

MALARIA DETECTION BY AN AUTOMATED HEMATOLOGY ANALYZER

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*“ Humanity has but three great enemies:
Fever, **f**amine, and **w**ar; of these by far the
greatest, by far the most terrible, is **f**ever.”*

WILLIAM OSLER

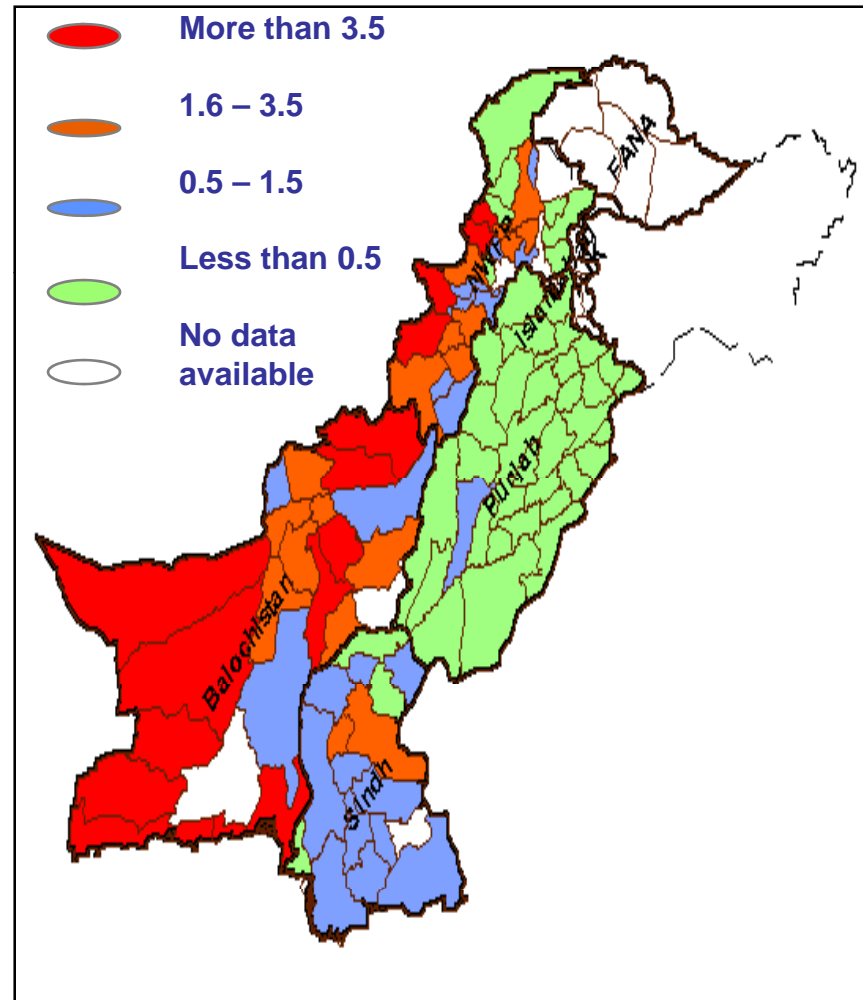
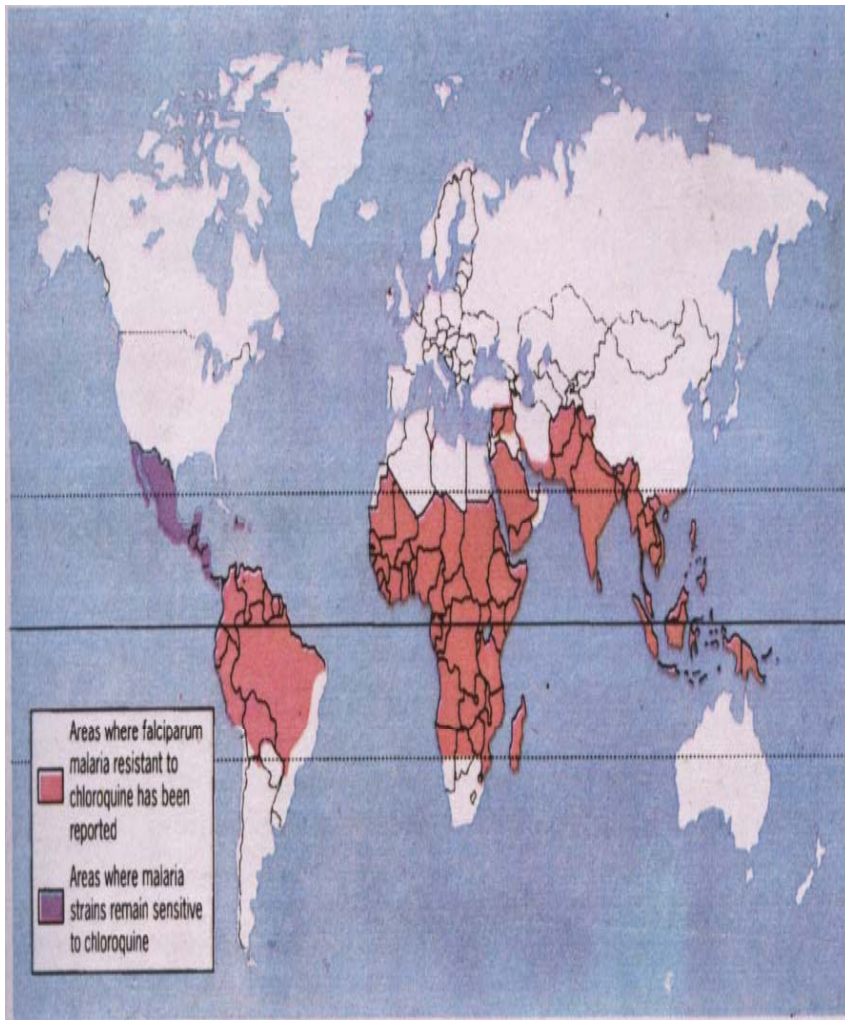


