

Operations Research as a Tool to Inform Public Health Decision Making: Examples from Mozambique

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What is OR?

Generic definition

- “[Application of] scientific methods to decision making in complex real world problems which are concerned with coordination and execution of the operations within an organization”
- Goal = find a best possible solution to improve performance of the organization
 - Use data, statistics, mathematical modeling
 - Synonym = “management science”

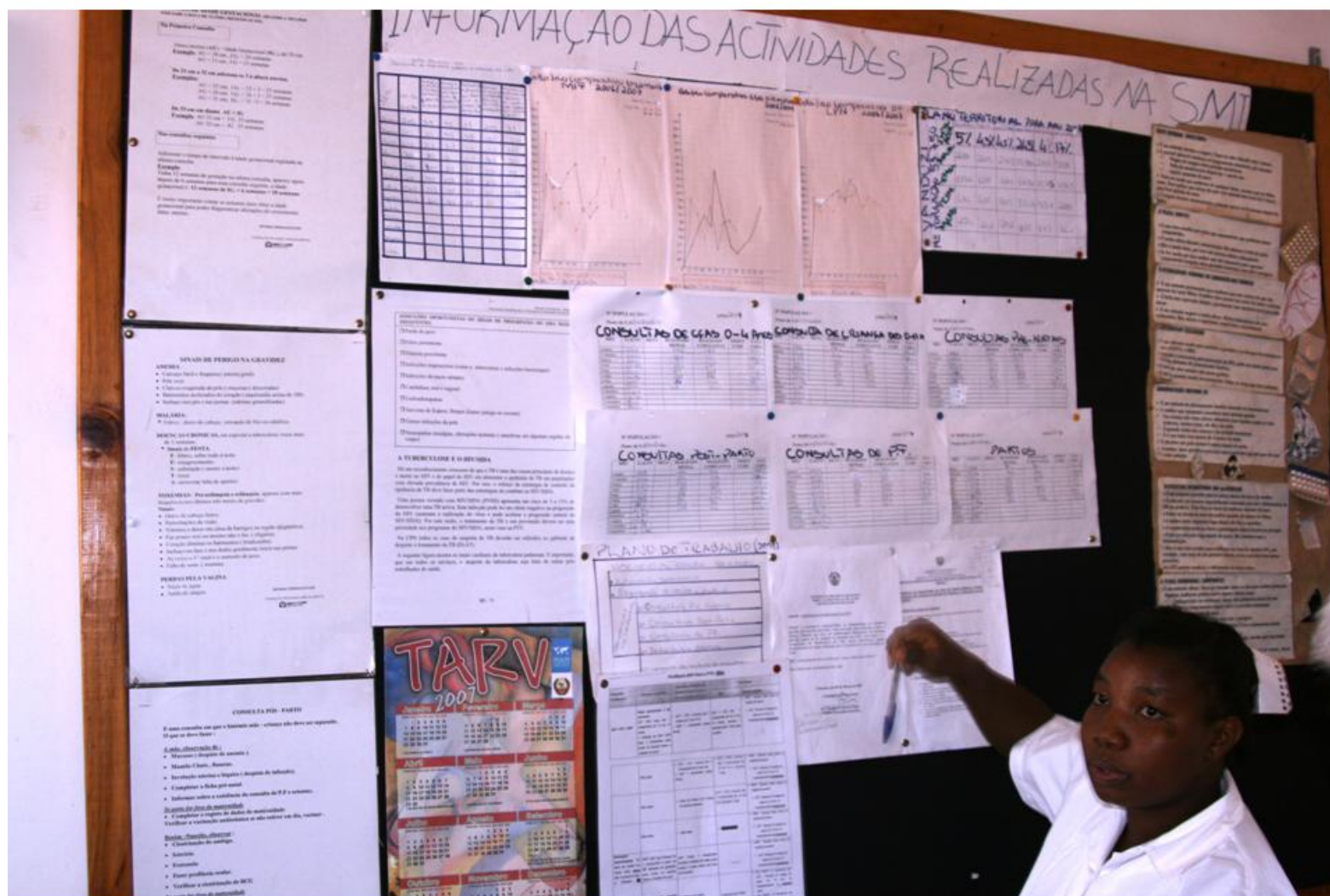
Basic principles of OR

- OR should focus on studying existing health programs which are key to health care delivery
 - Assures problems and solutions are defined by realities of the health program system
