

# The malaria vector control situation in vietnam

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# Malaria vector control network

Minister of health

\*national malaria control program

\* Vector Control Sub-Committee

Hanoi

STAFF:

City

- National Institutes of Malariology, Parasitology & Entomology,

- Institutes of Malariology, Parasitology & Entomology, Qui Nhon

- Institutes of Malariology, Parasitology & Entomology, Ho Chi Minh

- Army Institute of Hygiene and Epidemiology

\* Provincial Malaria Centers

\* District Health Mobile Teams

\* Commune Health Centers

# INTRODUCTION

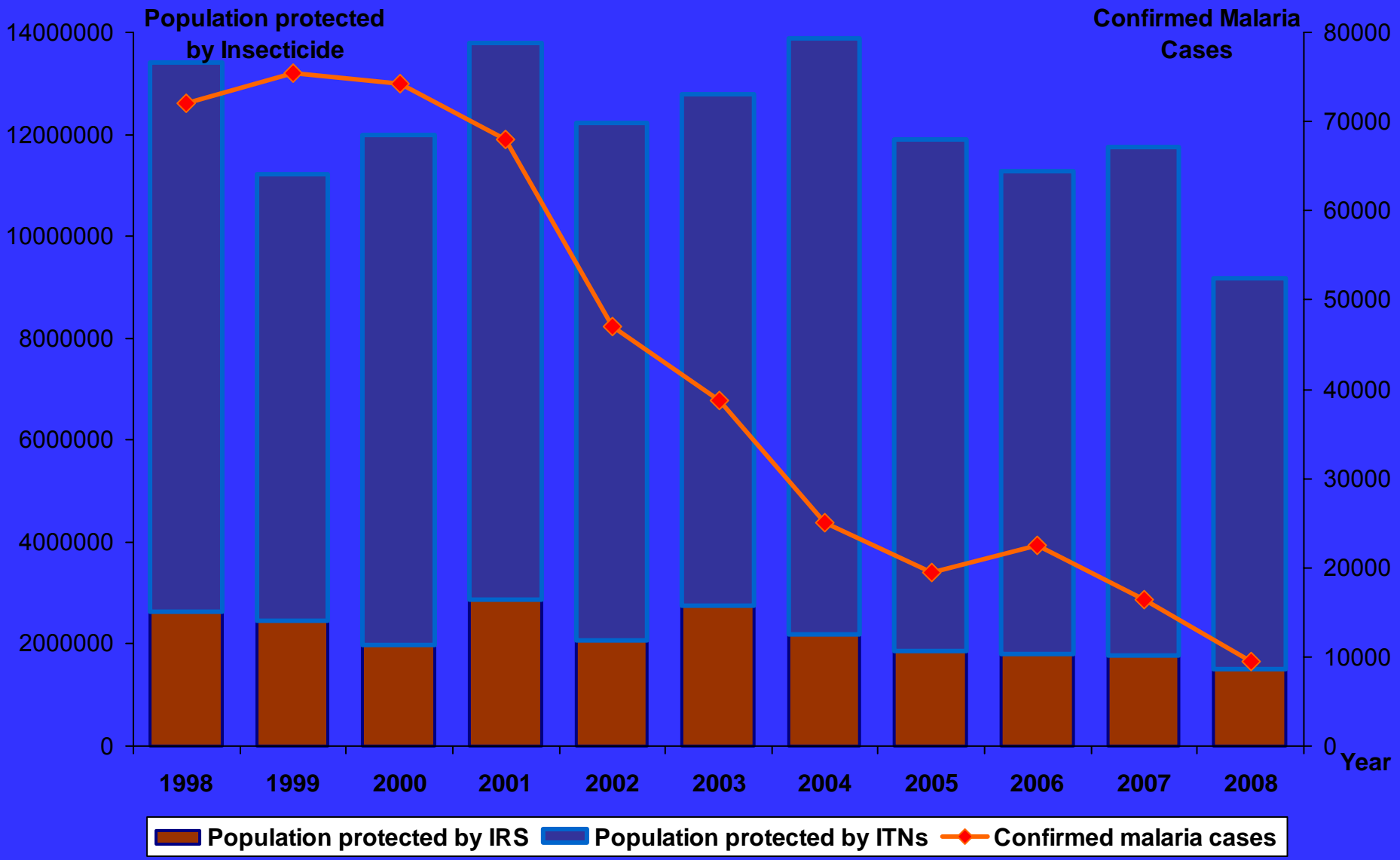
- Malaria morbidity below 2.1/1,000 and mortality below 0.05/100,000
- *Three major vectors: An. dirus s.l., An. epiroticus, An. minimus s.l.*
- In Vietnam, insecticide resistance monitoring of *Anopheles* mosquitoes has been carried out regularly

