

MALARIA SITUATION IN THAILAND

JITMM 2007

WICHAI SATIMAI

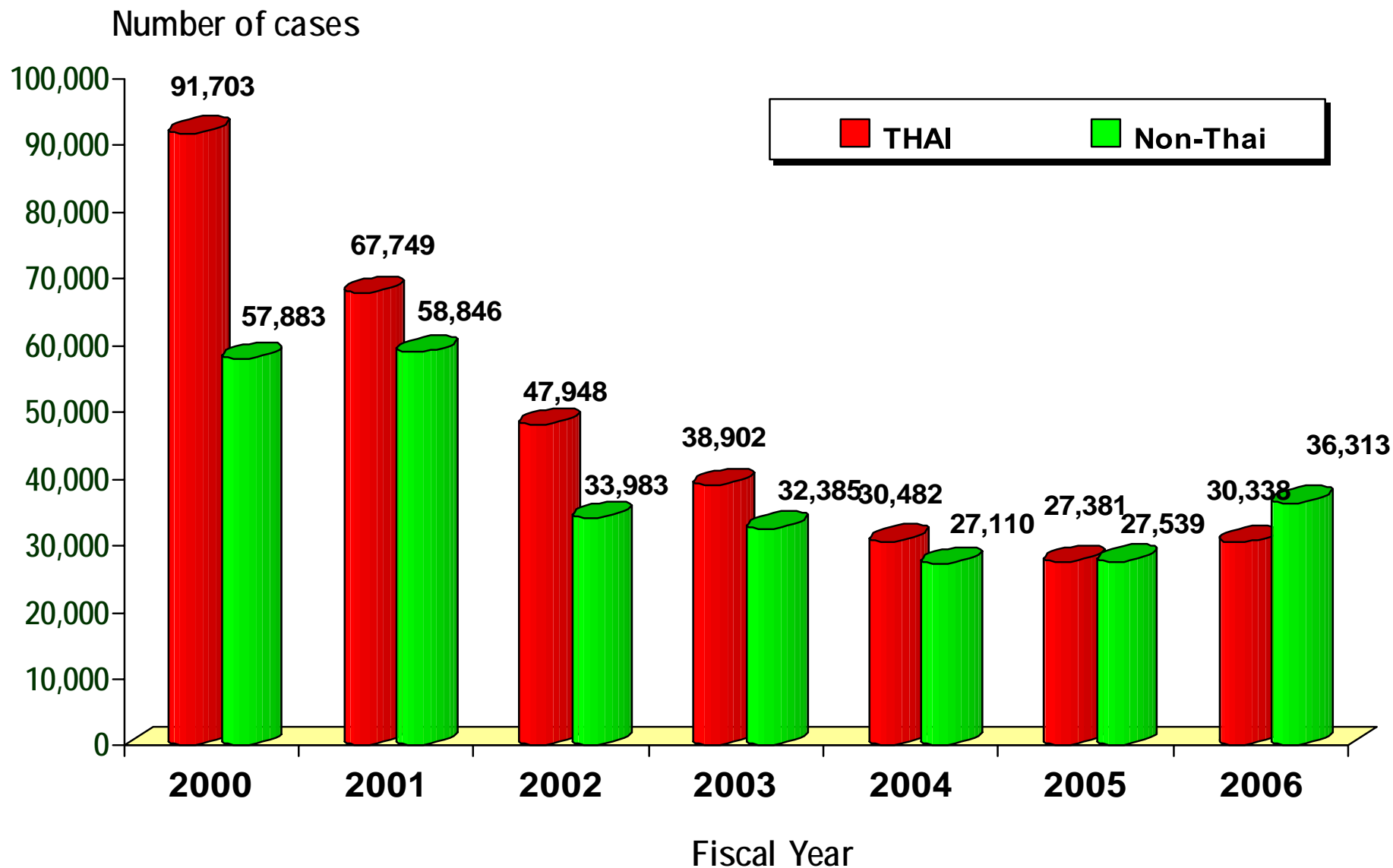
BUREAU OF VECTOR BORNE DISEASE

DEPARTMENT OF DISEASE CONTROL

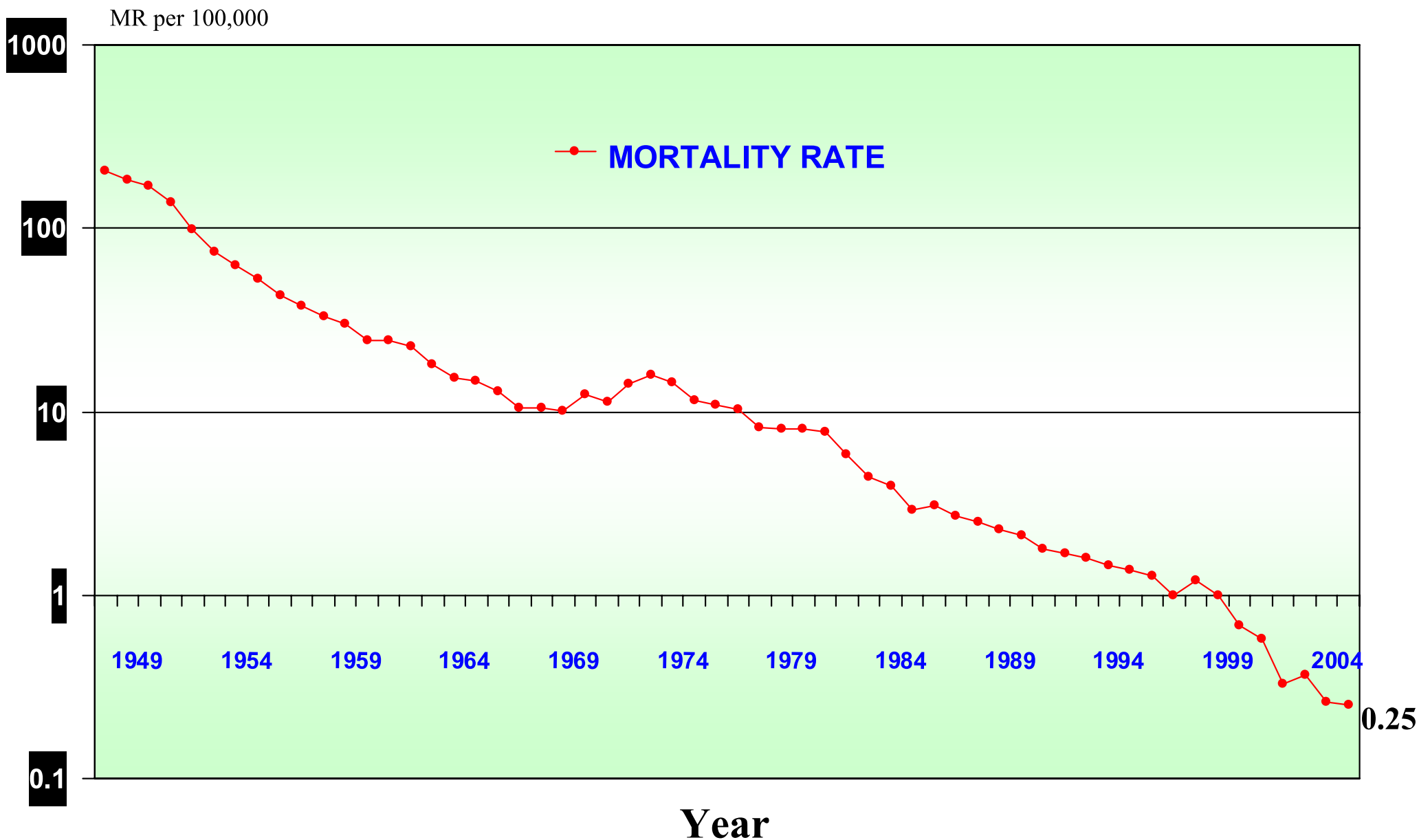
MINISTRY OF PUBLIC HEALTH

29 November 2007

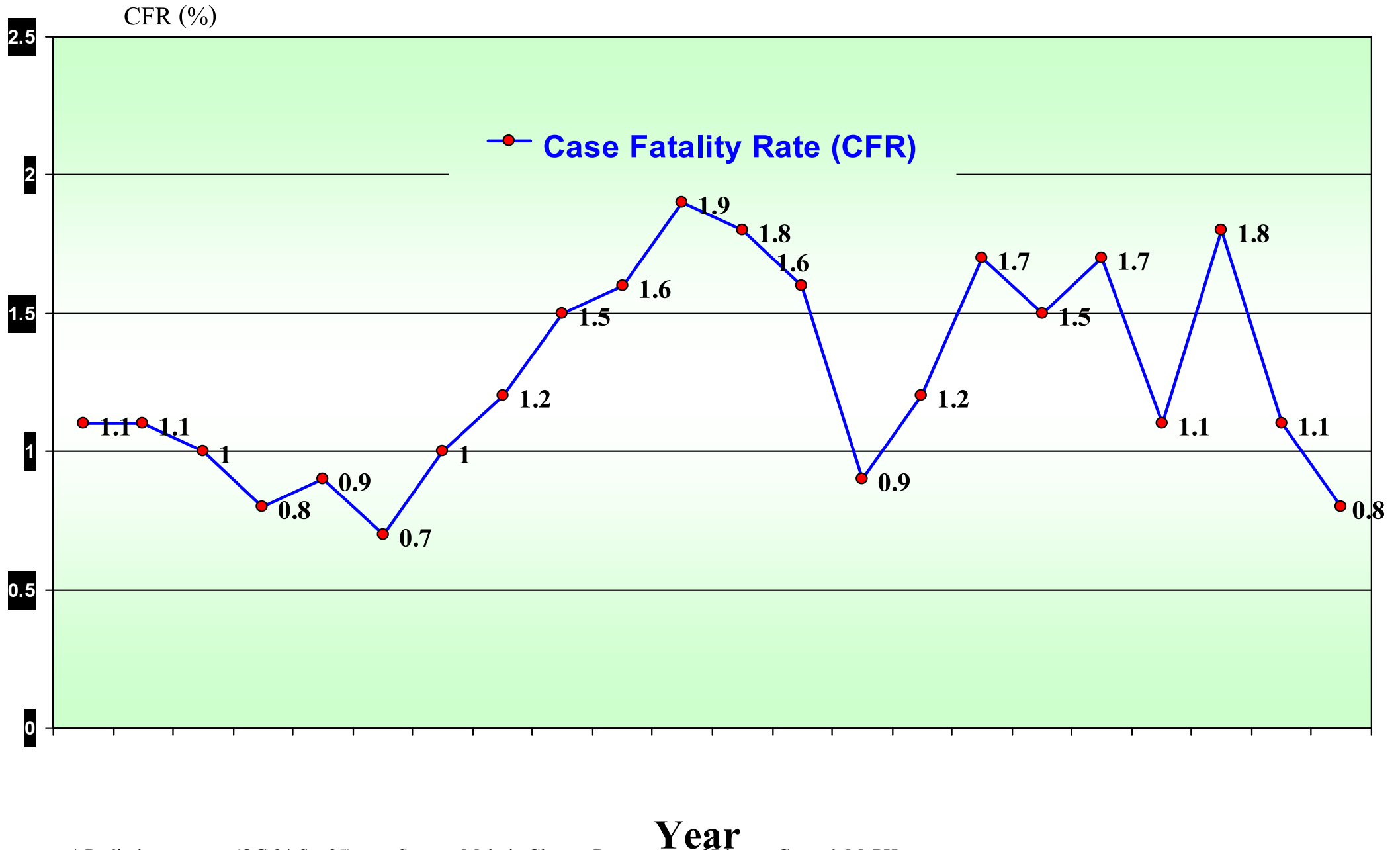
Thai and Non-Thai malaria cases Fiscal Year 2000-2006



Malaria Mortality Rate, Thailand, 1949-2006.