- Should Actively try to make the program better:
 - Improve access to services
 - Improve quality
 - Limit costs (find cost-effective strategies)
 - Improve health
- Results should be used:
 - Implement new strategy on local / national scale
 - Influence national / international policy
 - Dissemination of results, develop “best practices”

Strategies to maximize the impact of research on policy include:

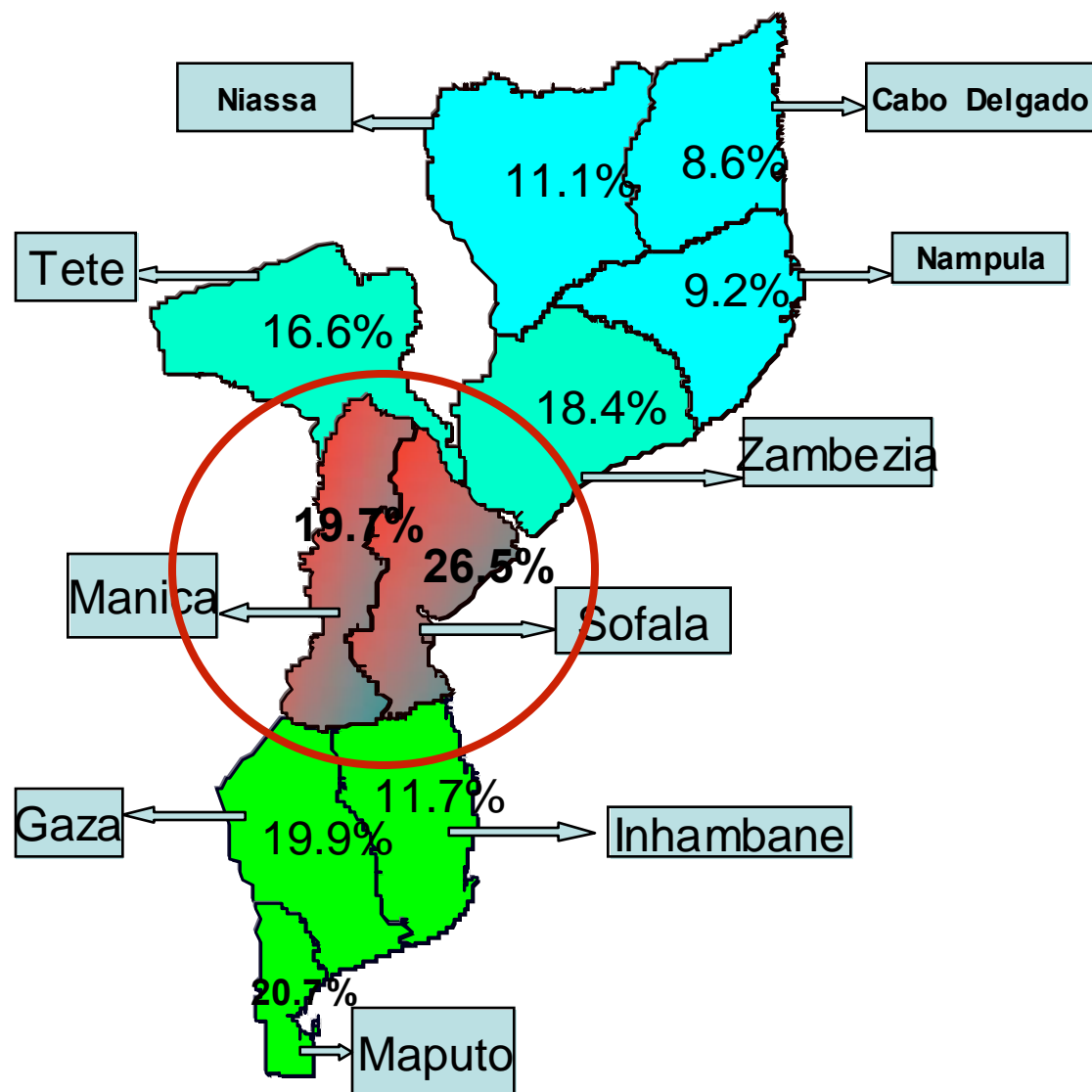
- Find the appropriate decision makers.
- Include health service managers/policy-makers in the project from the outset.
- Meet with the decision makers regularly to keep them informed of progress.
- Involve them when making recommendations.
- Present results in an accessible form.
- Disseminate results widely, include all "stakeholder" groups

