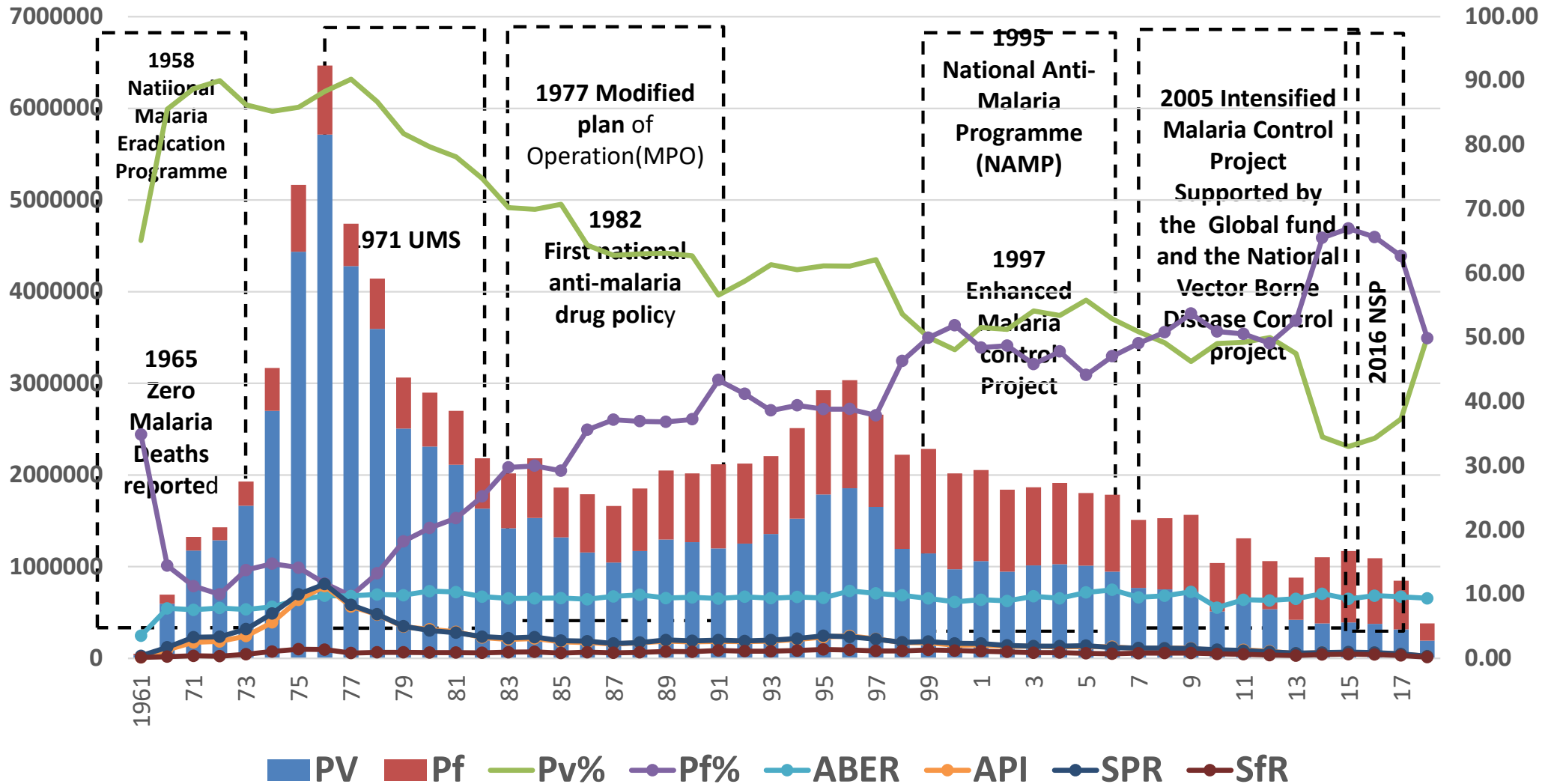


A microscopic view of a blood smear stained with Giemsa stain. The field is dominated by numerous red blood cells (erythrocytes) which appear as pale pinkish-purple discs. Scattered throughout are several malaria parasites (plasmodia) in various stages of development, including some with distinct nuclei and others with more complex internal structures. The background is a light, slightly granular texture.

