



# IRT Tools

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Worldwide Veterinary Service (WVS)

Mission Rabies



### VAXPLAN

*Untangle the complexities of planning an effective dog vaccination campaign.*

The goal of any rabies control program is to vaccinate a high proportion of the dog population as efficiently as possible. How to achieve this is impacted hugely on the specific composition dog population in the project location; how easy dogs are to handle and how willing people are to bring them for vaccination.

The VaxPlan tool enables you to input the characteristics of your dog population and provides insights into the likely vaccination coverage that will be achieved from a given campaign structure. This can aid the planning of new programs, enhance the efficiency of existing programs and forecast the effects of strategic alterations.

[LAUNCH THE TOOL](#)



### GDREP

*Understanding the impacts and costs of national rabies control.*

The Global Dog Rabies Elimination Pathway (GDREP) provides a means for public health officials to plan for a national strategy, allowing the resources required and estimated length of campaigns to be predicted.



### STARC MAPPING

*Maximising the impact of vaccination resources*

The Settlement Type and Road Connectivity (STARC) Mapping tool enables a representation of the potential rabies burden and transmissibility to communities to be established and for mapping of campaigns to be optimised based on this data.



### RABIES ECON

*Explore the cost-benefit of your campaign.*

The Rabies Econ tool supports governments in the planning and assessment of elimination programs, allowing estimations of the cost and benefits of different vaccination strategies to be made.

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# INTERNATIONAL RABIES TASKFORCE



### WVS DATA COLLECTION APP

*Data-driven dog vaccination in the palm of your hand*

The WVS App has been crafted from a decade of field experience running large-scale dog vaccination campaigns around the world. The system is a game-changer in campaign implementation, monitoring and evaluation, providing field staff with clarity on where they should focus vaccination efforts and campaign managers with the data they need to refine the program for efficiency and effectiveness. The app is a powerful tool in the quest to eliminate dog-transmitted rabies and is available to anyone running dog vaccination programs.

[FIND OUT MORE](#)



### RABIES EXPOSURE ASSESSMENT AND CONTACT TRACING (REACT) APP

*Digital support for robust rabies surveillance*

The REACT App addresses two core challenges to the implementation of effective rabies surveillance: standardised investigation of suspect rabid animals in challenging field conditions; and timely centralisation of case data. The app structure is based on the cost-effective methods of Integrated Bite Case Management and makes it possible for anyone to implement this approach.

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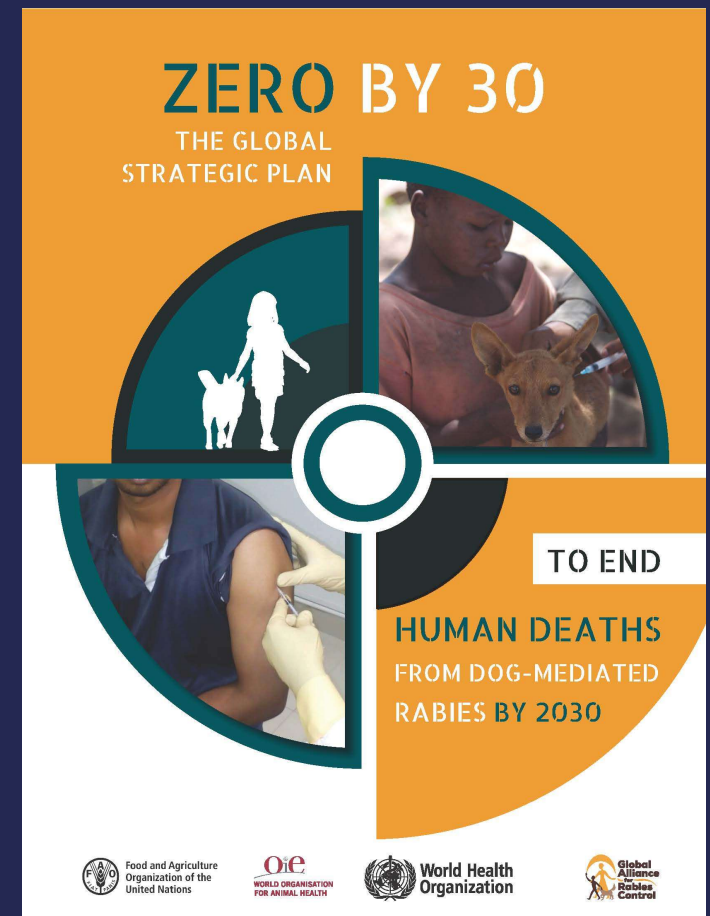
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# Zero by 30