INTRODUCTION

- Malaria is the most important parasitic disease world-wide, caused by the bite of mosquito, transmitting *Plasmodium* species
- 300-500 million people suffer from malaria worldwide every year & 1.1-2.7 million people die due to malaria.
- Like most other tropical countries, large number of Malaria cases occur in Pakistan

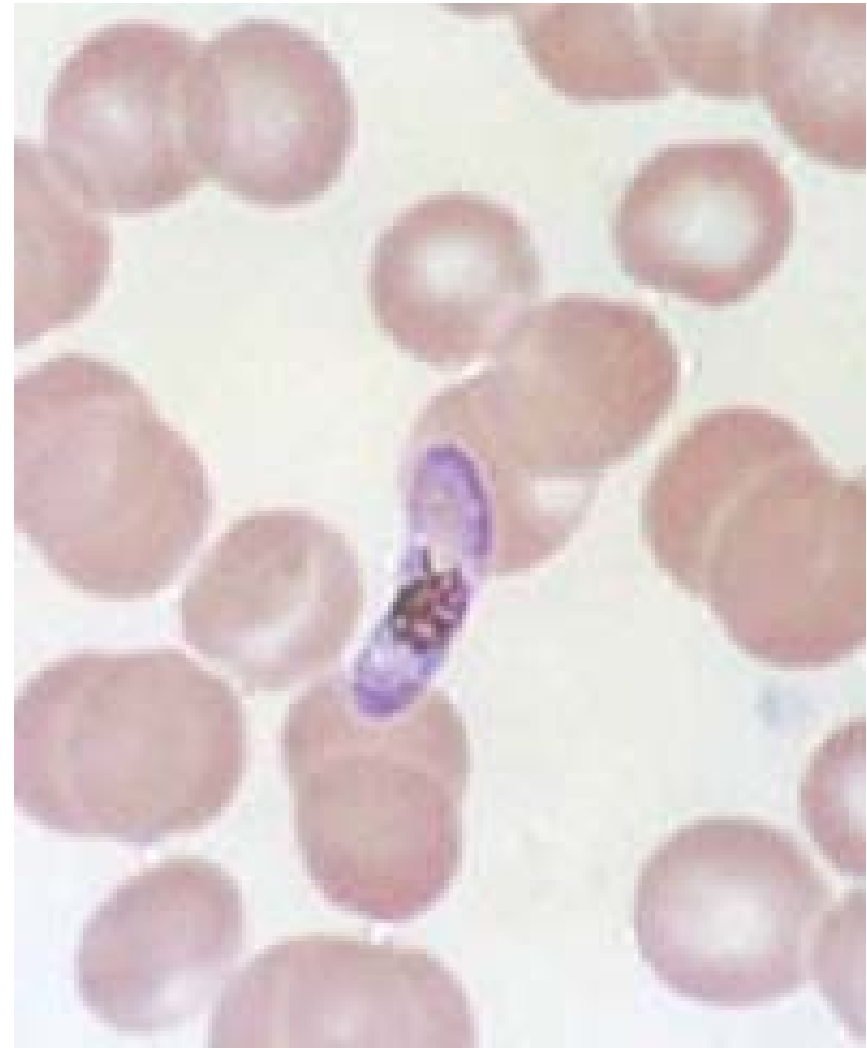


EPIDEMIOLOGY



INTRODUCTION

- Lack of clinical suspicion and lack of perseverance by lab staff in a smear examination, are well-known factors for a missed diagnosis
- Early diagnosis critically relies on clinical suspicion and requesting thick & thin smears for malaria- **“THE GOLD STANDARD”**



STUDY TYPE

- **Institution;** Rehman Medical Institute (RMI) Peshawar
- **Instrument;** Sysmex XT 2000i is used routinely for CBC+Diff+Retics
- **Observation** that no differential in CBC was associated with Malaria
- **Study type;** Retrospective & descriptive
- **Sample size;** 310
- **Duration;** August 2006- Dec 2008
- **Statistical analysis;** SPSS ver 16

SYSMEX XT 2000i- Contd

- **XT 2000i is a new automated state of the art haematology analyzer, launched by Sysmex Corporation Kobe, Japan.**
- **Predecessor- XE 2100**
- **Salient features of XT 2000i;**
 - **It gives an output of 30 parameters, an automated 5 part differential and an automated reticulocyte count.**
 - **The report is substantiated with comments for qualitative/ quantitative defects, Flags/ (?) suspects for blasts, NRBC's, reactive lymphocytes, iron deficiency/ Hb defect but not Malaria.**

SYSMEX XT 2000i

- **It measures**
 - **WBC's & Retics by Fow cytometry, using semiconductor Laser**
 - **RBC's & Platelets by Hydrodynamic focusing**
 - **Haemoglobin by SLS method**