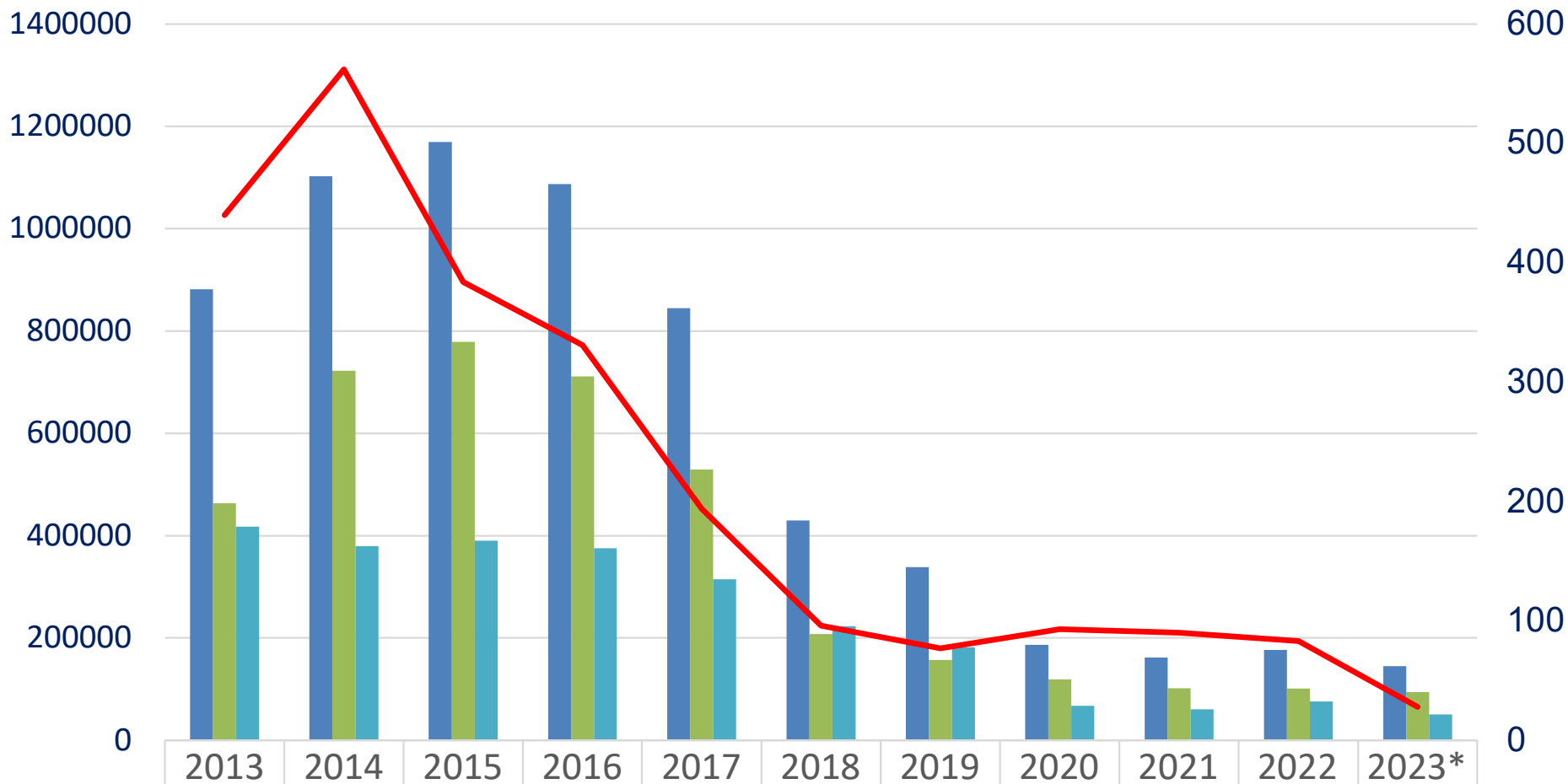
MALARIA ELIMINATION IN ODISHA: CHALLENGES AND RESEARCH PRIORITIES

**DR NILAM SOMALKAR
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ROHFW BHUBANESWAR**

Malaria Program and Malaria Situation in India, 1961 - 2018



Malaria in India 2013-2023



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023*
Malaria cases	881730	1E+06	1E+06	1E+06	844558	429928	338494	186532	161753	176522	144527
PF cases	463846	722546	778821	711502	529530	207198	156940	119088	101566	101068	94042
PV cases	417884	379659	390440	375783	315028	222730	181554	67444	60187	75452	50485
Deaths	440	562	384	331	104	96	77	93	90	83	28