- Reactive vs proactive approaches
- Need for realistic and feasible paths forward
- What can be learned from prior elimination successes?
- National, regional, and global strategic planning



# Global Rabies Dog Elimination Pathway (GDREP)



- US–CDC developed framework in 2017 to assess resources needed/challenges to overcome to achieve Zero by 30
- Draws on multiple datasets, including:
  - Prior dog vaccination campaigns
  - Rabies literature
  - Expert opinion



## Elimination of Dog-Mediated Human Rabies Deaths by 2030: Needs Assessment and Alternatives for Progress Based on Dog Vaccination

*Ryan M. Wallace\*, Eduardo A. Undurraga, Jesse D. Blanton, Julie Cleaton and Richard Franka*

National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, GA, USA

# Global needs assessment

- What infrastructure is needed?
- How many dogs are there?
- How much vaccine is needed?
- How many vaccinators are needed?
- What advances are needed?
- How much will this cost?



# GDREP

- Inform country-level decision making efforts for rabies elimination
- Focus on four key factors for rabies elimination efforts
  1. Country development
  2. Dog vaccination program costs
  3. Demand for dog rabies vaccine
  4. Available vaccinators





# GDREP Tool



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%			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 dogs Surveillance to establish disease freedom						
Cost estimates:	Current Vaccination Coverage + Infrastructure Improvements*			Expected Vaccination Coverage + Infrastructure Improvements*			Vaccination of 70% of the dog population						

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

# GDREP Tool

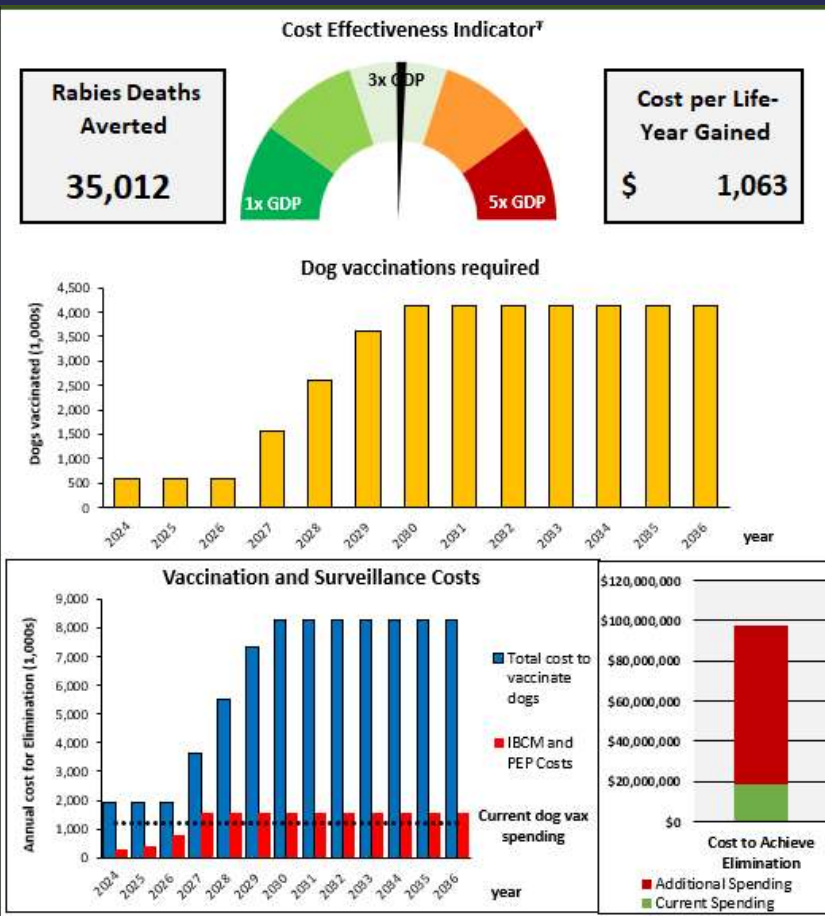
- Demographic, epidemiological, and cost input variables
  - Demographics – humans and dogs
  - Vaccination coverage
  - Campaign logistics
- Dog vaccination coverage
  - Current and goal
- Campaign logistics
  - Vaccinators available
  - Vaccination rate
- Cost per dog vaccinated