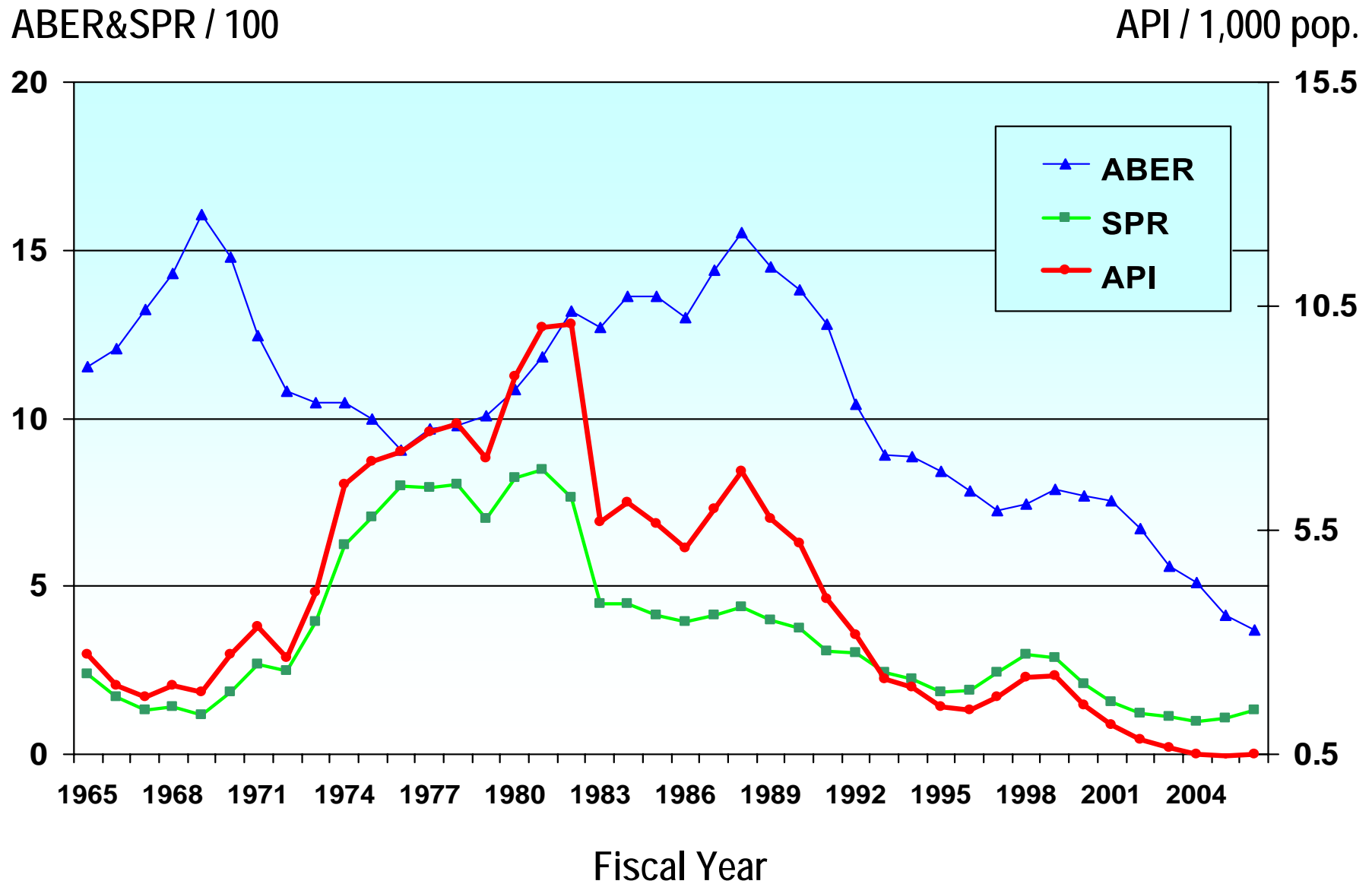
Case fatality rate of falciparum malaria Thailand, 1985-2005.



* Preliminary report (Oct04-Sep05)

Source: Malaria Cluster, Department of Disease Control, MoPH

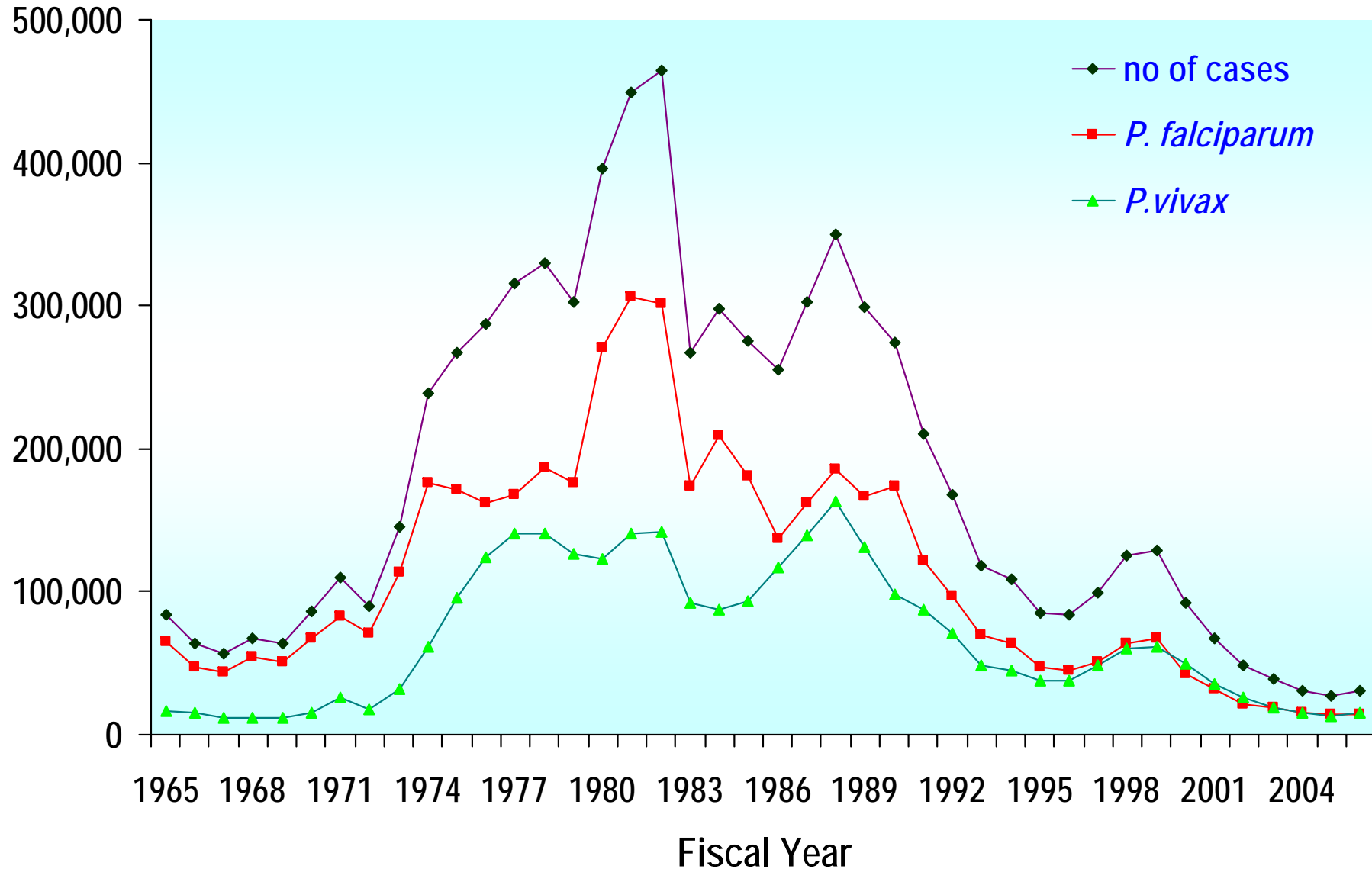
Annual Parasite Incidence (API), Annual Blood Examination Rate (ABER) and Slide Positive Rate (SPR) of Thai cases, Thailand, FY 1965-2006



Source: Malaria Cluster, Department of Disease Control, MoPH

Thai malaria cases and parasite species Fiscal Year 1965-2006

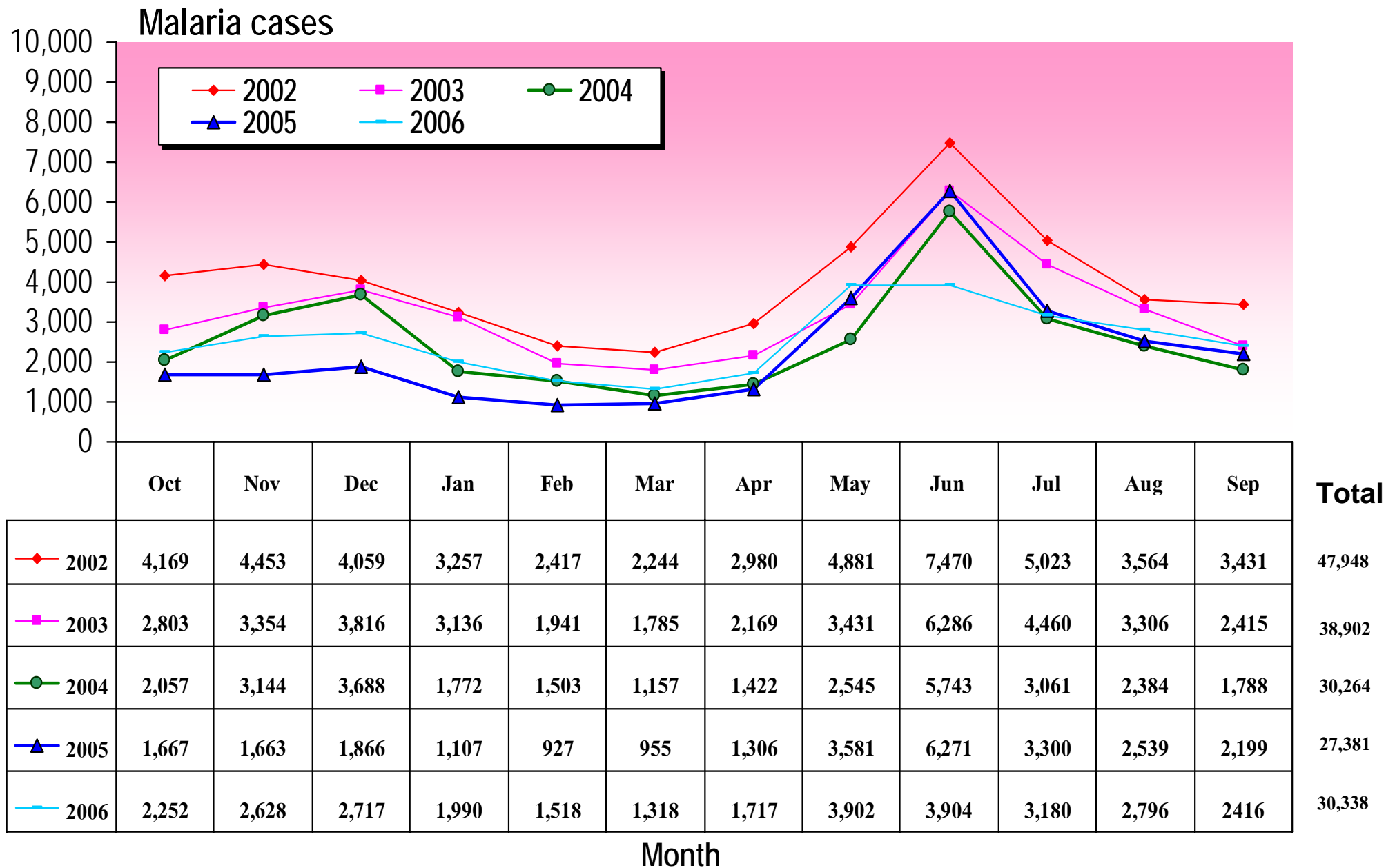
Number of cases



* Preliminary report (Oct05 - Sep06)

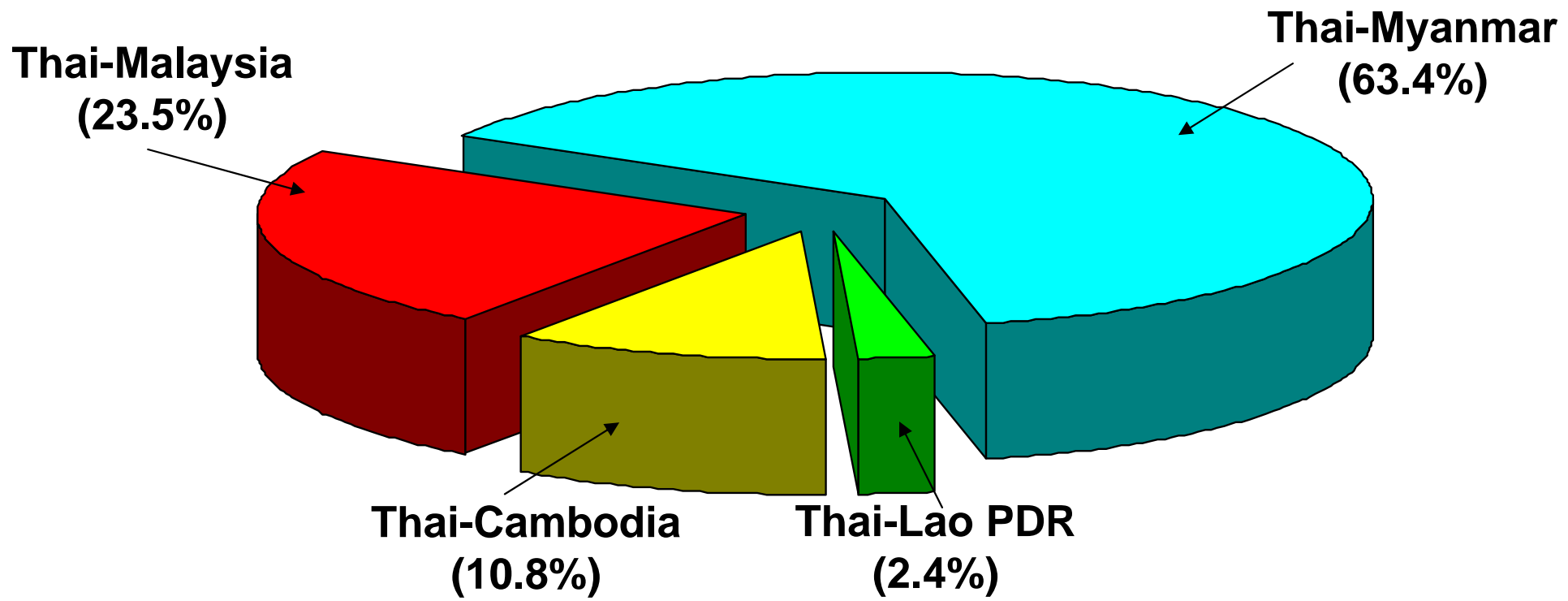
Source: Malaria Cluster, Department of Disease Control, MoPH