Examples from Mozambique



HIV prevalence in Mozambique

2004 Epidemiologic Surveillance Round

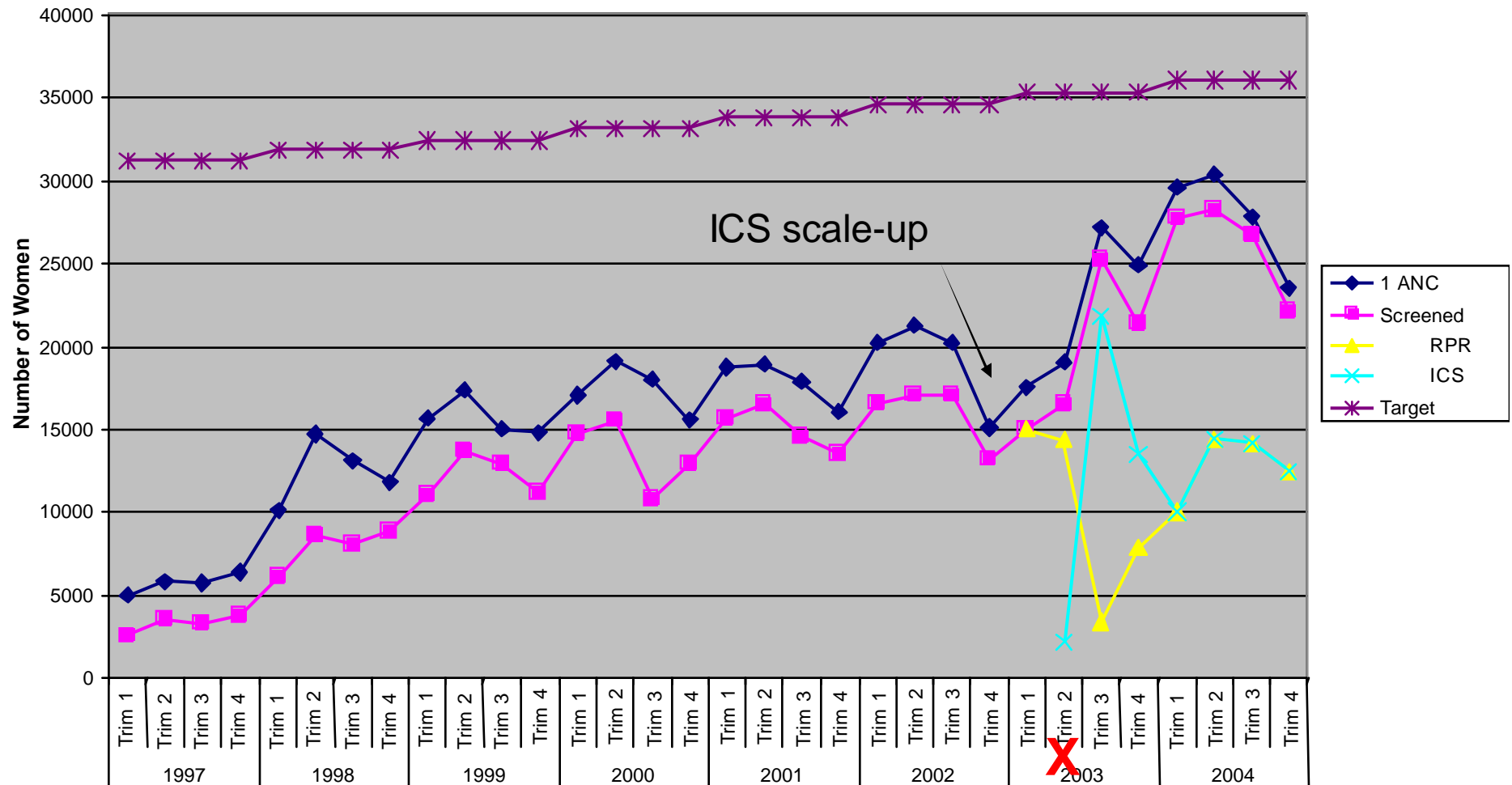


- 16.2% of adults HIV infected
- ~1.6 million PLWHA
- Also ↑ prevalence of
 - Syphilis (~8%)
 - Malaria (13-25%)
 - TB (450/100,000)
 - Malnutrition (5-20%)

Congenital Syphilis Prevention Methods

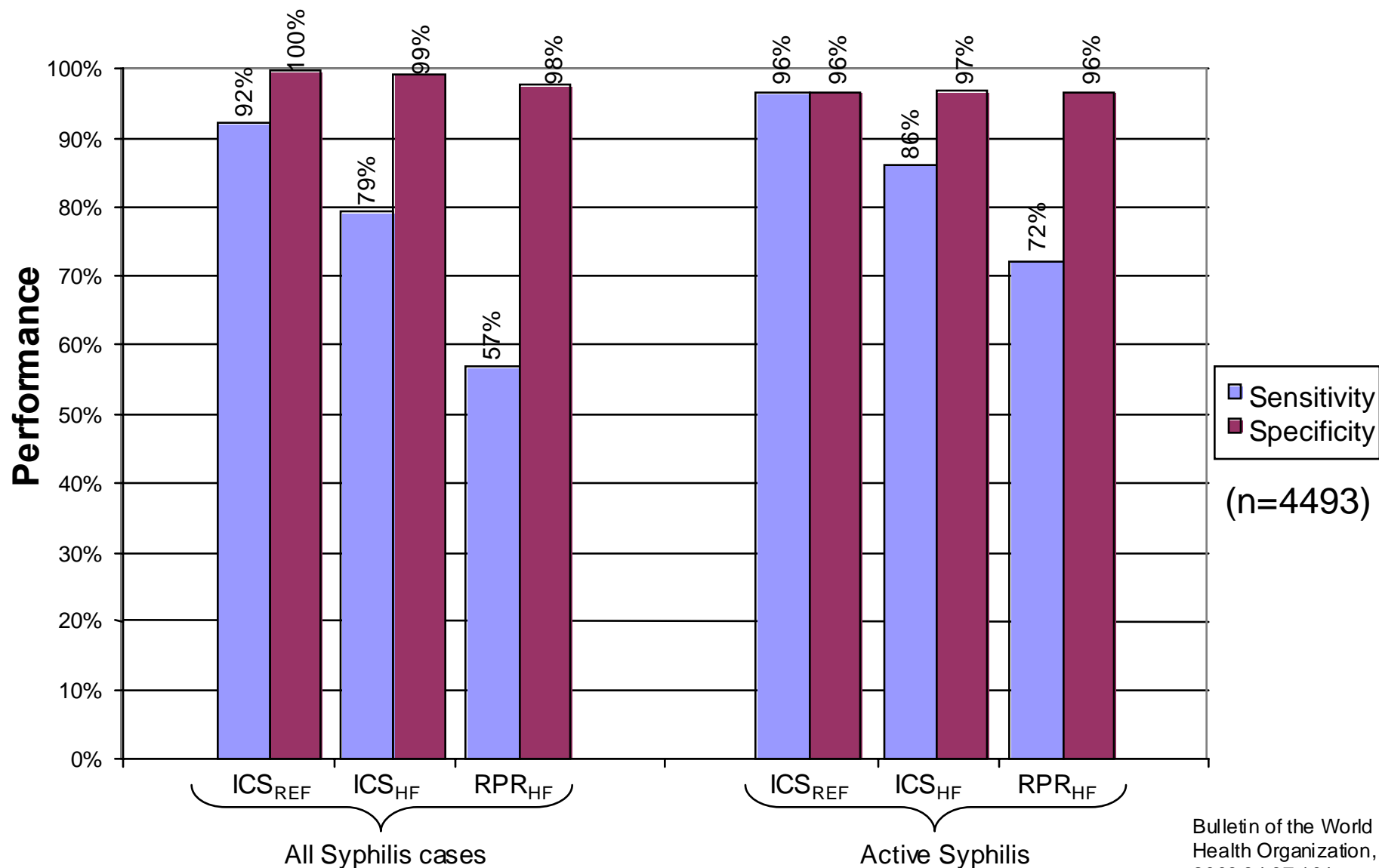
1. Analysis of information routinely collected by MCH nurses in health facilities (HF) with syphilis screening
 - Implementation of rapid syphilis test (ICS)
 - Comparison of the performance of the ICS to a gold standard (TPHA, RPR, DIF for *Tp*).
 - Evaluation of the provider satisfaction using a semi-structured interview.
 - Study of the cost-effectiveness of the ICS