*Provisional till September 2023

Epidemiological Scenario of Malaria in Odisha 2013-2023

Year	BSE	+ve	PF	Death	ABER	TPR	Pf%	API
2013	5067609	227615	208115	66	11.71	4.49	91.43	5.26
2014	6352249	395004	342250	89	14.60	6.22	86.64	9.08
2015	6608453	436850	369533	80	15.05	6.61	84.59	9.95
2016	7201271	444842	384668	77	16.29	6.18	86.47	10.06
2017	6648889	347860	293718	24	14.84	5.23	84.44	7.76
2018	6157502	66311	54042	3	13.76	1.08	81.50	1.48
2019	6552293	39556	35772	9	14.50	0.60	90.43	0.88
2020	5998664	41739	38140	9	13.15	0.70	91.38	0.92
2021	6914758	25503	22594	13	15.08	0.37	88.59	0.56
2022	8160202	23770	19295	5	17.73	0.29	81.17	0.52
2023(Up to Sept 23)	7047253	33516	27002	4		0.48	80.56	

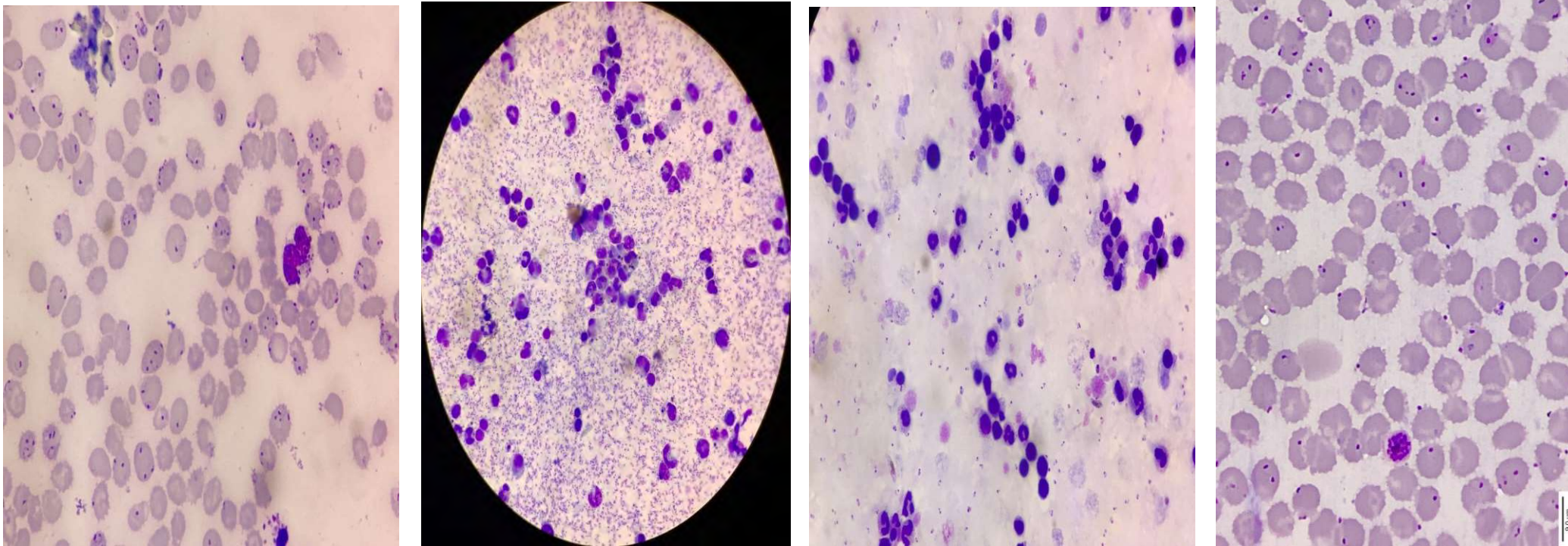
Why Odisha is important for Malaria Elimination in India?