Monthly malaria cases, FY 2002-2006

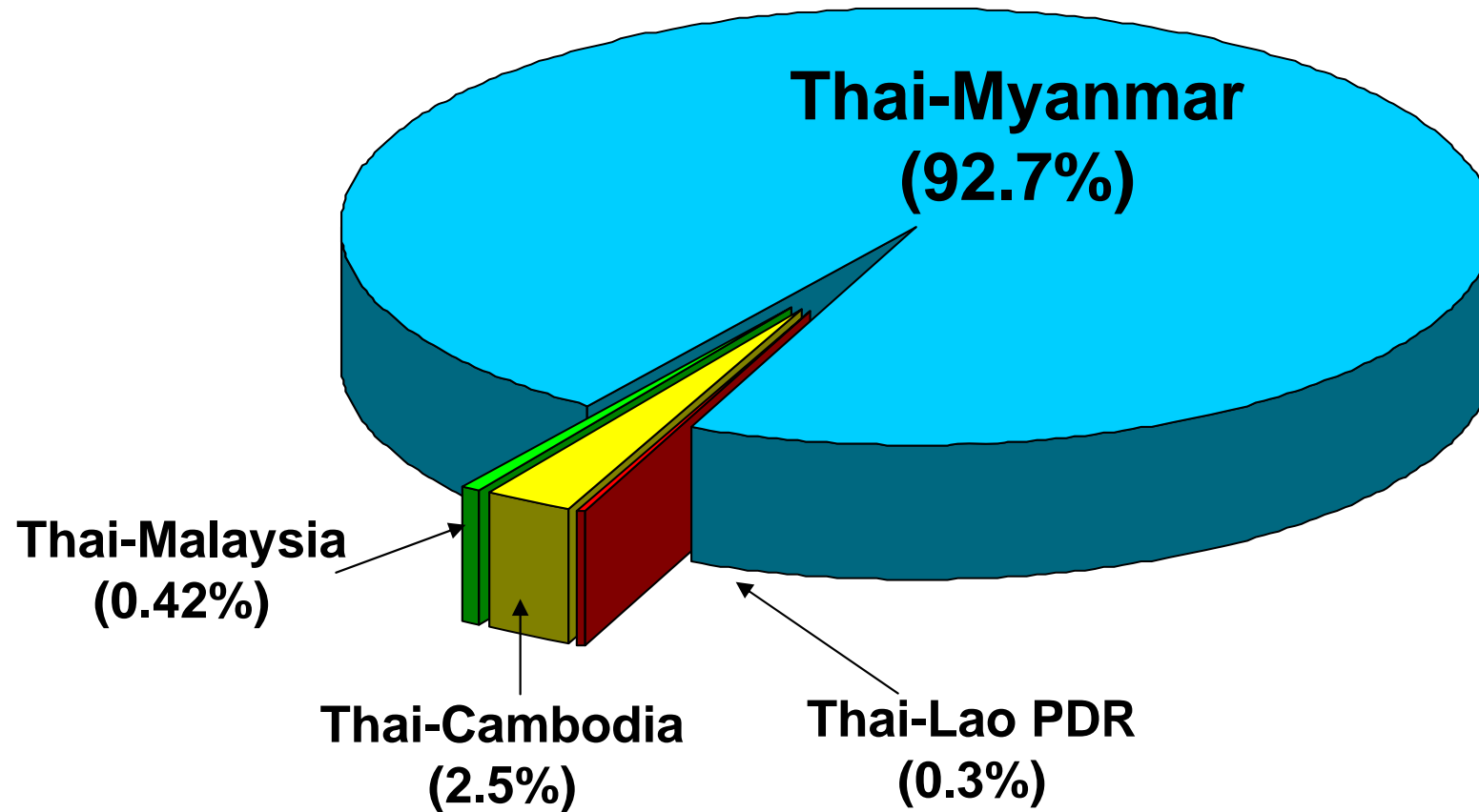


Source: Malaria Cluster, Department of Disease Control, MoPH

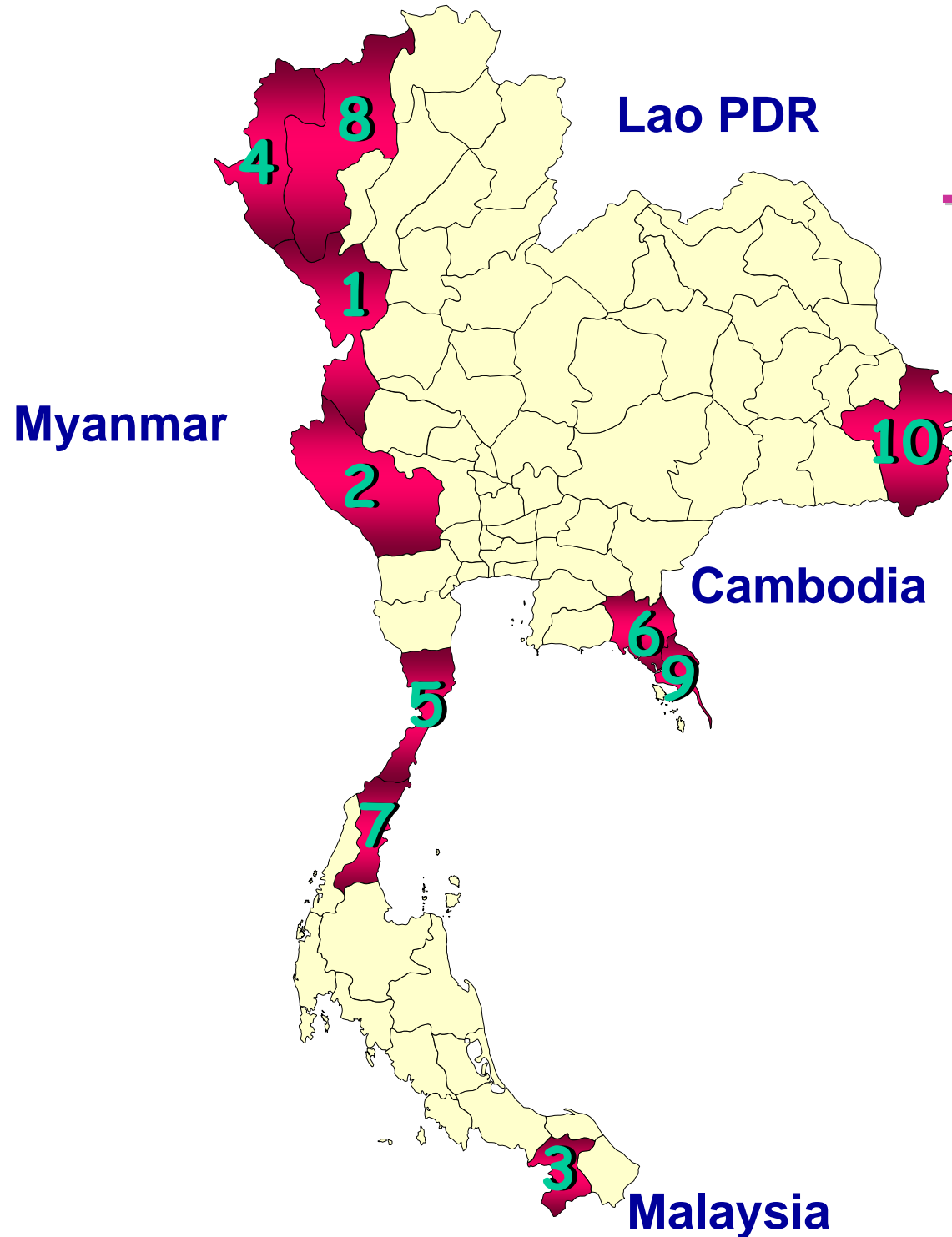
Proportion of **Thai cases** by border sites, Thailand, Fiscal Year 2006



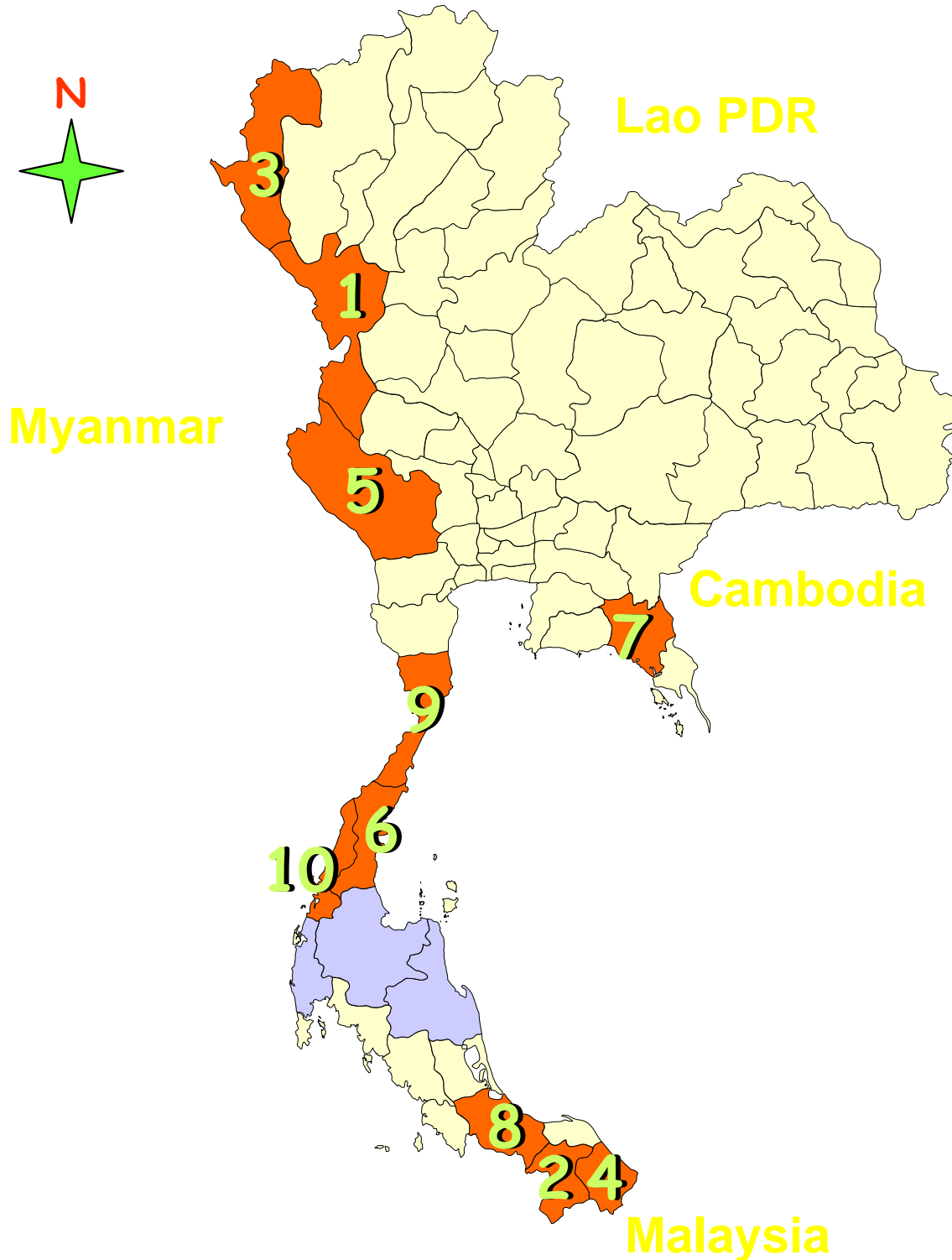
Proportion of foreign nationals cases by border sites, Thailand, Fiscal Year 2006