<b>Discount rate</b> (health outcomes & costs)	<b>0%</b>	
<b>Demographics</b>		
Human population	<b>31,700,000</b>	31,700,000
Percent urban	<b>38%</b>	38%
Urban population	12,046,000	12,046,000
Rural population	19,654,000	19,654,000
Number of humans per dog, urban areas	<b>12.0</b>	12.0
Number of humans per dog, rural areas	<b>4.0</b>	4.0
Total dog population	5,917,333	5,917,333
<b>Dog vaccination</b>		
Current dog rabies vaccination coverage (%)	<b>10.0%</b>	10.0%
Goal: annual coverage of dog population (%)	<b>70.0%</b>	70.0%
Total dogs currently vaccinated per year	591,733	591,733
Dogs to reach vaccination goal	3,550,400	3,550,400
<b>Vaccination campaign logistics</b>		
Vaccinators available	<b>446</b>	446
Dogs vaccinated per vaccinator per day (rate)	<b>50</b>	50
Campaign vaccination days	<b>25</b>	25
Estimated Vaccinator Capacity (per campaign)	557,887	557,887
Additional vaccinators needed to reach goal	2,867	2,867
Vaccination rate needed to reach goal	371	371
Vaccinators to reach vaccination goal at peak	3,314	3,314
<b>Average Cost per Dog Vaccinated</b>		
Estimate Value	<b>\$</b>	<b>2.00</b>
<b>Surveillance and PEP (\$/person, USD)</b>	<b>Communities with access [%]</b>	
\$0.05	20%	
<b>Level of Surveillance and PEP Maintained Post-Elimination</b>	50%	
<b>Annual Deaths Under Current Program</b>	1,476	

# GDREP Tool



Resources needed (annual)	
Total dog population	5,917,333
Dogs currently vaccinated annually	591,733
Dogs unvaccinated	5,325,600
Additional dogs needing vaccination	3,550,400
Average cost per dog vaccinated	\$2.00
Dog Vaccination Costs to Eliminate	
Cost to complete Phase I	\$5,680,640
Cost to complete Phase II	\$16,464,980
Cost to complete Phase III	\$57,989,867
<b>Total Dog Vaccination Costs for Elimination</b>	<b>\$80,135,487</b>
<i>Total vaccination costs (lower-upper)</i>	<i>(44,875,873 - 100,163,353)</i>
<b>Additional Vaccination Funding Required</b>	<b>\$64,750,420</b>
<i>Range (lower-upper)</i>	<i>(36,260,235 - 80,338,025)</i>
Surveillance and PEP Costs to Eliminate	
<b>Total Surveillance and PEP Costs</b>	<b>\$17,355,750</b>
<i>Range (lower-upper)</i>	<i>(13,884,600 - 20,826,900)</i>
<b>Additional S &amp; PEP Funding Required</b>	<b>\$14,502,750</b>
<i>Range (lower-upper)</i>	<i>(11,602,200 - 17,403,300)</i>
Total Cost to Declare Elimination	
<b>Total Program Cost per Resident, over 13 Years</b>	<b>\$3.08</b>
<b>Funding Gap, Assuming Current Budget is Maintained</b>	<b>\$79,253,170</b>
<b>End of Human Rabies Deaths</b>	<b>2032</b>
<b>End of Canine Rabies Deaths</b>	<b>2035</b>
<b>Declaration of Canine Rabies Freedom</b>	<b>2037</b>