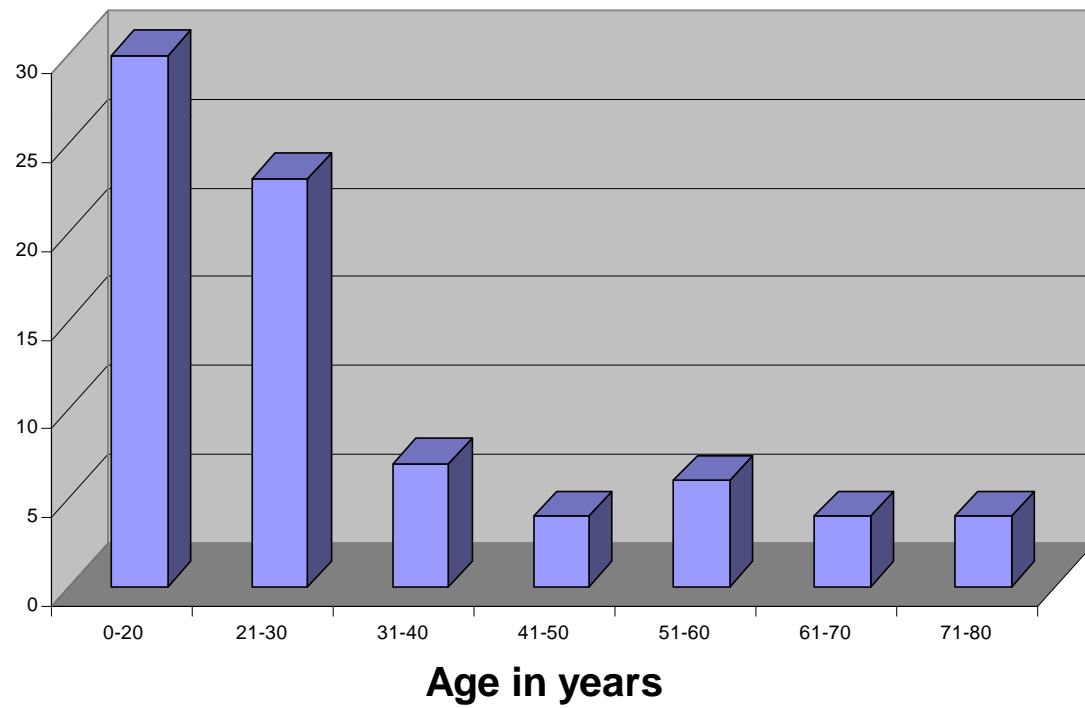


OBJECTIVE

- **This study was aimed;**
 - **To evaluate the diagnostic utility of the Sysmex XT 2000i hematology analyzer, in malaria cases where the instrument failed to give any differential**
 - **To demonstrate any difference in depolarization pattern with different malaria species**