# INTRODUCTION (conti..)

- \*Over 95% of the households had bednets
- \*65% of the total existing bednets had been impregnated with insecticide
- \*Indoor residual spraying had been applied to about 25% of the households
- \*People were regularly using bednets in 91% of the total households surveyed, and 68.5% of the people interviewed were sleeping under ITNs

# Chemicals had been used in Vietnam

No	compound	class	formulation	Duration using	Type of application	For control of
1	Permethrin 0,75%	pyrethroid	EC	1990-2001	Treatment of mosquito nets	malaria
2	Alpha-cypermethrin 30mg/m <sup>2</sup>	pyrethroid	SC	2003 up to now	Indoor residual spraying	malaria
3	Lambda-cypermethrin 0,05%	pyrethroid	CS	2003 up to now	Treatment of mosquito nets	malaria
4	DDT 4%	organochlorine	WP	1960-1990	Indoor residual spraying	malaria



Vector Control and Confirmed Malaria Cases

# METHODS FOR RESISTANCE MONITORING

- susceptibility test WHO/CDS/CPS/MAL/98.12
- *Bioassay test* WHO/CDS/CPS/MAL/2006.3
- molecular assays
- biochemical assays

# RESULTS

\*The two major insecticide resistance mechanisms:

Kdr mutation in: An.sinensis, An.vagus

Metabolic resistance: Anopheles epiroticus

\*Anopheles dirus s.l., the main vector in forested malaria foci, was susceptible to permethrin

\*In Vietnam, tolerant Anopheles minimus has been susceptible to pyrethroid group in almost areas, a little An. minimus s.l. populations showed tolerance to Lambda-cypermethrin 0,05%, Permethrin 0,75%

\*The main vector, Anopheles epiroticus, has been highly resistance to pyrethroid group



# Test results of *Anopheles minimus* khai/rao communes at Tan Lạc, Hoa Binh (10/2006)

N.o	insecticide	Number of mosquito	Knockdown during exposure after time of contact			mortality after 24 hours	number dead
			20'	40'	60'		
1	Permethrin 0,75%	100	34	100	100	88	88
			51	100	100	100	100
	control	20	0	0	0	0	0
2	Alpha-cypermethrin 30mg/m <sup>2</sup>	100	42	92	100	80	80
			57	100	100	100	100
	control	20	0	0	0	0	0
3	Lambda-cypermethrin 0,05%	100	36	94	100	82	82
			57	100	100	100	100
	control	20	0	0	0	0	0
4	DDT 4%	100	39	81	100	100	100
			63	100	100	100	100
	control	20	0	0	0	0	0

# Test results of *Anopheles minimus* in 2007

N.o	insecticide	province	Number of mosquito	mortality after 24 hours	%
1	Malathion 5%	Quang ninh	103	103	100
		Lang son	200	199	99,9
		Bac can	185	185	100
2	Alpha-cypermethrin 30mg/m <sup>2</sup>	Quang ninh	147	107	78,05
		Lang son	200	188	94
		Bac can	201	196	97,05
3	Lambda-cypermethrin 0,05%	Quang ninh	203	187	92
		Lang son	200	195	97,5
		Bac can	112	196	97,2
4	DDT 4%	Quang ninh	102	102	100
		Lang son	200	200	100
		Bac can	130	129	99,9
5	Propoxur	Quang ninh			
		Lang son	200	199	99,9
		Bac can	185	185	100

# Vector control strategy

- Mainly use insecticides to protect people from biting of malaria vectors.
- Insecticide impregnated bed-net is main measure. (at present)
- Free of charge and subsidized price for insecticides, nets & services.
- Prioritize hyper endemic areas, ethnic minority and remote areas.

# Criteria for Insecticides

1. WHO accepted for public health use
2. Registered to use in Vietnam
3. Evaluation for effectiveness in malaria vector control in pilot trials (in 3 zones: North, Center and South)
4. Effectiveness but safe for people, animal
5. No pollution to environment
6. No bad smell
7. Low cost

# Measure Selections

- Residual spraying (1 time per year) for:
  - Outbreak malaria
  - Meso & hyper endemic areas
  - Not enough net or <80% sleeping under net
  - Newly settle zones
- Bed-net Impregnations (1 times per year)
  - Most of endemic areas
  - People going to endemic areas
- Others
  - Mosquito Cream, Mosquito Coil
  - Environmental clearance
  - Larva control (fishes, Bacillus)

# Priority

- Free of charge for insecticides and services
- Nets are free of charge for the poor and sold at subsidized prices
- Cover protecting by insecticides all of meso & hyper endemic areas

# Monitoring of Vector Control

- Method selected is Judicious or not.
- Quality of applied measures:
  - Doses of insecticides
  - Coverage
  - Residual time
  - Technique
  - Expenditure

Thank you for your attention