# GDREP Tool

- Costs per dog vaccinated
- Economic costs
  - Workers participating
  - Transportation and logistics
  - Awareness campaign
  - Equipment
  - Other costs
- Overall costs for campaigns





# VAXPLAN

# VAXPLAN Tool



- Provides insights into likely vaccination coverage achieved from a given campaign structure
  - **Aid** the planning of new programs
  - **Enhance** the efficiency of existing programs
  - **Forecast** the effects of strategic alterations
- Input dog population characteristics



# Scenario 1



## CONTROL PANEL

### DOG POPULATION

Number of dogs in program area	<input type="text" value="100000"/>
Confined dogs (n, %)	<input type="text" value="10"/>
Sometimes confined dogs (n, %)	<input type="text" value="70"/>
Never confined dogs (n, %)	<input type="text" value="30"/>

### DOG VACCINATION CAMPAIGN

Parenteral vaccines procured (number)	<input type="text" value="60000"/>
Oral vaccines procured (number)	<input type="text" value="10000"/>

### VACCINATION STRATEGY (PERCENTAGE)

CP Central Point	<input type="text" value="20"/>
DD Door to Door	<input type="text" value="70"/>
CVR Capture, Vaccinate, Release	<input type="text" value="10"/>

## EXPECTED VACCINATION EFFECTIVENESS BY METHOD

	CP	DD	CVR	ORV
Confined	<input type="text" value="95"/>	<input type="text" value="95"/>	<input type="text" value="5"/>	<input type="text" value="5"/>
Sometimes Confined	<input type="text" value="80"/>	<input type="text" value="80"/>	<input type="text" value="95"/>	<input type="text" value="95"/>
Never Confined	<input type="text" value="5"/>	<input type="text" value="5"/>	<input type="text" value="80"/>	<input type="text" value="95"/>

## CONFIDENCE

How confident are you in your responses to the probability table?

# Scenario 1



## RESULTS

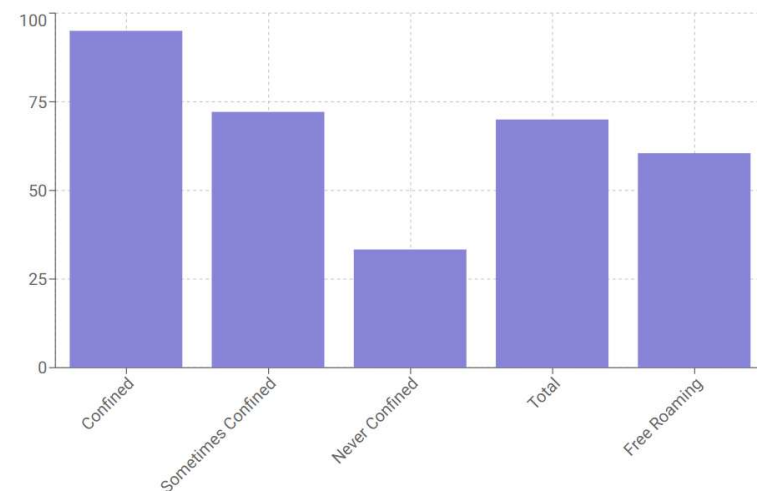
### VACCINATION DOSES BY STRATEGY

		Procured	Used	Unused
Central Point	CP	12000	12000	0
Door to Door	DD	42000	42000	0
Capture, Vaccinate, Release	CVR	6000	6000	0
Oral Vaccine Handouts	ORV	10000	10000	0

### VACCINATION DOSES BY DOG TYPE

	Vaccinated	Unvaccinated	Percent	Lower	Upper
Confined	9500	500	95%	89%	100%
Sometimes Confined	50500	19500	72.1%	66.1%	78.1%
Never Confined	10000	20000	33.3%	27.3%	39.3%