Evolution of the Congenital Syphilis Prevention Program, Manica e Sofala, 1998-2004



~50% of the 1st ANC visits occur before the 24th week of pregnancy

Comparison of the Sensitivity and Specificity of the ICS and RPR Performed at Beira's Reference Lab (Ref) and at the Health Facilities (HF)

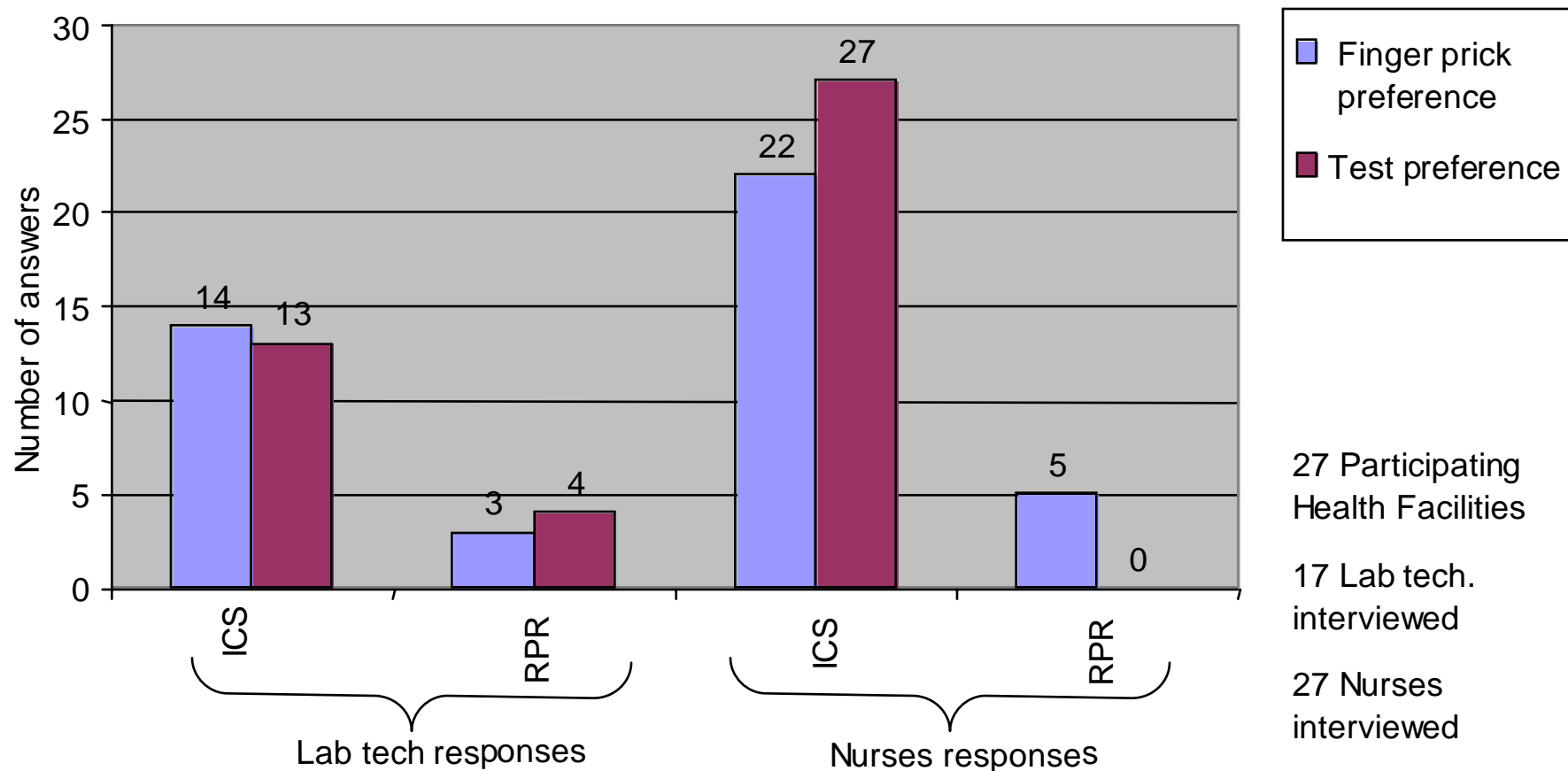


*All syphilis defined as TPHA+

*Active Syphilis defined as TPHA+/RPR+

Bulletin of the World Health Organization, 2006;84:97-104

HEALTH PERSONNEL SATISFACTION SURVEY FOR THE USE OF THE RAPID TEST, SOFALA & MANICA, 2003



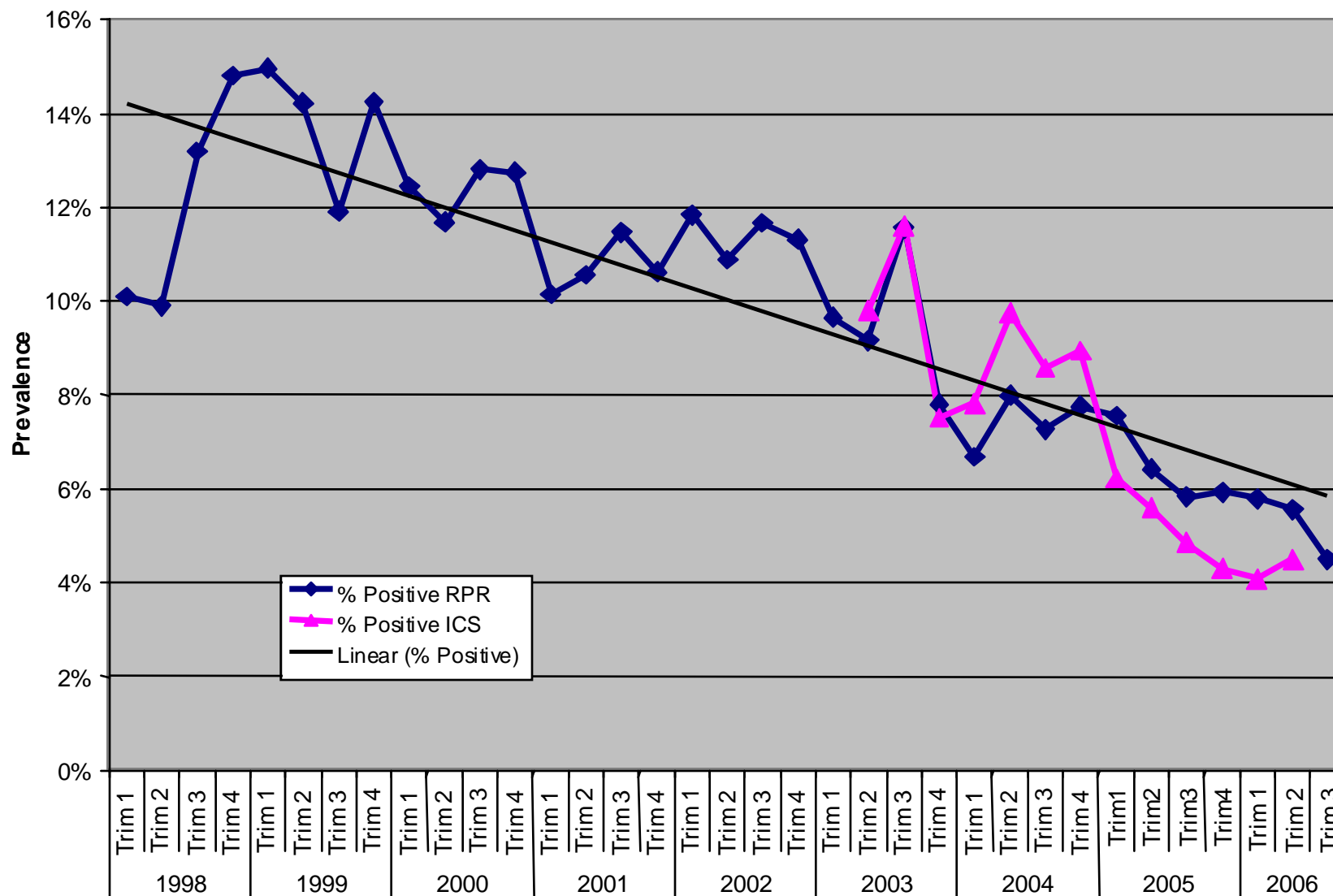
- 8/17 Lab tech and 17/20 nurses did not see disadvantages using the ICS.

Cost effectiveness

- Incremental cost-effectiveness of ICS test compared to the RPR: approximately \$4.00 per disability-adjusted life-year (DALY) averted