Map showing Top Ten Provinces of Thailand with highest malaria cases, 2004

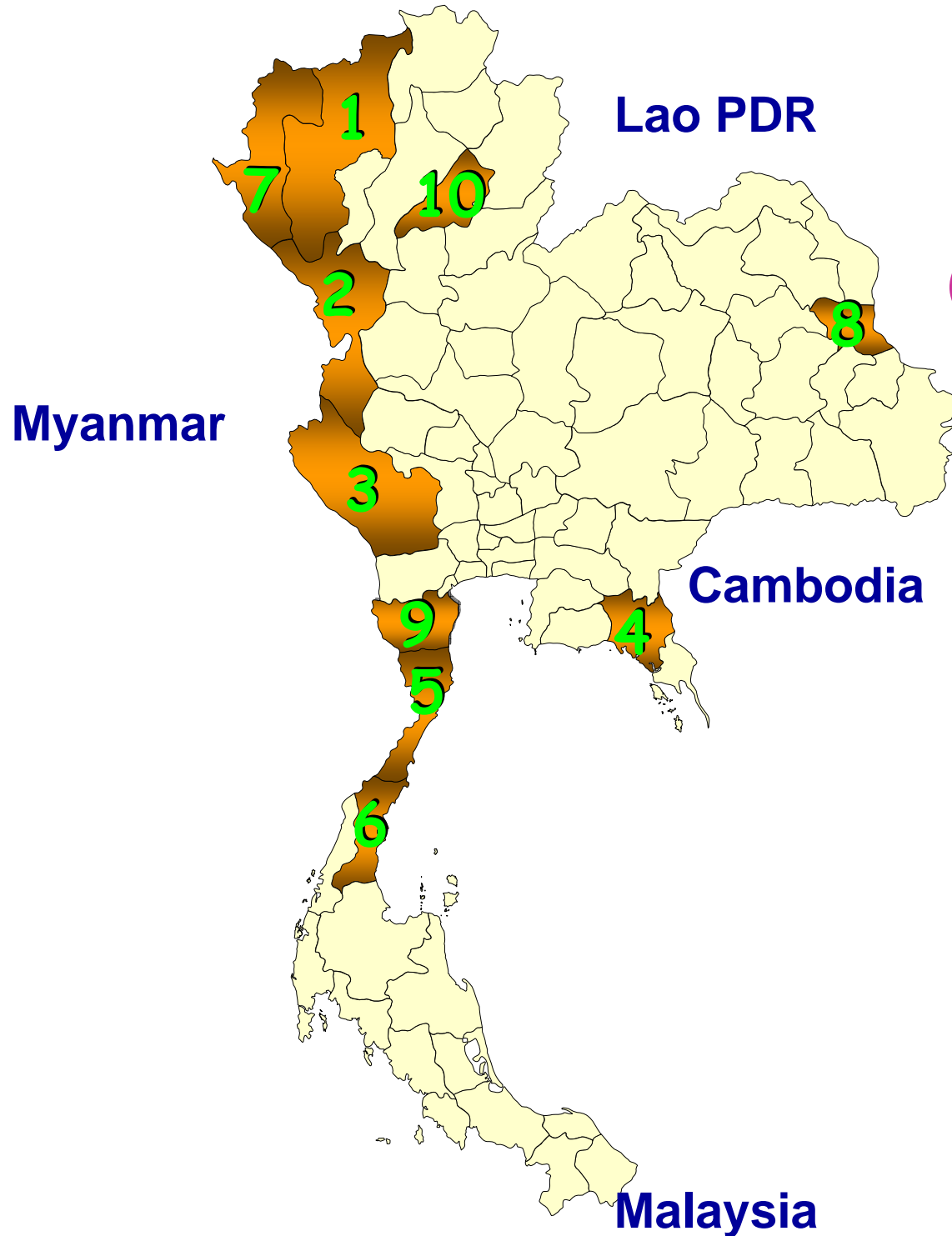


1. Tak (7,147)
2. Kanchanaburi (2,211)
3. Yala (1,903)
4. Mae Hong Son (1,659)
5. Prachuap Khiri Khan (1,621)
6. Chanthaburi (1,524)
7. Chumporn (1,485)
8. Chiang Mai (1,413)
9. Trat (1,016)
10. Ubon Ratchathani (979)



Map showing Top Ten Provinces of Thailand with highest malaria cases, 2006 (October 05 - September 06)

1. Tak (5,058)
2. Yala (3,550)
3. Mae Hong Son (2,411)
4. Narathiwat (1,758)
5. Kanchanaburi (1,250)
6. Chumporn (1,232)
7. Chanthaburi (1,224)
8. Songkla (1,164)
9. Prachuap Khiri Khan (1,108)
10. Ranong (1,072)

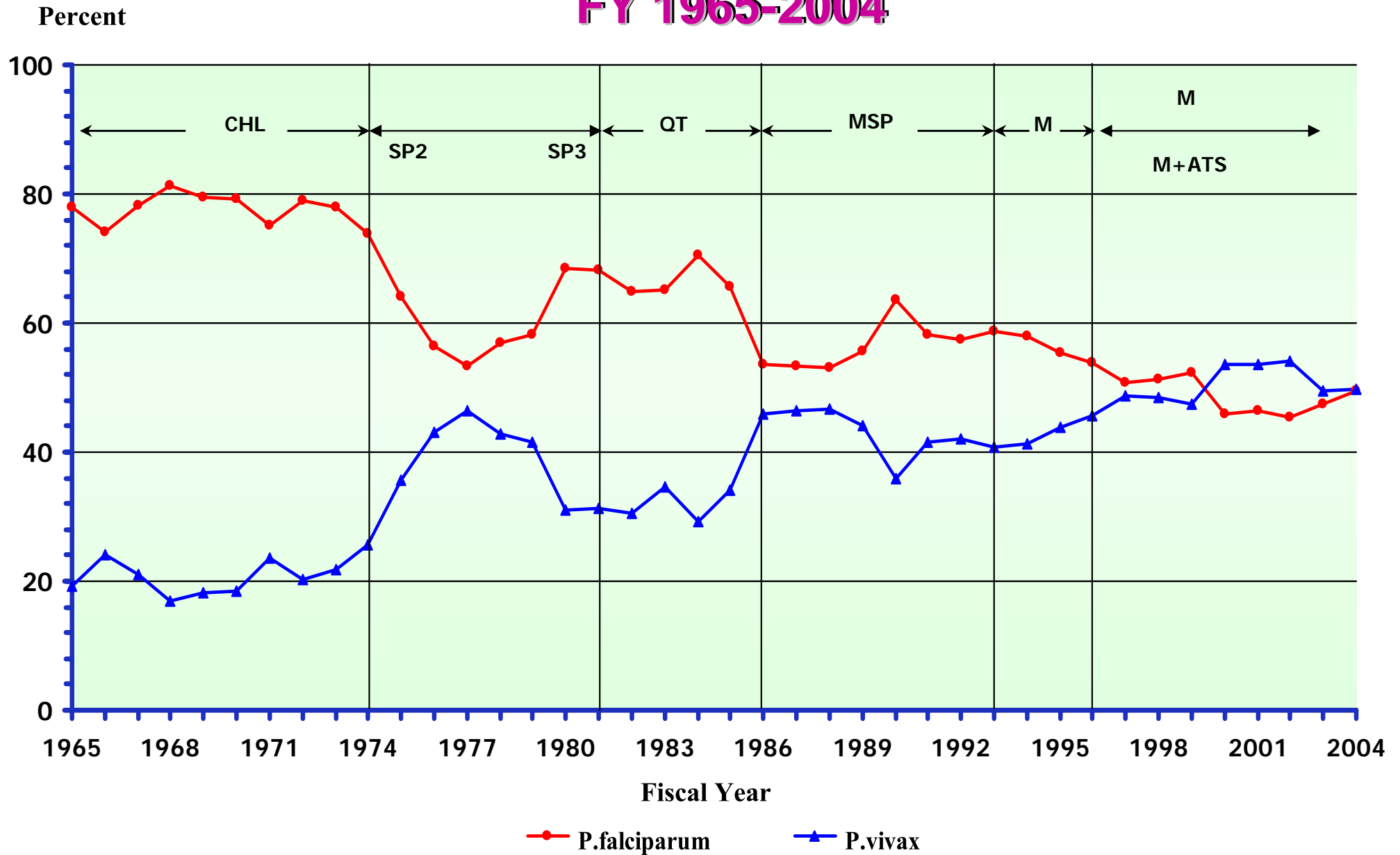


Map showing Top Ten Provinces with high mortality rate (per 100,000 pop.), 2003.



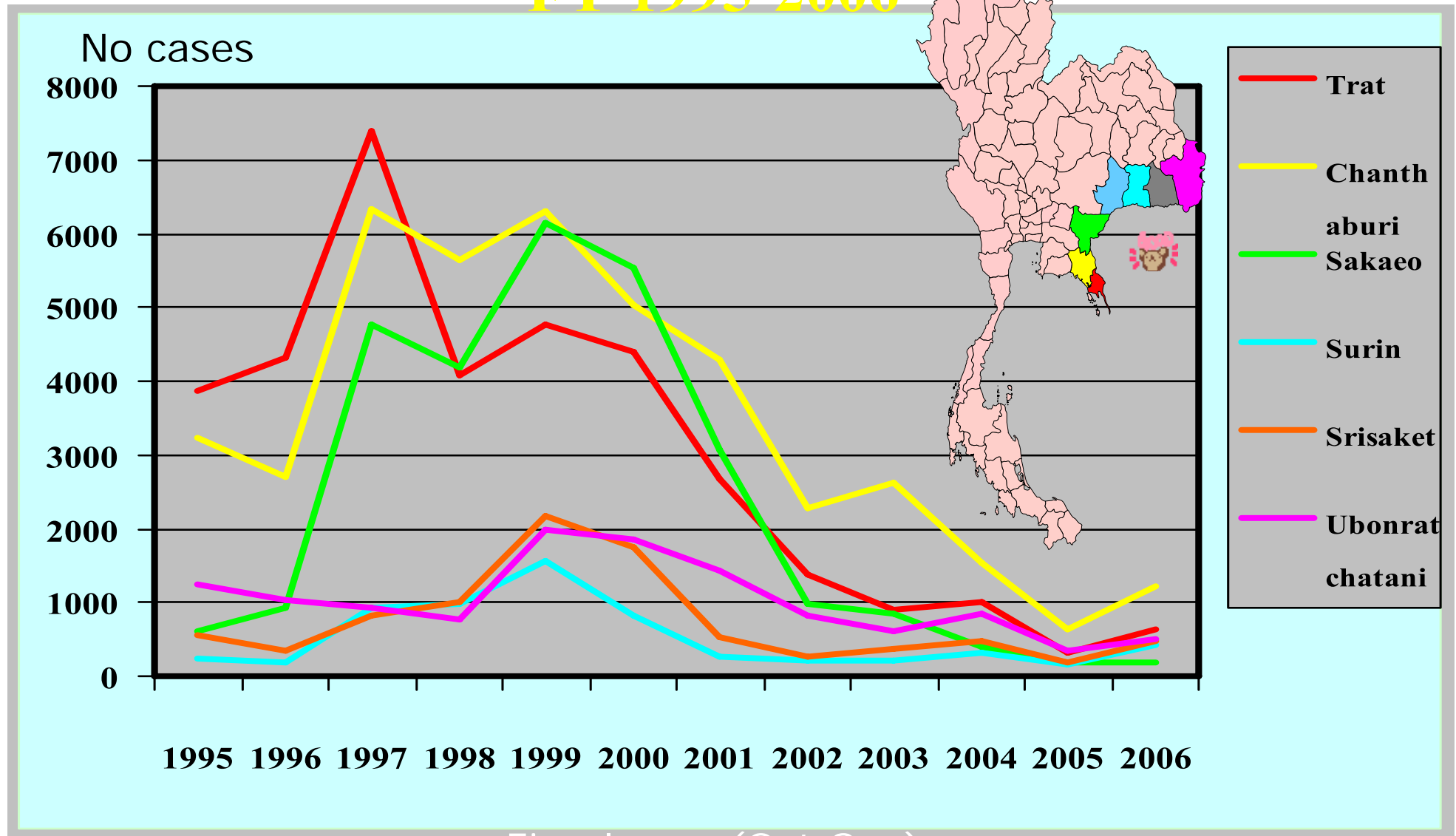
1. Mae Hong Son (5.87)
2. Tak (4.97)
3. Kanchanaburi (4.14)
4. Chanthaburi (2.98)
5. Prachuap Kiri Khan (2.88)
6. Chumporn (2.76)
7. Chiangmai (2.25)
8. Mukdahan (1.48)
9. Petchaburi (1.3)
10. Phare (1.24)

Proportion of malaria parasite species in relation to the National drug policy, Thailand, FY 1965-2004