Odisha contributes around 4% population of India with its 4.5 crore population

Year	India	Odisha	% of contribution
2019	338494	39556	11.68
2020	186532	41739	22.37
2021	161753	25503	15.76
2022	176522	23770	13.46
2023 till Sept 23	144527	33516	23.19

PF cases in India	PF cases in Odisha	% contribution of PF cases from Odisha
156940	35772	22.79
119088	38140	32.02
101566	22594	22.24
101068	19295	19.09
94042	27002	28.71

Character of PF malaria in Odisha



- ❖ **Uncountable parasitemia: Around 70% PF blood slides**
- ❖ **Rare stages like PF tropho and schizont found in 20-23% PF slides**
- ❖ **Phagocytosis of WBC being character of severe malaria is again common finding**
- ❖ **>10% slides are having gametocyte**

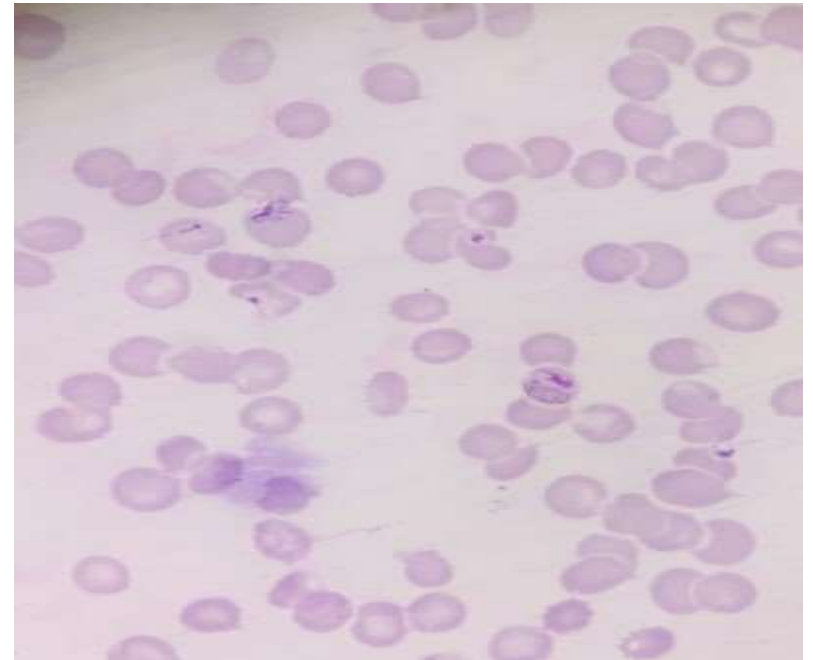
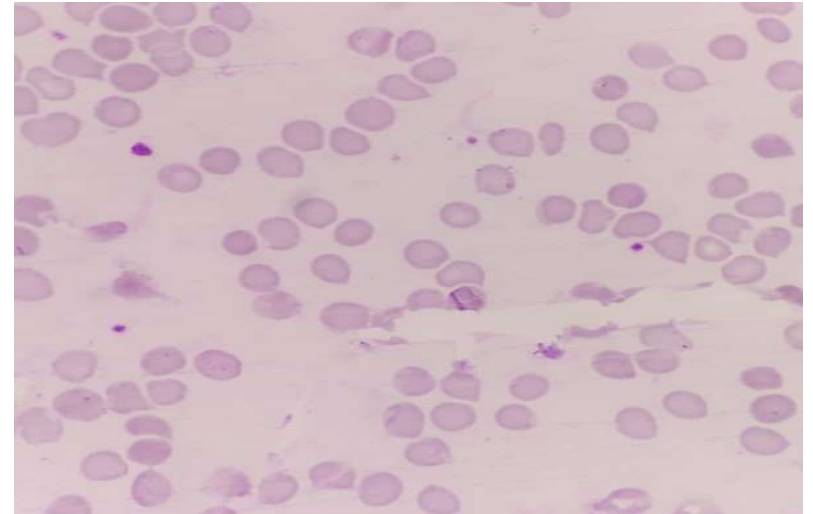
Rising trend of PV malaria in Odisha

