171				7.5
Czech Republic	Europe	EasternEurope	10,551,219	72.992	0.865	1			7,701,546	2,849,673				6.5
Democratic People's Republic of	Asia	Asia 2	25,155,317	60.875	0.766	1			15,313,239	9,842,018				7.5
Democratic Republic of the Cong	Africa	Congo Basin	77,266,814	42.494	0.296	1			32,633,760	44,433,054				21.2
Djibouti	Africa	North Africa	887,861	77.343	0.43	1			686,698	201,163				21.2
Dominican Republic	Americas	Caribbean	10,528,391	78.98	0.689	1			8,315,323	2,213,068				7.5
Ecuador	Americas	Andean	16,144,363	63.742	0.72	1			10,290,740	5,853,623		7.2		7.5
Egypt	Africa	North Africa	91,508,084	43.135	0.644	1			39,472,012	52,036,072				21.2
El Salvador	Americas	Central America & Mexico	6,126,583	66.726	0.674	1			4,088,024	2,038,559				7.5
Equatorial Guinea	Africa	Congo Basin	845,060	39.923	0.537	1			337,373	507,687				21.2
Eritrea	Africa	North Africa	5,222,000	37.7	0.349	1			1,968,694	3,253,306				21.2
Estonia	Europe	EasternEurope	1,311,998	67.538	0.835	1			886,097	425,901				6.5
Ethiopia	Africa	SADC	99,390,750	19.472	0.363	1			19,353,367	80,037,383				21.2
Gabon	Africa	Congo Basin	1,725,292	87.156	0.674	1			1,503,695	221,597				21.2
Gambia	Africa	West Africa	1,990,924	59.632	0.42	1			1,187,228	803,696				21.2
Georgia	Europe	Eurasia	3,679,000	53.641	0.733	1			1,973,452	1,705,548				6.5
Ghana	Africa	West Africa	27,409,893	54.042	0.541	1			14,812,854	12,597,039				21.2
Guatemala	Americas	Central America & Mexico	16,342,897	51.571	0.574	1			8,428,195	7,914,702				7.5
Guinea	Africa	Congo Basin	12,608,590	37.161	0.344	1			4,685,478	7,923,112				21.2
Guinea-Bissau	Africa	West Africa	1,844,325	49.332	0.353	1			909,842	934,483				21.2
Guyana	Americas	Central America & Mexico	767,085	28.553	0.633	1			219,026	548,059				7.5
Haiti	Americas	Caribbean	10,711,067	58.645	0.454	1			6,281,505	4,429,562				7.5
Honduras	Americas	Central America & Mexico	8,075,060	54.73	0.625	1			4,419,480	3,655,580				7.5
Hungary	Europe	EasternEurope	9,844,686	71.227	0.816	1			7,012,074	2,832,612				6.5
India	Asia	India	1,311,050,527	32.747	0.547	1			429,329,716	881,720,811		12.0 - 35.0	37	7.5

Customizable GDREP Tool



Customized GDREP Tool: Kenya

Demographic, epidemiological, and cost input variables

Model Variable	Input values	Default values
Select country <input type="button" value="Clear"/>	Kenya	KEN
Discount rate (health outcomes & costs)	3%	
Demographics		
Human population	46,050,302	46,050,302
Percent urban	26%	26%
Urban population	11,973,079	11,799,008
Rural population	34,077,223	34,251,294
Number of humans per dog, urban areas	21.2	21.2
Number of humans per dog, rural areas	7.4	7.4
Total dog population	5,169,798	5,185,110
Dog vaccination		
Current dog rabies vaccination coverage (%)	11.0%	0.5%
Goal: annual coverage of dog population (%)	70.0%	70.0%
Total dogs currently vaccinated per year	568,678	25,926
Dogs to reach vaccination goal	3,050,181	3,603,652
Vaccination campaign logistics		
Vaccinators available	1,207	1,207
Dogs vaccinated per vaccinator per day (rate)	100	100
Campaign vaccination days	25	25
Estimated dogs vaccinated during campaign	3,017,500	3,017,500
Additional vaccinators needed to reach goal	241	245
Vaccination rate needed to reach goal	120	120
Vaccination campaign costs per vaccinated dog*		
Average cost per dog vaccinated	<input type="button" value="Estimate value"/>	



GDREP: Country Report

- Who is the intended audience?
 - High-level stakeholders, policy-makers, national rabies control programs
- What are the goals?
 - Highlight the monetary and fiscal commitment that are required for rabies elimination
 - Initiate discussions about funding continuity
 - Establish a strong foundation for multi-year government commitment



GDREP Tool: How can it be used?

• WORKSHOPS



• SARE

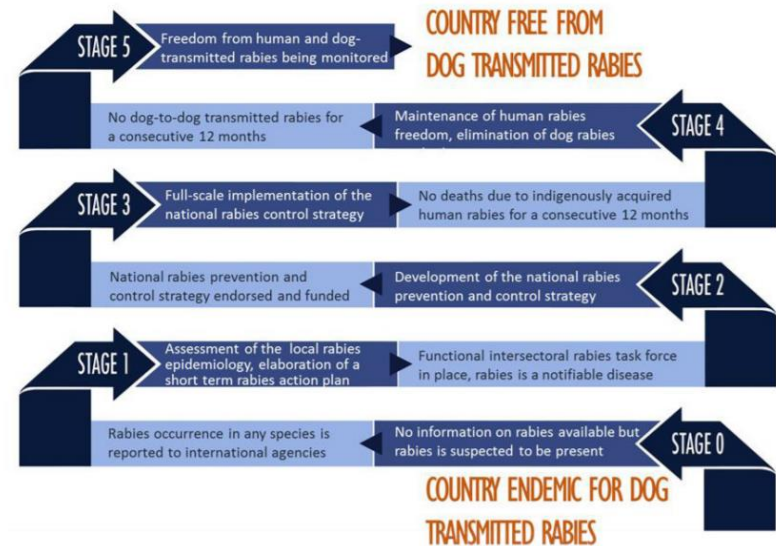
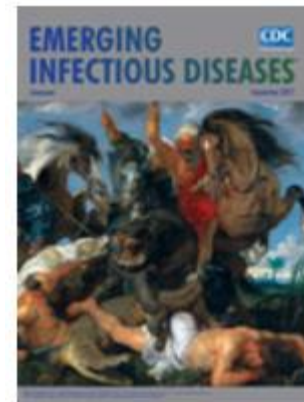


Fig 1. Diagram of SARE

• ONLINE



Thank you!

- Government Partners

- Haiti Ministry of Agriculture
- Haiti Ministry of Health
- Ethiopia Public Health Institute
- Vietnam Department of Animal Health
- Kenya ZDU

- Universities

- University of the Valley – Guatemala
- Ohio State University
- Georgia State University

- Partners

- GARC
- Christian Veterinary Mission
- Mission Rabies
- Humane Society International
- World Health Organization
- OIE
- PAHO