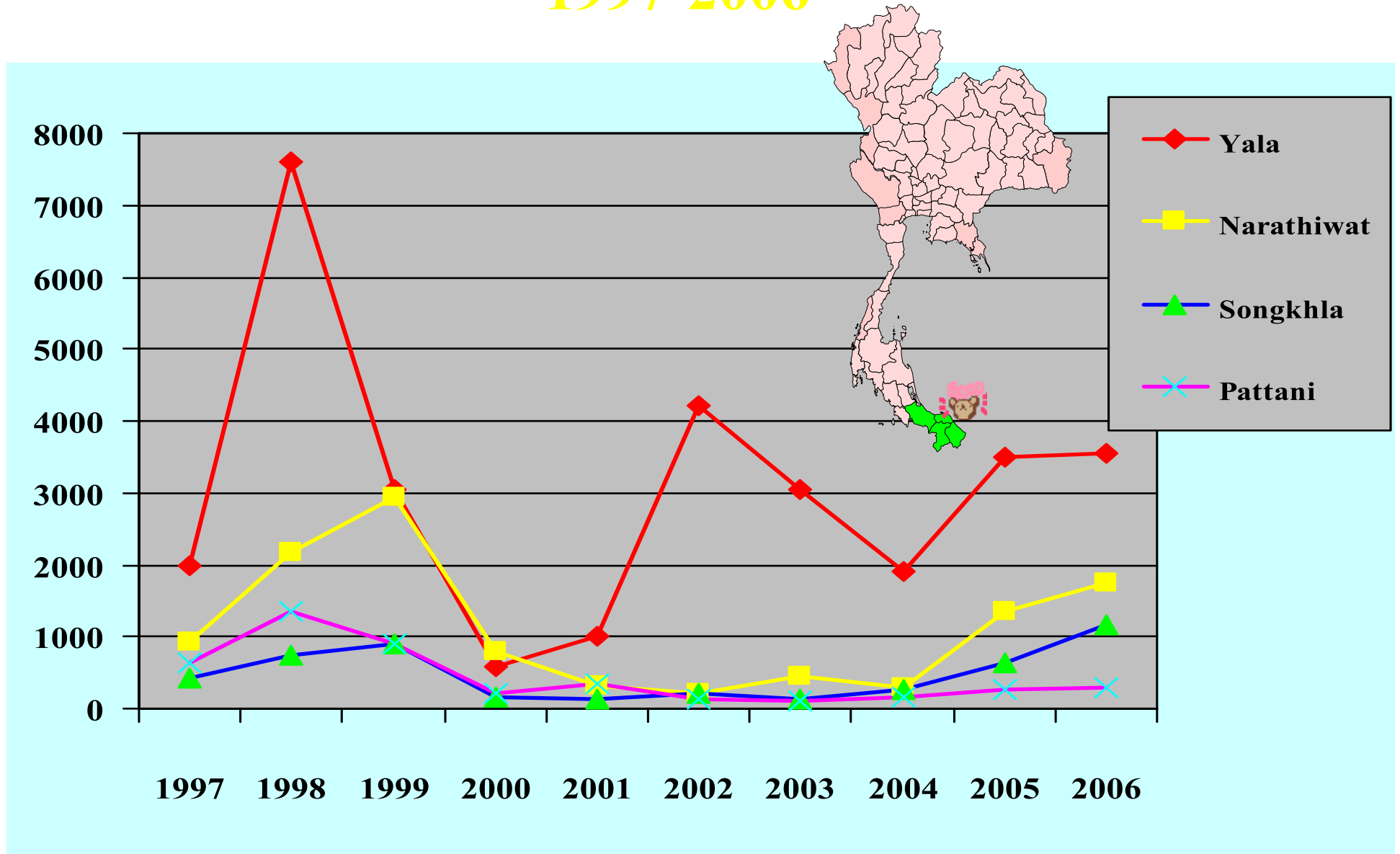
Malaria cases in Thai/Cambodian Border Provinces

FY 1995-2006



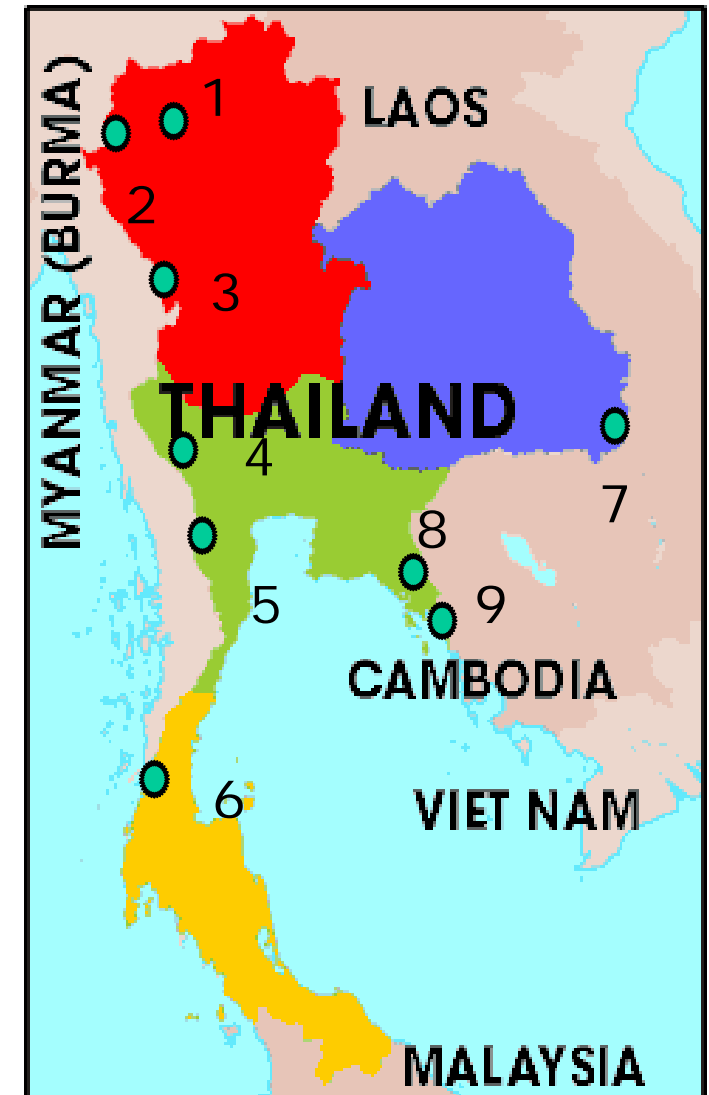
Malaria cases in Thai/Malaysian Border Provinces

1997-2006



Monitoring Malaria Drug Resistance in Thailand

1. Mae Hong Son
2. Tak
3. Kanchanaburi
4. Ratchaburi
5. Ranong
6. Ubon Ratchathani
7. Chiang Mai
8. Chanthaburi
9. Trat



Treatment Efficacy of Mefloquine monotherapy and ACT against falciparum malaria in Thailand, 1997 - 2003

Mae Hong Son mef 750 mg. +p 15 mg

1997 ACR=87.8% (n=41)

2002 ACR=73.2% (n=56)

2003* ACR= 67.7% (n=32)

Kanchanaburi mef 750 mg. + p.30 mg

1997 ACR=82.0% (n=50)

2002 ACR=59.6% (n=109)

mef 750 mg+ art 600 mg+ p 30mg

2002 ACR=86.7% (n=45)

2003* ACR= 100% (n=65)

2003* ACR=94% (n=50)

Ubon Ratchathani

mef 750 mg. +p30mg

1997 ACR = 92% (n=50)

1998 ACR = 98% (n=50)

1999 ACR = 94% (n=51)

2002 ACR = 96.7% (n=30)

Ranong mef 750mg +p30mg

1997 ACR= 96%(n=51)

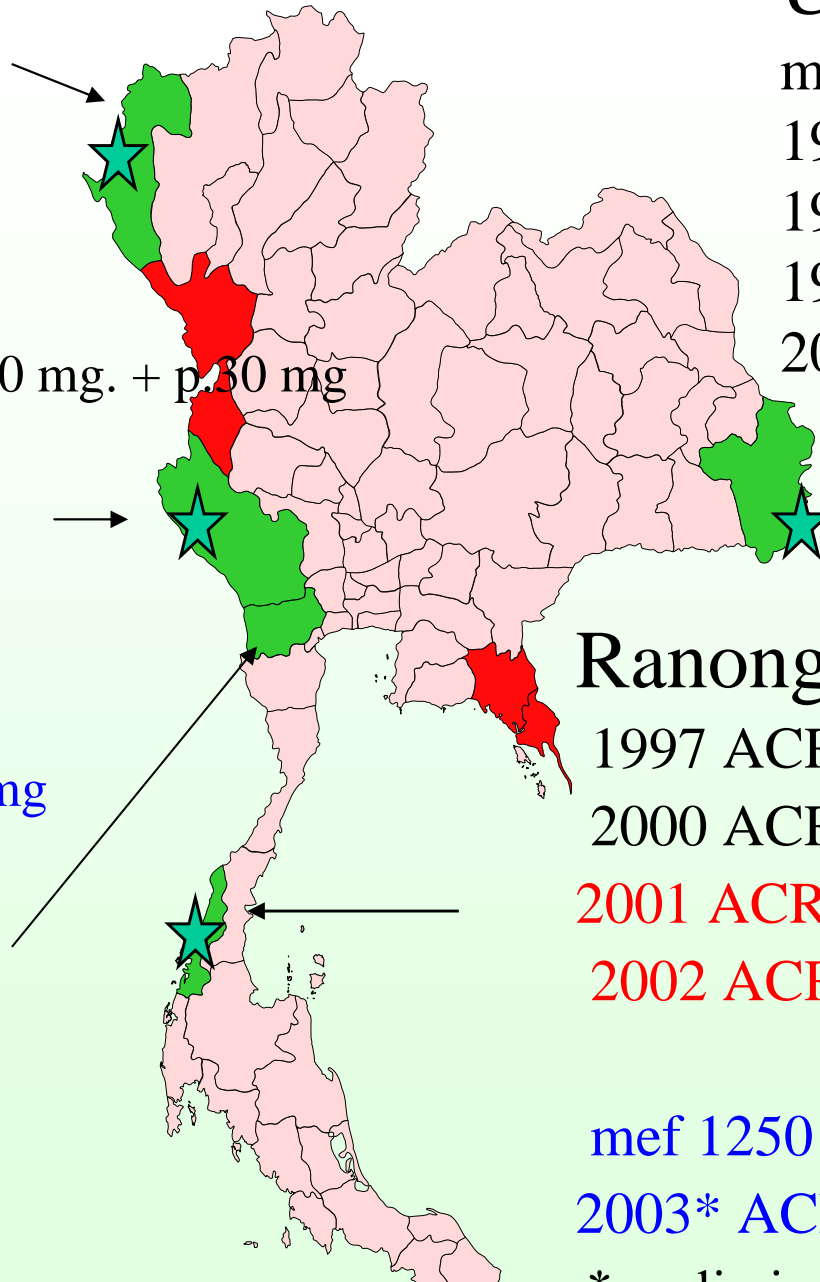
2000 ACR = 81% (n= 50)

2001 ACR = 38% (n=42)

2002 ACR = 31.6%(n=38)

mef 1250 mg+art 600mg+p 30mg

2003* ACR = 96.2 (n=26)



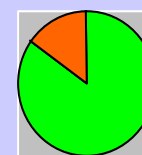
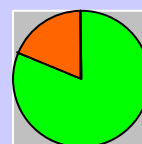
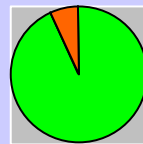
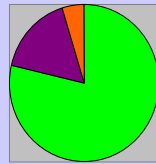
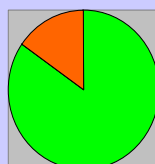
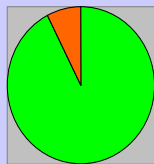
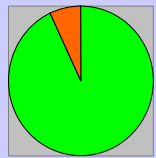
* indicates data from 2003

Trat

Mef 25 mg/kg + Art 12 mg/kg for 2 days

6/1/2007

	N	ACPR%	LTF%	ETF%
1997:	57	93	7	0
1998:	40	92.5	7.5	0
2002:	65	84.6	15.4	0
2003:	44	78.6	4.8	16.6
2004:	15	93.3	6.7	0
2005*:	22	81.8	18.2	0
2006:	46	85	15	0



1997

1998

2002

2003

2004

2005

2006

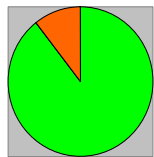
* PCR corrected

Tak

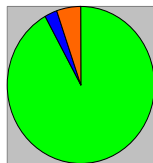


Mef 25 mg/kg + Art 12 mg/kg for 2 days

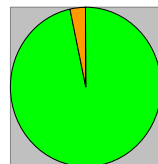
	N	ACPR%	LTF%	ETF%
1997:	38	89.5	10.5	0
2002:	39	92.3	5.4	2.6
2003:	71	96.6	3.4	0
2004:	47	86.5	13.5	0
2006:	46	89	11	0



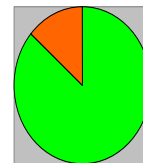
1997



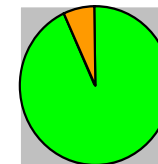
2002



2003



2004



2006



MHS

CHM

TR

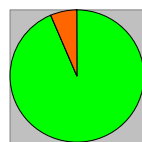
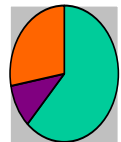
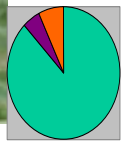
UB