### VACCINE USAGE BY DOG TYPE



# Scenario 2



## CONTROL PANEL

### DOG POPULATION

Number of dogs in program area  
Confined dogs (n, %)  
Sometimes confined dogs (n, %)  
Never confined dogs (n, %)

100000
10
20
70

### DOG VACCINATION CAMPAIGN

Parenteral vaccines procured (number)  
Oral vaccines procured (number)

60000
10000

### VACCINATION STRATEGY (PERCENTAGE)

CP Central Point  
DD Door to Door  
CVR Capture, Vaccinate, Release

20
70
10

## EXPECTED VACCINATION EFFECTIVENESS BY METHOD

	CP	DD	CVR	ORV
Confined	95	95	5	5
Sometimes Confined	40	80	95	95
Never Confined	5	5	80	95

## CONFIDENCE

How confident are you in your responses to the probability table?

5
---

# Scenario 2



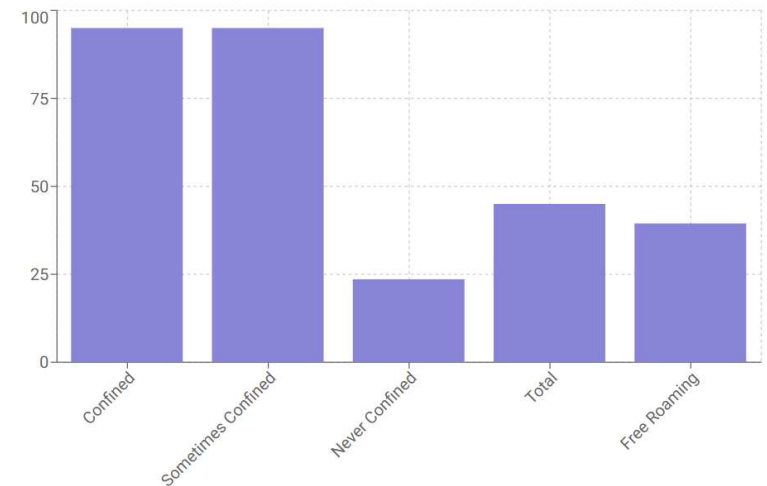
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		Procured	Used	Unused
Central Point	CP	12000	12000	0
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Capture, Vaccinate, Release	CVR	6000	6000	0
Oral Vaccine Handouts	ORV	10000	10000	0

## VACCINATION DOSES BY DOG TYPE

	Vaccinated	Unvaccinated	Percent	Lower	Upper
Confined	9500	500	95%	89%	100%
Sometimes Confined	19000	1000	95%	89%	100%
Never Confined	16500	53500	23.6%	17.6%	29.6%

## VACCINE USAGE BY DOG TYPE



# In Summary

- Describe your dog population
  - Confinement: Confined, Sometimes, Roaming
  - Ownership: Owned, Community Owned, Stray
  - Accessibility
- Choose appropriate vaccination methods
  - Fixed Point, Door to Door, Capture-Vaccinate-Release, ORV
- Identify your workforce
  - Who is available?
  - What is your budget?
- Understand community buy-In
- Choose high quality vaccines
  - Efficacy, thermostability, expiration dates



# Rabies ECON

# Rabies Econ Tool

- Mathematical model that can estimate the rate of dog-to-dog and dog-to-human rabies virus transmission
- Supports governments in the planning and assessment of elimination programs
- Estimates cost and benefits of different vaccination strategies
- Models spread of rabies in dogs
  - Susceptible
  - Exposed
  - Infected/infectious
  - Removed/immune
- Allows for year-to-year changes in vaccination coverage



# Rabies Econ Tool

- The model includes several user-defined interventions such as
  - dog vaccination
  - human vaccination
  - population management
- Users can define their program area, input basic factors describing the community and design their own interventions to determine the cost-effectiveness of rabies control





**Thank you!**

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