Year	PV cases in India	PV cases in Odisha	% of contribution
2019	181554	3784	2.08
2020	67444	3599	5.34
2021	60187	2909	4.83
2022	75454	4475	5.93
2023 till Sept 23	50485	6514	12.90

- Large number of PV cases reported from Odisha
- PV malaria is known for its compliance issue
- PV malaria is known for its relapse issue
- Effectiveness of CQ against PV as a schizonticidal drug
- Many tribal districts in Odisha is observing PV rise but compliance of 14 days PQ?
- G6PD Testing

Rare Malaria in Odisha

- **Plasmodium Malariae (PM), Plasmodium Ovale (PO) is rare malaria species**
- **Plasmodium Knowlesi (PK) is primate malaria called as monkey malaria**
- **India never reported these species in last 5-10 years except sporadic cases from Kerala among African migrant**
- **Bivalent RDK used in program not detect these species**
- **Odisha is having microscopy and PCR confirmed PM (2023), PK (2021)**
- **All these cases were of indigenous origin**



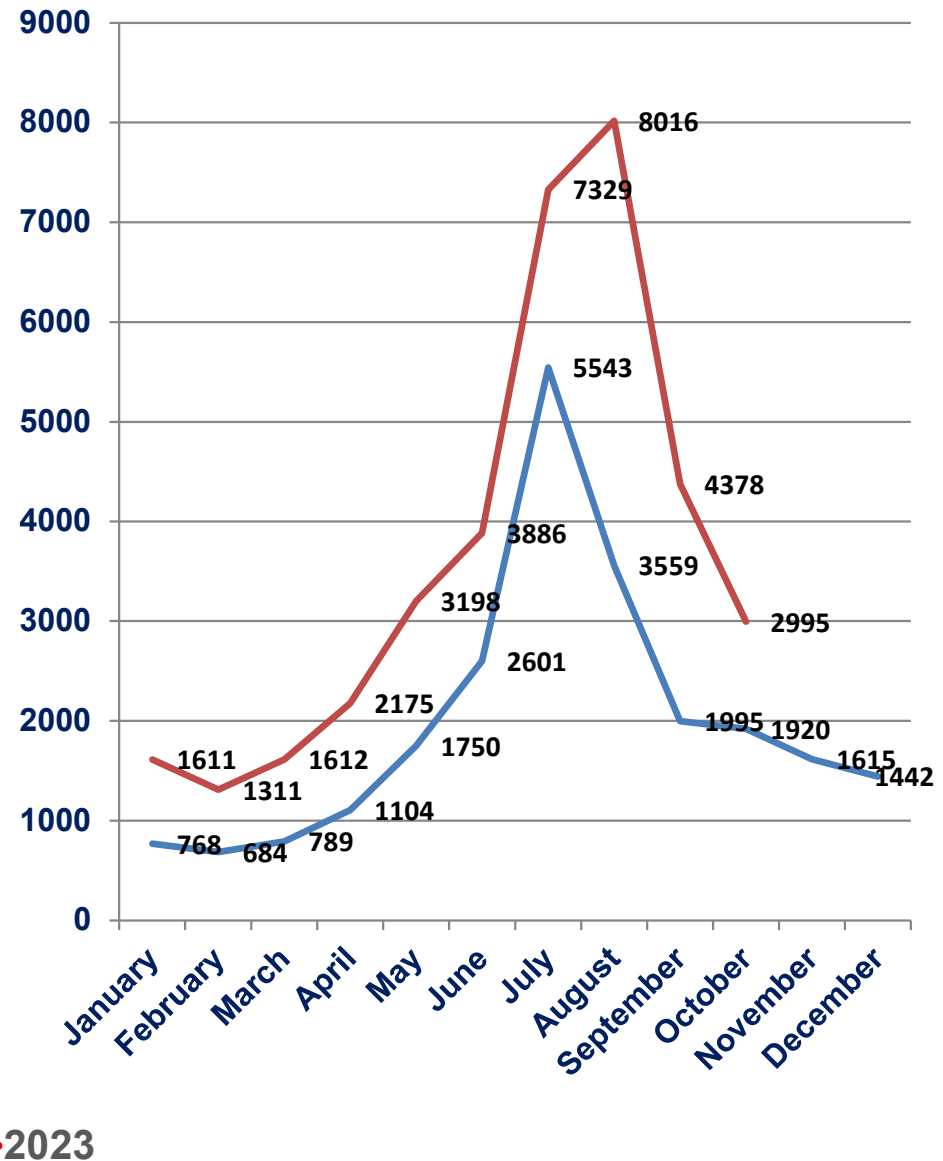
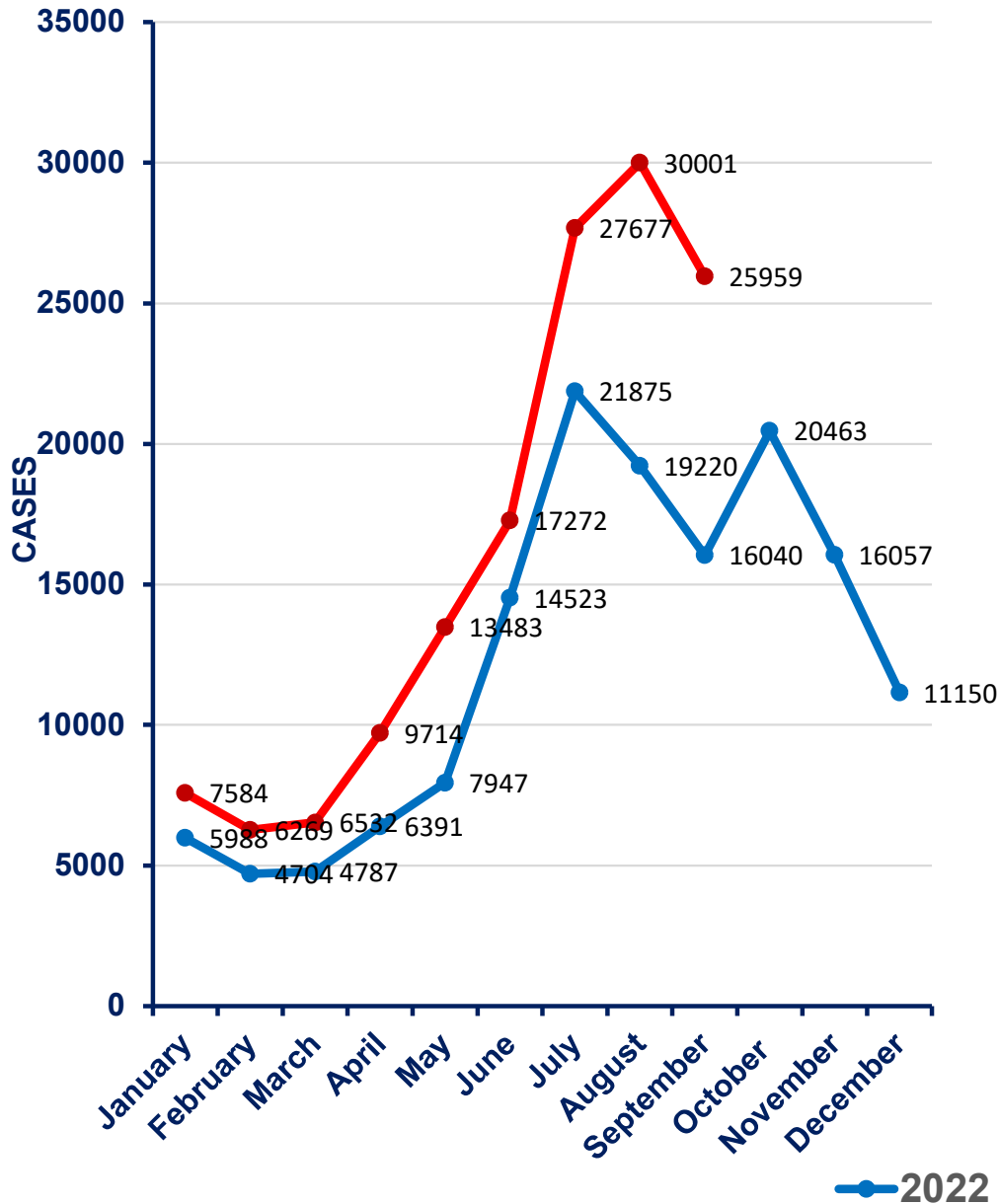
Tackling malaria in hard to reach pocket