TAK

KB

RB

RN

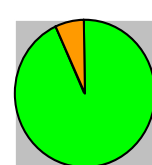
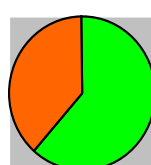
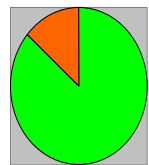
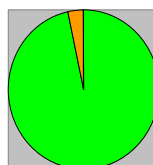
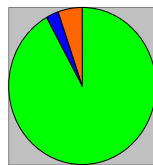
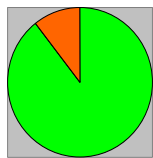


1997

2002

2003

2004



1997

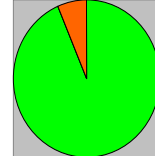
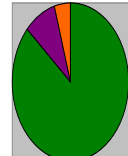
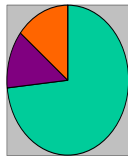
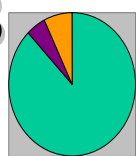
2002

2003

2004

2005

2006



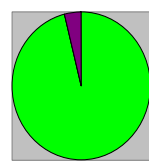
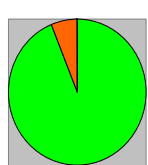
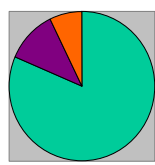
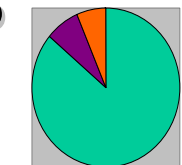
1997

2002

2002

2003

2004



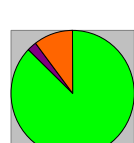
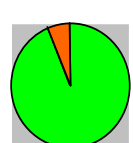
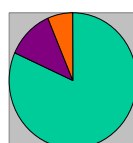
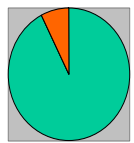
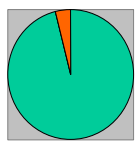
2002

2003

2004

2005

2006



1997

1998

2000

2002

2003

2004



M3



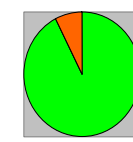
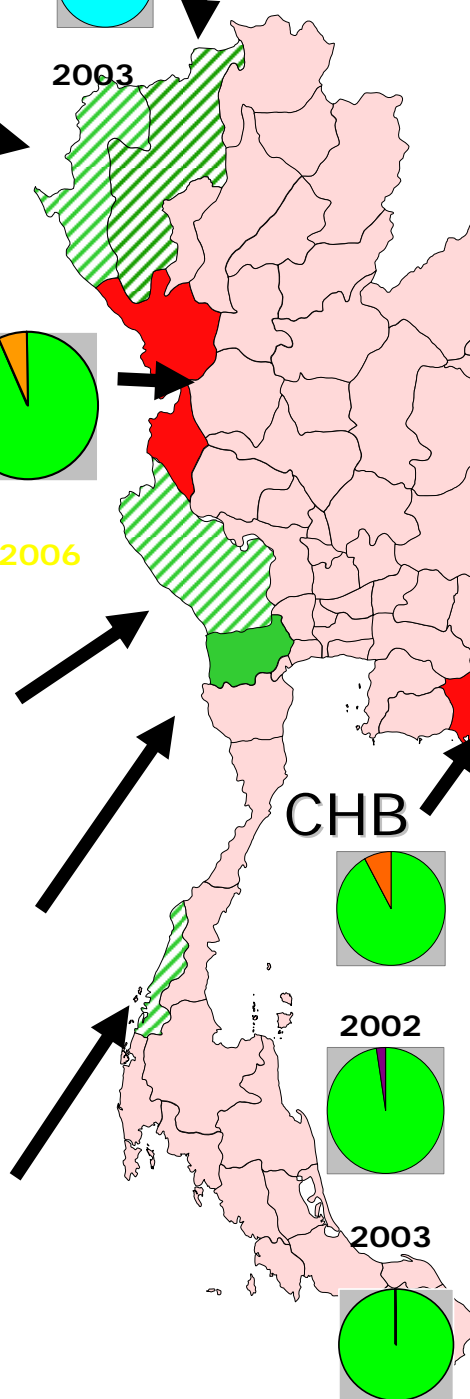
M3A12



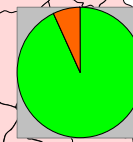
M5A12



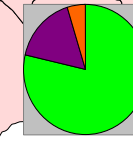
2003



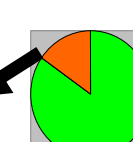
1997



1998



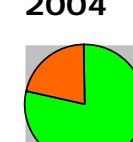
2002



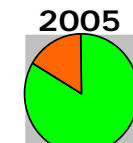
2003



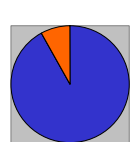
2004



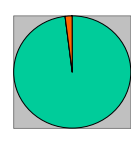
2005



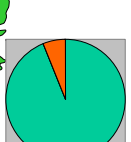
2006



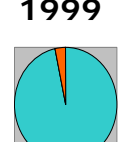
1997



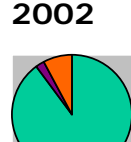
1998



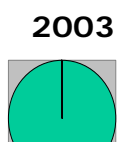
1999



2002

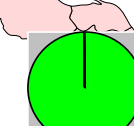
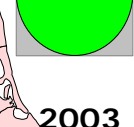
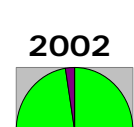
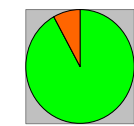


2003

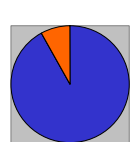


2004

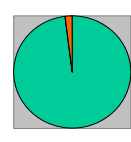
CHB



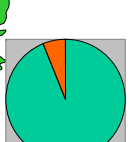
2004



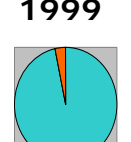
1997



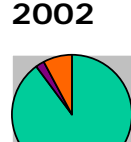
1998



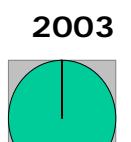
1999



2002

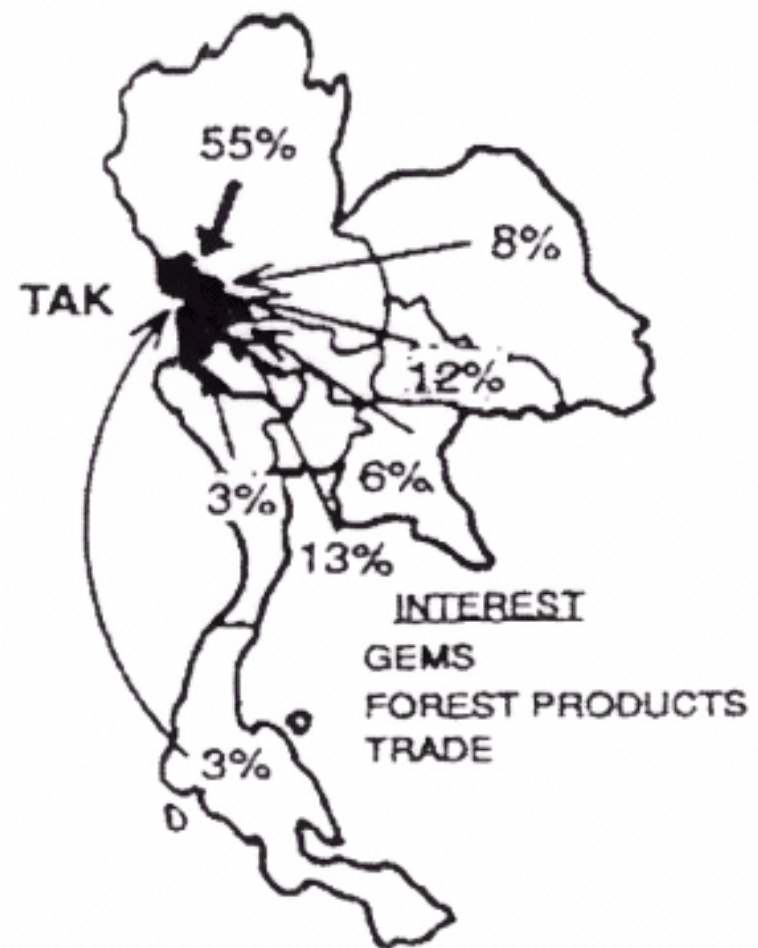
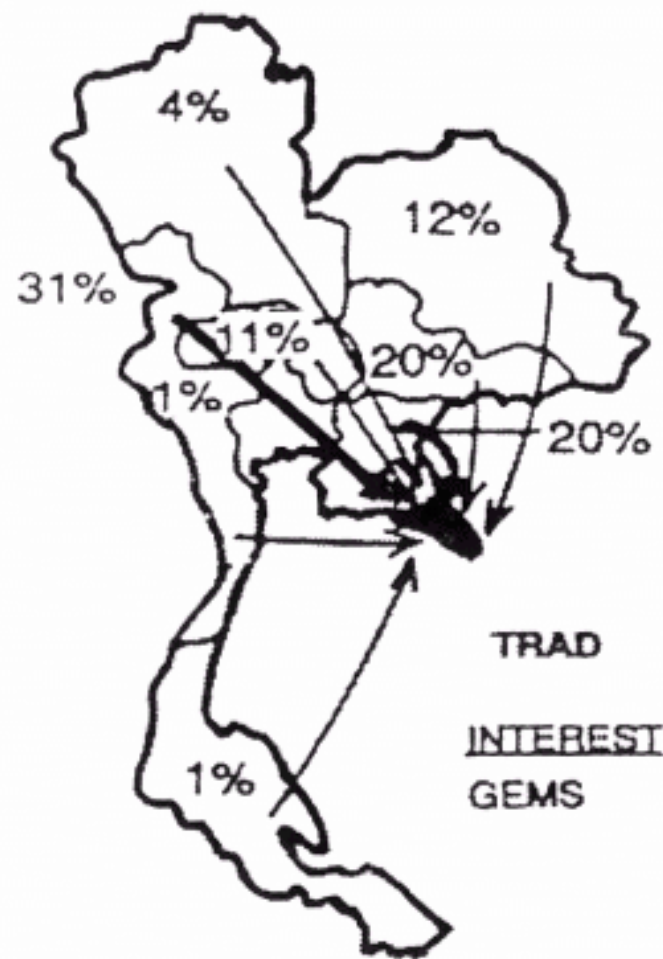


2003



2004

Pattern of migrations across the country in 1989-90 mostly due to common interest, gem-mining, after the opening of Thai-Cambodia Border near “Pailin” (Cambodia).