RESULTS

Age Distribution

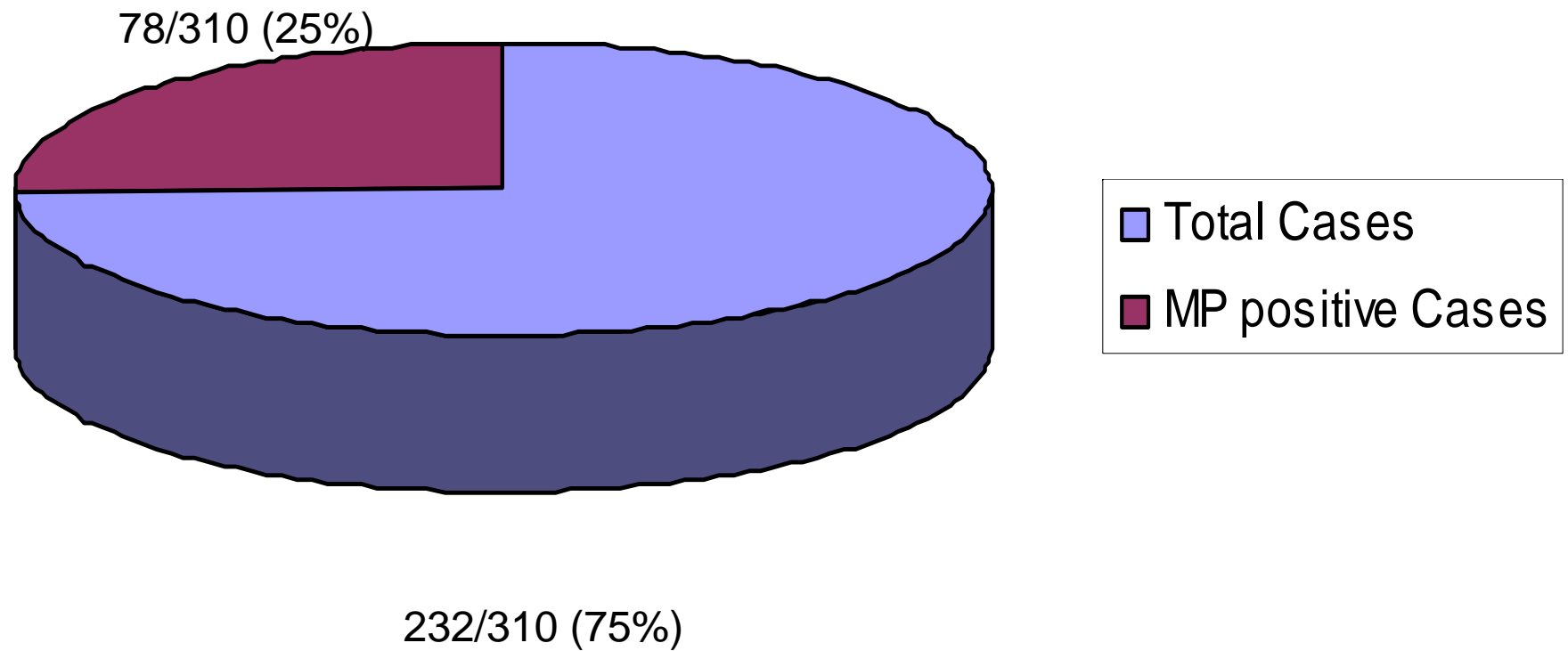


Min=1 month
Max=77 yrs
Mean=29 yrs

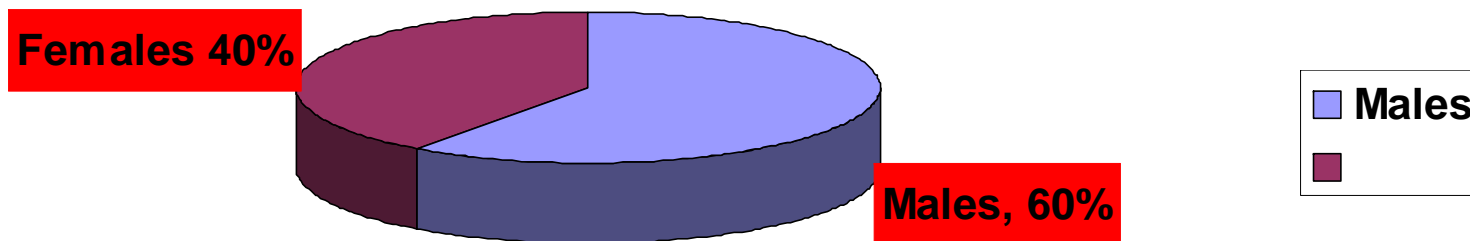
RESULTS

- In a total of 310 cases in which XT 2000i did not give any differential, 78 (25%) showed malaria, and 232 (75%) showed other causes.
- Out of these 78 cases only 3 (3.8%) were suspected as malaria by the clinician and were advised MP as a separate test.