- Odisha is having 22% tribal population
- Odisha is known for large hilly, forest area
- Inaccessibility, hard to reach causes difficulty in routine surveillance activities of malaria
- DaMAN camps twice in a year are conducted to reach to these population
- 50% of total malaria cases reported in such camps
- 80% is asymptomatic cases as per state report

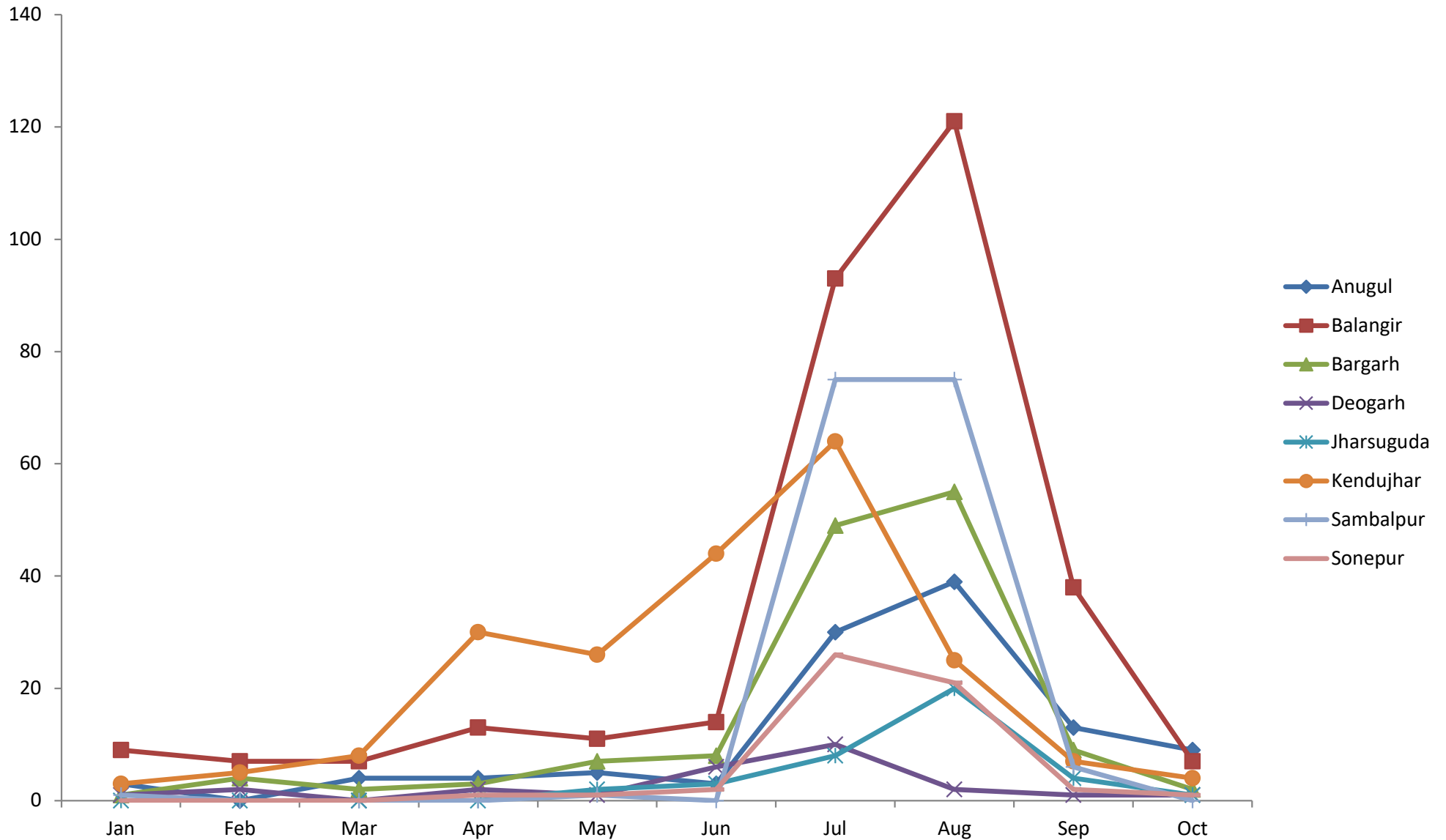


Malaria in India and in Odisha

Month wise Positive Cases in 2023 compared to 2022



Monthwise malaria situation in 2023 in historically high endemic district



Integrated Vector Management

- **Strong entomological surveillance round the year**
- **Except IRS and LLIN other methods like Larval Source Management is difficult to conduct**
- **Round the year use of LLIN is an issue due to high humidity specific to pre-monsoon period**
- **After DDT phase out, other insecticide to be used is big problem**
- **Guaranteed replenishment of LLIN on time**
- **Behavioral change for use of LLIN as still old LLIN of 2010 are in field**