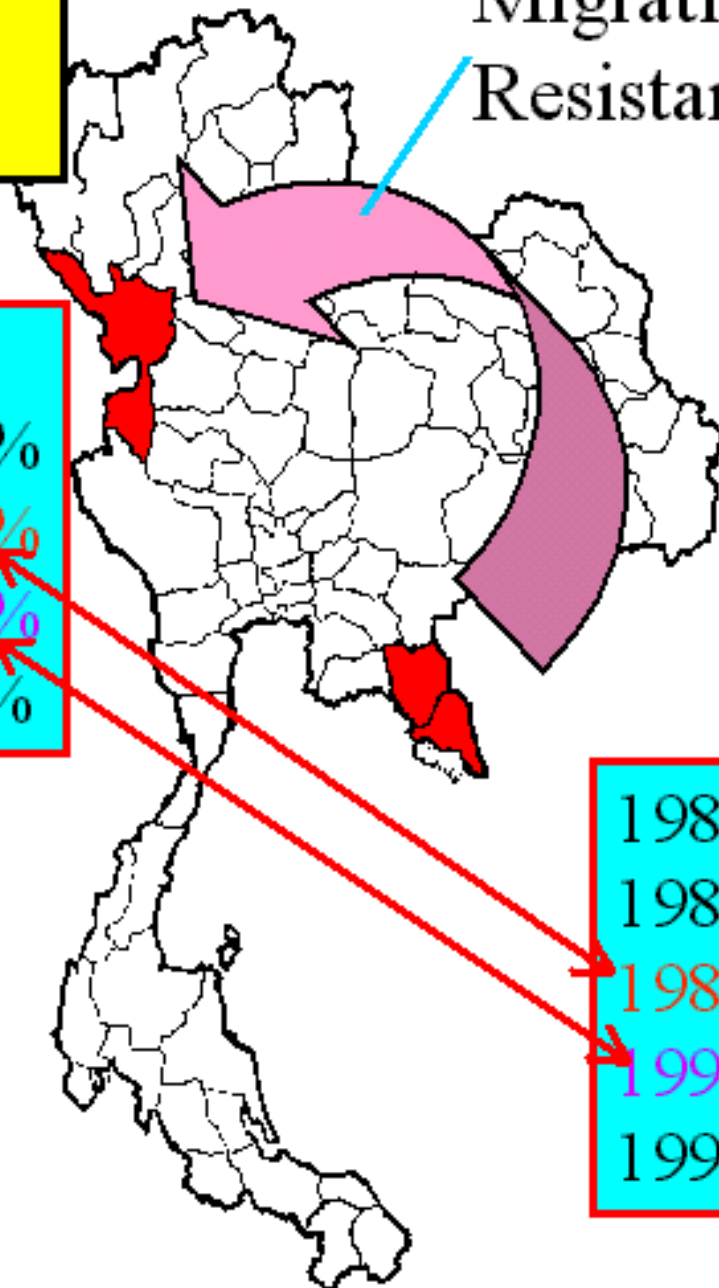


Therapeutic Efficacy of **Mefloquine** From 1984-91

Migrations and
Resistance Parasites

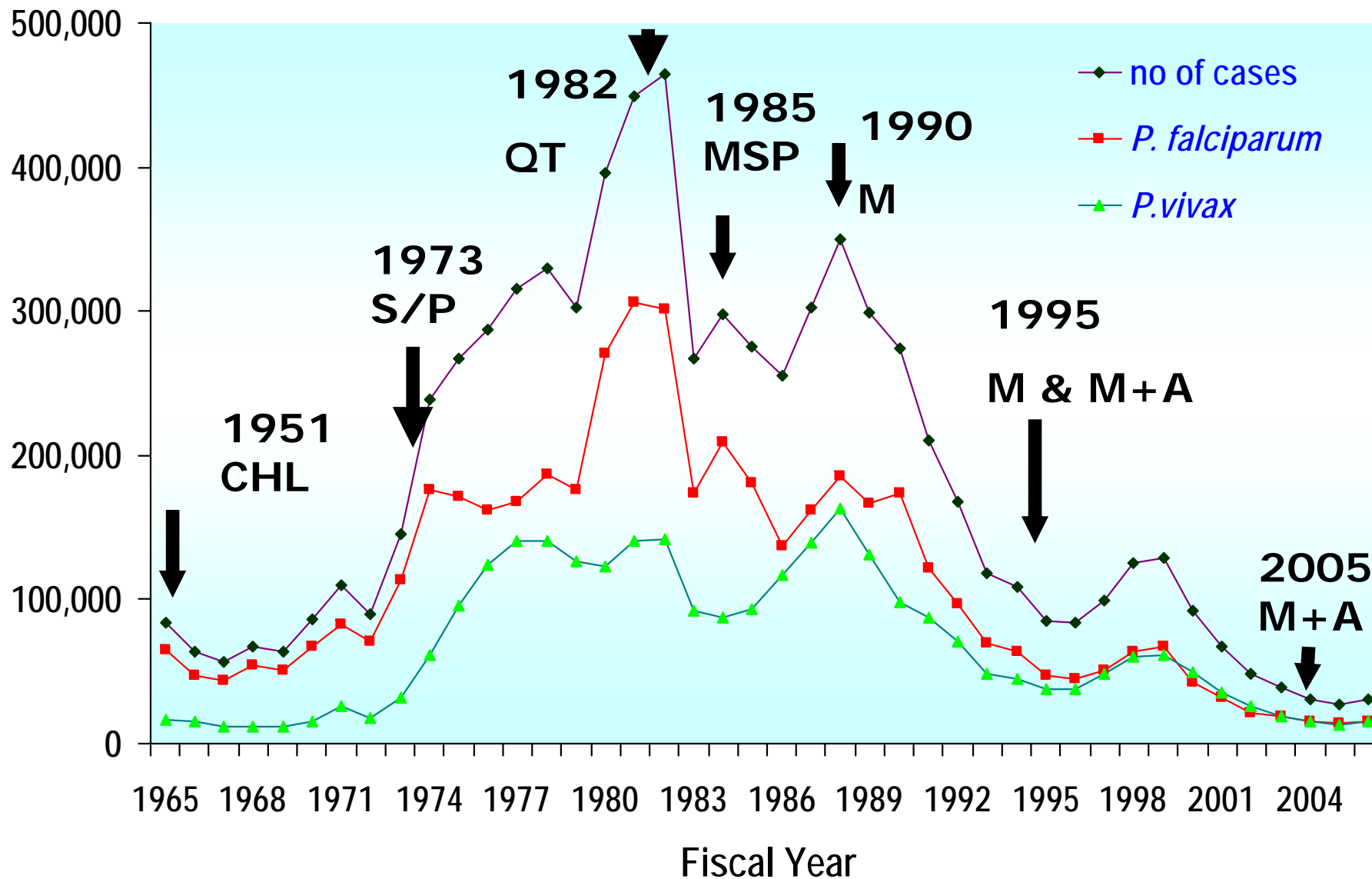
1984
1985 MSP3 97.6%
1989 MSP3 53.0%
1990 MSP3 28.0%
1991 M3 36.4%

1984 MSP3 96.7%
1985 MSP3 97.2%
1989 MSP3 55.2%
1990 M3 33.3%
1991



No. of Malaria Cases by Parasite Species and 1st Line Drug Regimens for *P. falciparum*, Thailand, 1965-2005

Number of cases



* Preliminary report (Oct05 - Sep06)

Source: Malaria Cluster, Department of Disease Control, MoPH

Increasing Evidence of ATS-MFQ Failures on the Thai-Cambodian Border

Refs.	Study site, Year	Dose	Subjects (N)	Follow-up duration	Efficacy
Mey Bouth et al, Siem Reap Conf., 2002.	Pailin Cambodia 2002	AM4, AM3, AM2 3 days	Children and adults (70)	28 days	87.0% (PCR-corrected)
Vijaykadga et al, TMIH 2006.	Trat Thailand 2003	ATS (600 mg) + MFQ 1,250 mg) in 2 days	Mostly adults (>=10 yrs) (44)	28 days	78.6%
Mey Bouth et al, TMIH 2006.	Pailin Cambodia 2004	ATS 12 mg/kg in 3 days + MFQ 25 mg/kg.	Children and adults (81)	42 days	79.3% (PCR-corrected)

First line Treatment for *Plasmodium Falciparum* start from 1 January 2008

AGE	DAY 1		DAY 2		DAY 3	
YEAR	ATS(tab)	M(tab)	ATS(tab)	M(tab)	ATS(tab)	P (mg.)
14+	4	3	4	2	4	30
8 -13	3	2	3	1 1/2	2	15
3-7	2	1 1/2	2	1	2	10
1-2	1	3/4	1	1/2	1	5
6-11 month	1	1/2	1	1/3	-	-

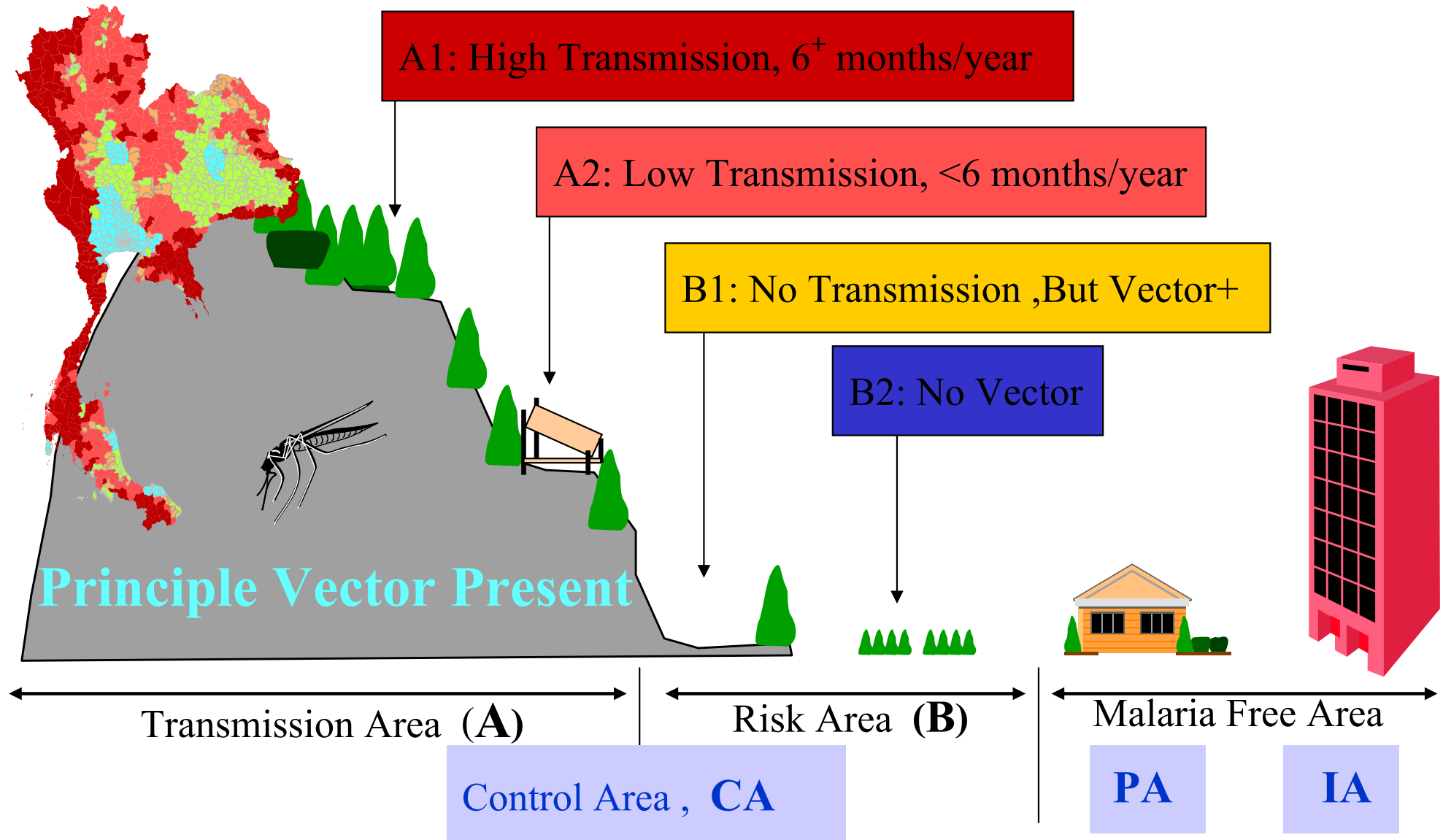
ATS = artesunate M = mefloquin

P =primaquin

AREA STRATIFICATION

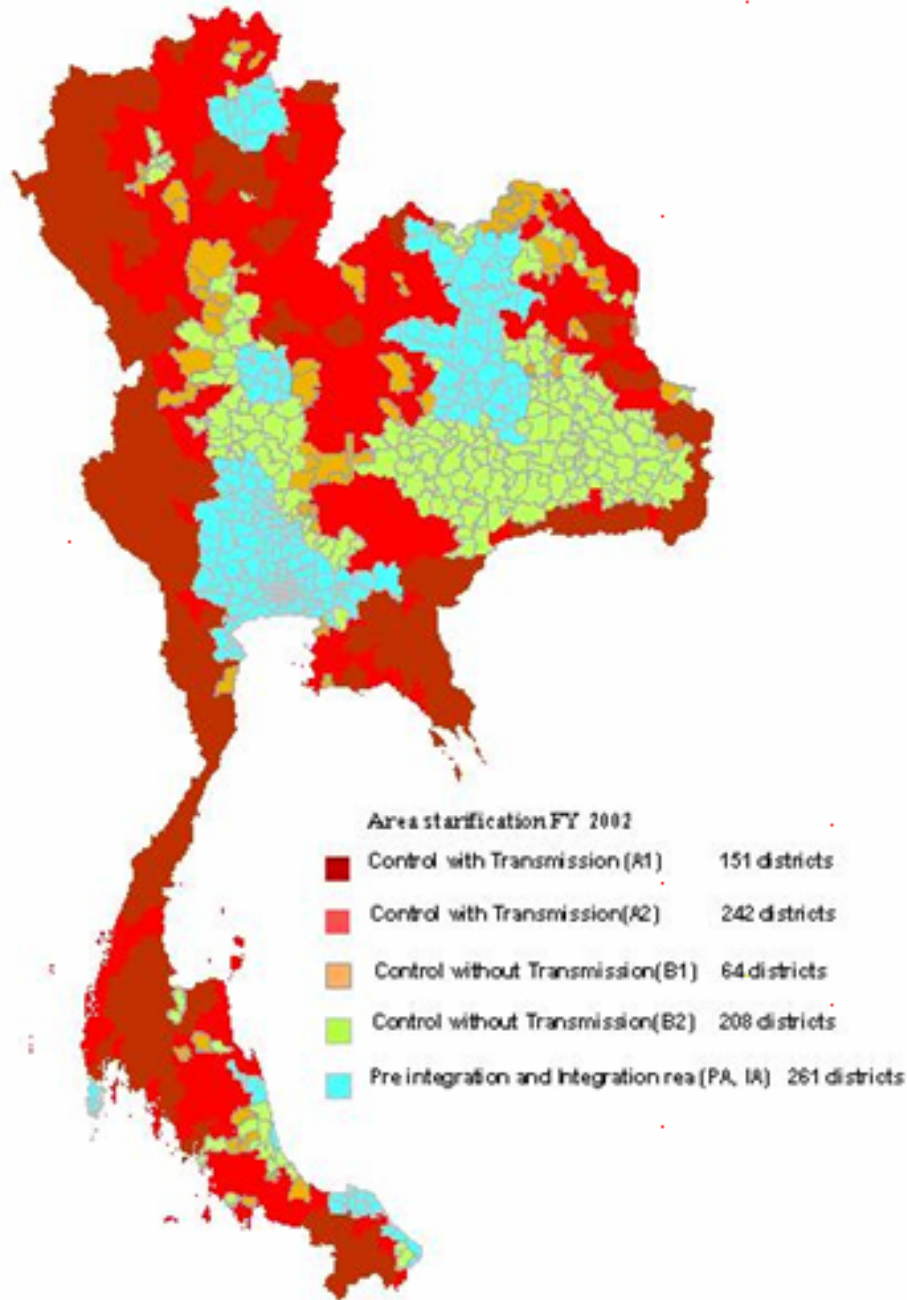
National Malaria Control Program Stratifies

area in the country into 3 main categories : CA , PA & IA



Map showing Area stratificationm

Thailand FY 2002



Population covered, FY 2006

Control area

-with transmission (A1+A2)