Total Cases with no Differential by XT 2000i
n=310

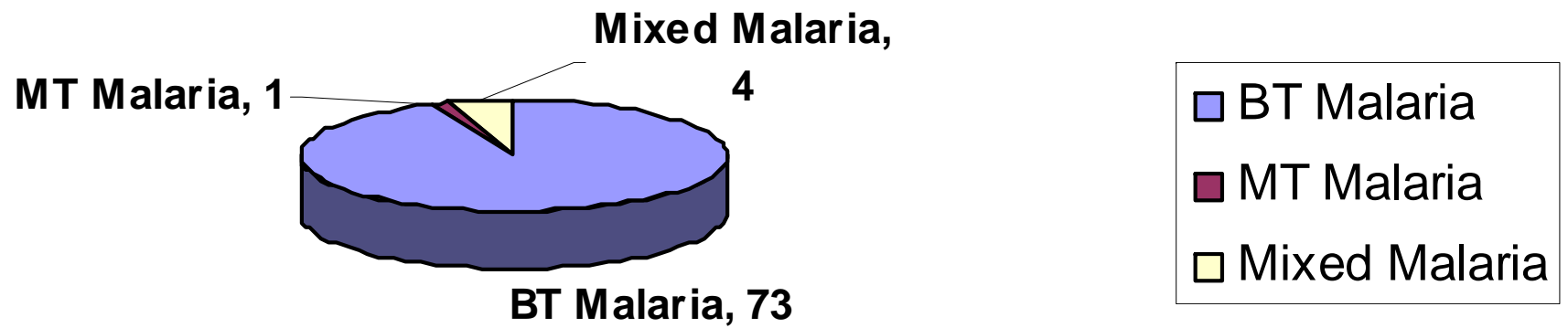


Sex Distribution in MP Positive Cases

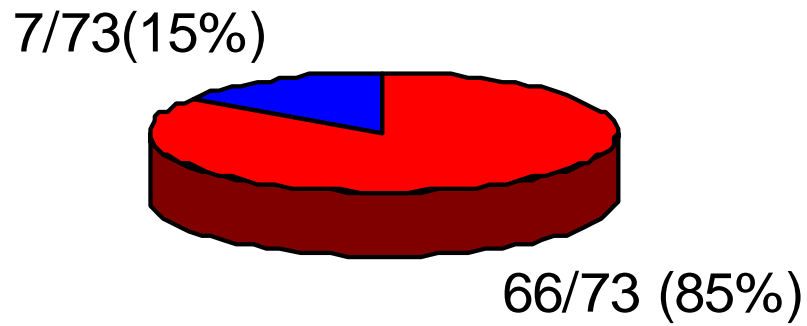


BREAKUP OF MALARIA CASES

n=78

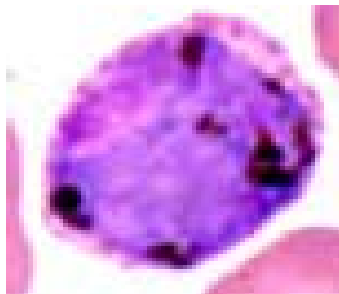
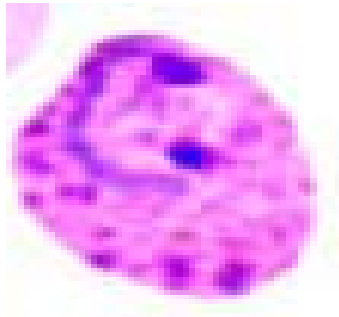