Program Management

- Malaria Elimination journey of Odisha requires strong and continuous support
- Monitoring and supervision of program will play crucial part
- Uninterrupted supply of drugs and diagnostics
- Availability of drugs and diagnostics upto village level in regular manner
- Addition of all kind of surveillance to know real burden and its control

In addition to medical college, DHH/SDH/CHC/PHC and manpower available, support available for malaria program

HR personnel	Sanctioned	In position
ASHAs	49049	48905
ANM	9105	7974
MPW	2825	1143
CHOs	5400	4815
Lab Technician(SSMTC)	90	90
MTS (VBDTS)	180	178
DVBD Consultant	30	28
DMO(ADPHO(VBD))	30	30
State Consultant	6	5

Innovations adopted in Odisha

- **Alternate FTD at inaccessible hamlet/ villages under DAMaN & PPP mode to ensure EDCT services.**
- **Inter district and intra district boarder meeting to synchronize the malaria control activities & case notification.**
- **E Booklet- effective monitoring feedback mechanism**
- **Involvement of Mission Shakti – women SHG for malaria control programme in 13 high burden districts covering 1500 villages of 44 blocks .**
- **DAMaN (Durgama Anchalare Malaria Nirakaran)- State specific malaria control activity in hard to reach inaccessible pocket.**
- **Integrated House to house campaign for one month which not only increased surveillance but also EDCT could be ensured.**
- **Village contact drive/malaria samadhan sibira- to create awareness and sensitise people for early reporting to ASHA/facility in case of fever**
- **Utilizing Health Mela platform to create awareness**

Innovations from ROHFW Bhubaneswar

- **Confirmation of rare species of malaria like PM and PK in indigenous cases**
- **Variety of microscope including Pentahead, Digital and Binocular which are being used for training**
- **Malaria Slide Repository of around 4000 positive slides of all 5 species of malaria and Filaria Slide Repository of around 2000 positive slides of all 2 species of filaria found in India**
- **As per demand these slides are shared with various state VBD program, teaching institutions like State Medical Colleges and AIIMS**
- **Training on VBD and Malaria and Filaria Microscopy for Odisha and other states**
- **National Training Centre for Malaria Microscopy**

Research Priority:

- 1. Reality of malaria elimination in view of high parasitemia, severity picture on microscopy and less death due to malaria**
- 2. CQ response to PV, and relapse in PV along with issue of G6PD**
- 3. Existence of rare species of malaria in India and its confirmation**
- 4. Parasite response to antimalarials and insecticide response on mosquito**
- 5. Lastly Burden Estimation in view of malaria elimination and forecasting models**

Malaria Disease Burden and Deaths due to Malaria in India

Year	Malaria cases in India as per program data	Estimated malaria cases in India As per WMR
2018	429928	50-60 Lakh
2019	338494	50-60 Lakh
2020	186532	50 Lakh
2021	161753	40 Lakh
2022	176522	40 Lakh

Year	Death due to malaria in India as per program data	Death due to malaria in India as per RGI data
2017	194	3633
2018	96	3178
2019	77	3364
2020	93	1438

1.As per estimates given in WMR, around 8000-10000 malaria Death taking place in India every year
 2.RGI covers only 20% of deaths registered in India for MCCD

Burden estimation of malaria cases and deaths due to malaria is need of hour during malaria elimination

Kumar et al. Malar J (2020) 19:156:

- The malaria cases estimated in India were 3875,078 (95% confidence interval 3792,018– 3958,137) with API of 3.05 (2.99–3.12)
- 2789,483 (2740,577–2838,389) Plasmodium falciparum
- The estimated deaths in India were 29,341 (23,354–35,327) including 19,067 (13,665–24,470) confirmed and 10,274 (7694–12,853) suspected deaths in 2015–2016

Thank You