Pop 2,486,036 (4%)

-without transmission (B1+B2)

pop 30,460,478 (49%)

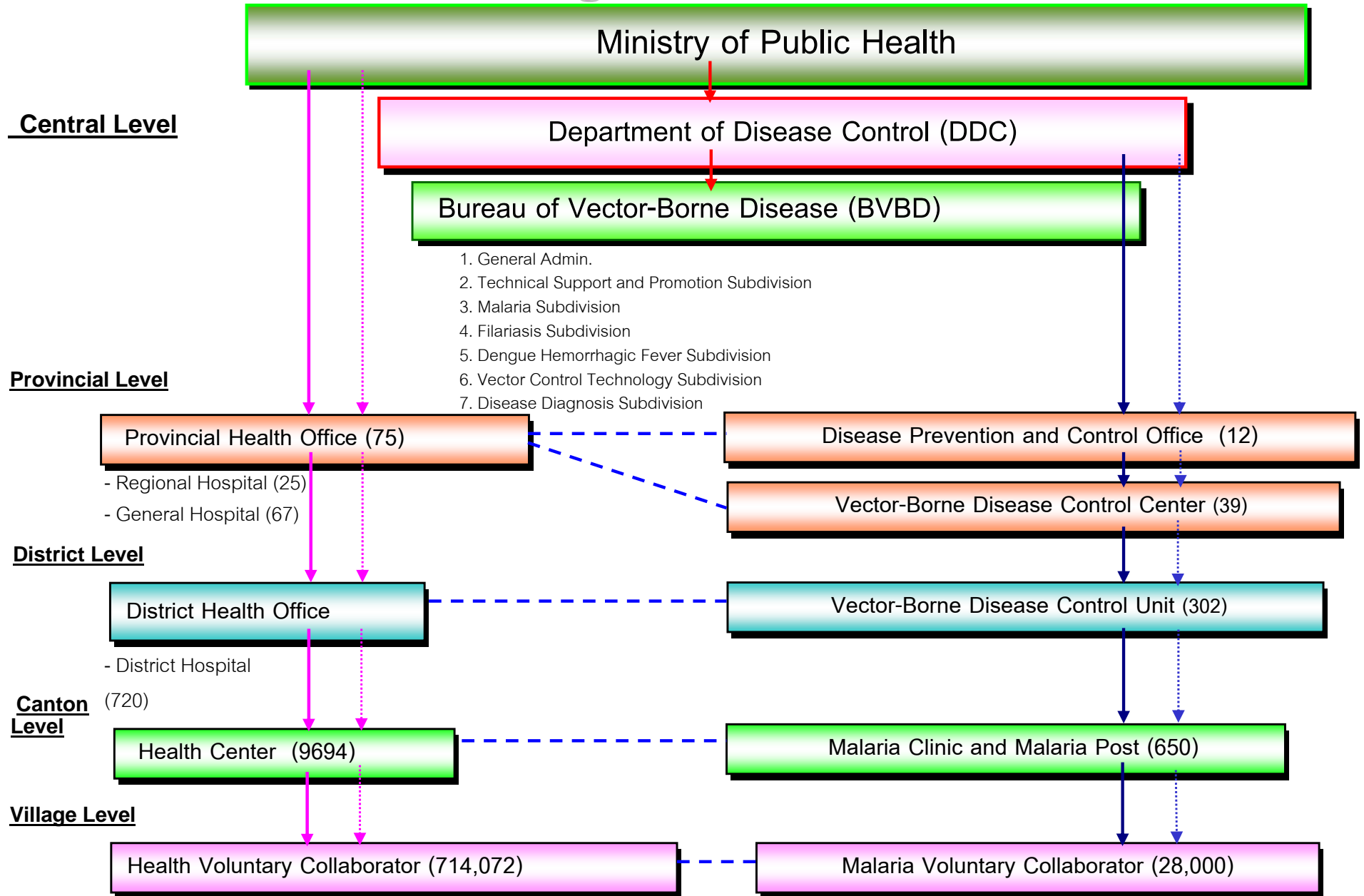
Pre-integration area

pop 5,560,765 (8.9%)

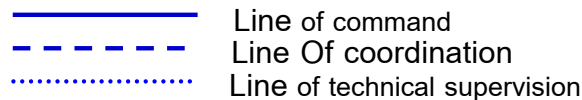
Integration area

Pop 23,499,462 (37.9%)

Organization Chart



Remarks : Commencing October 2002



ODPC 10 Chiang Mai
 VBDC 10.1 Mae Hong Son
 VBDC 10.2 Lampang
 VBDC 10.3 Chiang Rai
 VBDC 10.4 Chaing Mai

ODPC 9 Pitsanulok
 VBDC 9.1 Phare
 VBDC 9.2 Pitsanulok
 VBDC 9.3 Phetchaboon

ODPC 6 Khon khen
 VBDC 6.1 Khon khen
 VBDC 6.2 Udon Thani
 VBDC 6.3 Sakhon Nakorn
 VBDC 6.3 Loei



ODPC 8 Nakhon Sawan
 VBDC 8.1 Nakhon Sawan
 VBDC 8.2 Tak
 VBDC 8.3 Mae Sot

ODPC 2 Phrabuddhabat
 VBDC 2.1 Phrabuddhabat

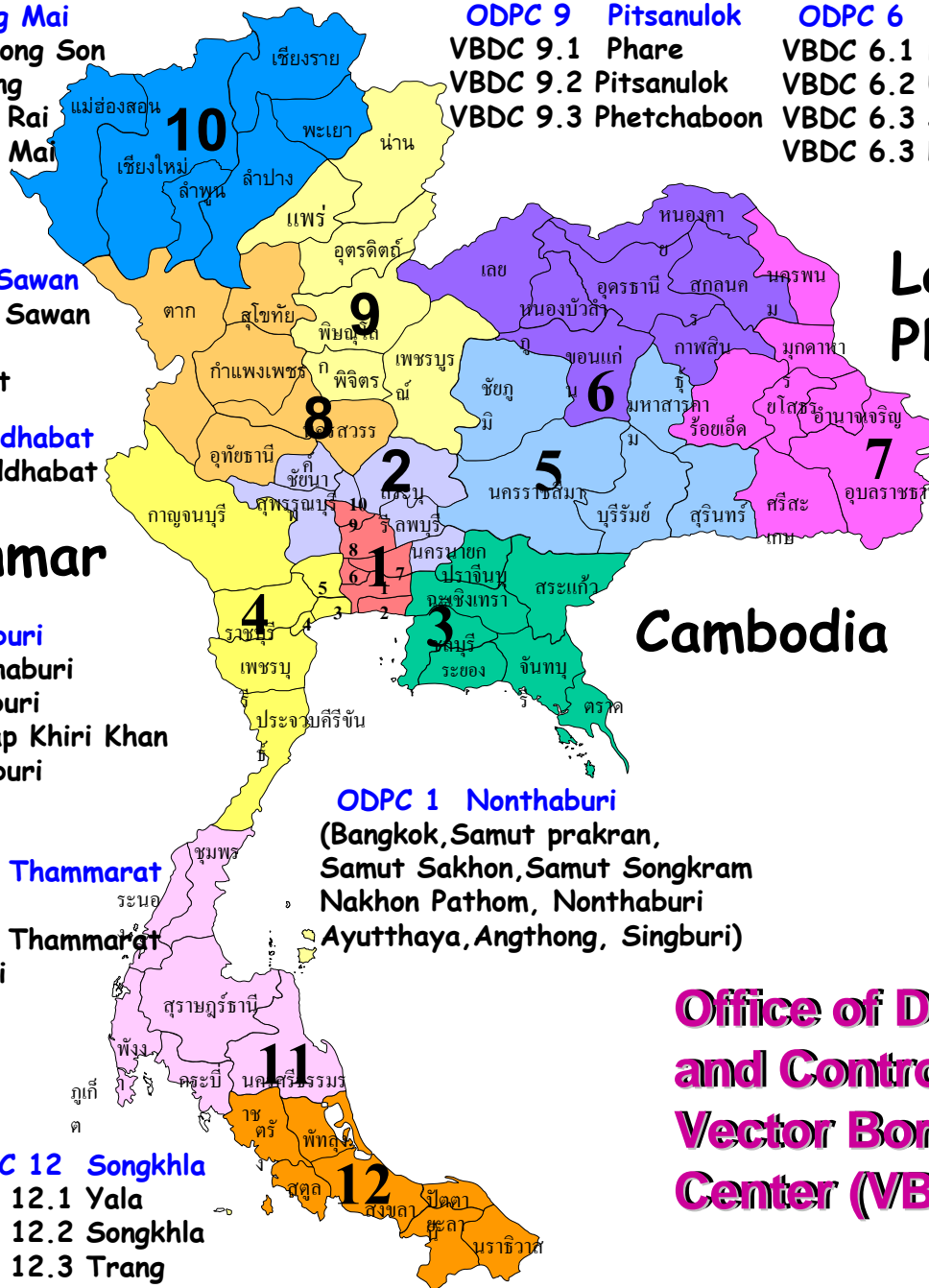
Myanmar

ODPC 4 Ratchaburi
 VBDC 4.1 Kanchanaburi
 VBDC 4.2 Petchaburi
 VBDC 4.3 Prachuap Khiri Khan
 VBDC 4.4 Ratchaburi

ODPC 11 Nakhon Sri Thammarat
 VBDC 11.1 Phangha
 VBDC 11.2 Nakhon Sri Thammarat
 VBDC 11.3 Surat Thani
 VBDC 11.4 Chumporn
 VBDC 11.5 Ranong

ODPC 12 Songkhla
 VBDC 12.1 Yala
 VBDC 12.2 Songkhla
 VBDC 12.3 Trang
 VBDC 12.4 Narathiwat

Malaysia



Lao PDR

ODPC 7 Ubon Ratchathani
 VBDC 7.1 Ubon Ratchathani
 VBDC 7.2 Roi et

ODPC 5 Nakhon Ratchasima
 VBDC 5.1 Chaiyapum
 VBDC 5.2 Nakhon Ratchasima
 VBDC 5.3 Surin
 VBDC 5.4 Pak Chong

ODPC 3 Chonburi
 VBDC 3.1 Sriracha
 VBDC 3.2 Sakeao
 VBDC 3.3 Rayong
 VBDC 3.4 Trat
 VBDC 3.5 Chanthaburi

Office of Diseases Prevention and Control (ODPC 1-12) and Vector Borne Diseases Control Center (VBDC 1-39)



Thank you
for your attention!

Therapeutic Regimens

	D ₀	D ₁	D ₂	D ₄
A	ATS 300mg. 6 hours ↓ M 750mg.	ATS 300mg. 6 hours ↓ M 500 mg.		
B	ATM 320 mg. 6 hours ↓ M 750 mg.	ATM 320 mg. 6 hours ↓ M 500 mg.		
C	ATS 300 mg.	ATS 100 mg.	ATS 100 mg.	ATS 100 mg.
D	ATM 320 mg.	ATM 120 mg.	ATM 120 mg.	ATM 120 mg.
E	Q ₇ T ₇			
F	M 750 mg.	M 500 mg.		
G	ATS 300 mg. 1 hours ↓ M 750 mg.	ATS 300 mg.		

Results of treatment by various regimens

Regimen	N		Response					Cure rate on Day 28(%)
	N	S	RI	RII	RIII	S/RI	U	
A	80	75	1	0	0	2	2	98.7
B	45	34	1	0	0	5	5	97.1
C	55	46	1	0	0	1	7	97.9
D	42	30	1	0	0	3	8	96.7
E	47	36	2	1	0	2	6	92.3
F	45	41	0	0	0	2	2	100
G	68	59	3	0	0	2	4	95.2

*Thimasarn K. Southeast Asian Trop Med Public Health, 1997