BT MALARIA BREAKUP

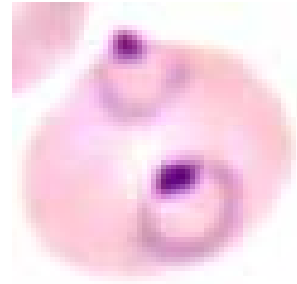


- BT MALARIA TROPHOZOITES
- BT RINGS + TROPHOZOITES

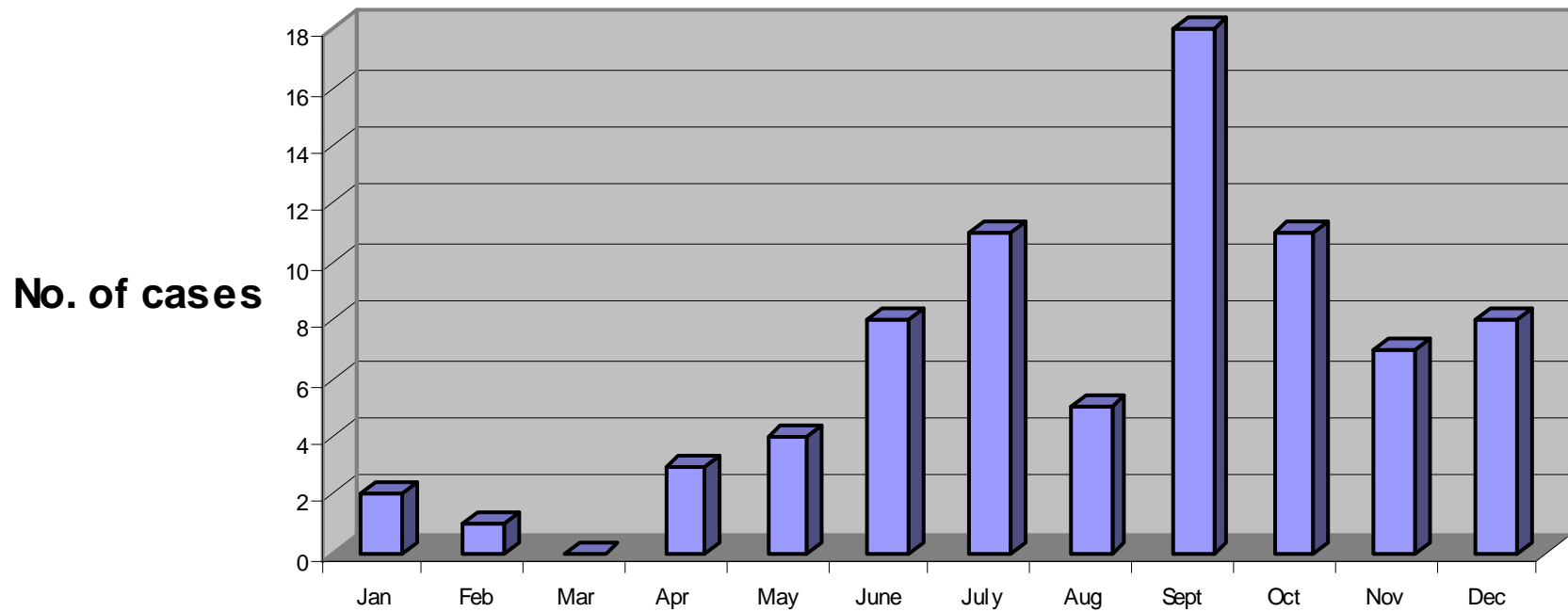
P.vivax



P.falciparum



Seasonal Variations



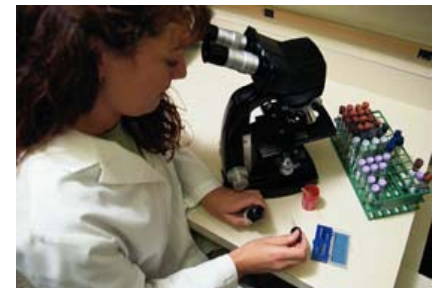
66% in 2nd & 3rd Qtr

RESULTS- Contd

- **Mean WBC count was $6.38 \times 10^9/l$, (Range 1.79-45.2);**
- **Mean Haemoglobin was 11.94 g/dl (Range 4.4-16.8).**
- **Mean Platelet count was $107 \times 10^9/L$ (range 14-403),**
- **Mean reticulocyte count was 1.31% (Range 0.074- 14.5) with absolute retics # of $0.05233 \times 10^9/L$ (Range 0.0102-0.2179),**

CONCLUSIONS

- We conclude that after neonatal period, cases in which the XT 2000i did not give any differential, there was a strong correlation with malaria positivity, especially with Trophozoite forms of *P. vivax* (BT Malaria)
- This is the first ever report of association of malaria infestation with Sysmex XT 2000i automated haematology analyzer (CD 4000, XE 2100)
- This finding will provide an opportunity to the lab personnel in endemic area, to suspect and search for malaria in those cases, where there is no differential by the XT 2000i
- **Caution!**



Thank you