- Per 10,000 women:
 - ICS costs are ~\$1,200 more than RPR
 - ICS results in ~295 fewer DALYs
- By existing benchmarks of cost-effectiveness the ICS is 'very cost-effective' in a setting where RPR is currently being used

Sexually Transmitted
Diseases 2007 Jul;34(7
Suppl):S47-54

EVOLUTION OF THE SYPHILIS SCREENING PROGRAM IN CENTRAL MOZAMBIQUE: SYPHILIS PREVELENCE, 1998-2006



Conclusions

- Feasibility of use in health facilities with and with out laboratory
 - Easy to use by MCH nurses in ANC visit in both types of sites
- User satisfaction
 - Lab technicians and nurses preferred the ICS
- Performance evaluation of the ICS and RPR
 - ICS with significantly higher sensitivity at the health facility level (86% vs. 72%)
- ICS very cost effective
- Significant increase in coverage of screening

Implications for Policy Decision Making

- ICS approved by MOH for HF with out laboratory country wide.
- Syphilis screening (including ICS) in new ANC registries and program registry books
- Over 100,000 women screened for syphilis yearly in Manica and Sofala provinces (>90% of 1st ANC visits)



Sexually Transmitted Diseases,
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No. 7, p.S31–S36

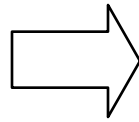
Intermittent Preventive Therapy for Malaria during Pregnancy (IPT)

Methodology

- Pregnant women receiving 3 doses of Sulfadoxin
Pirimethamine (SP) as direct observed therapy (DOT)
during the antenatal care visit (ANC)
- Counseling on the use of insecticide treated bed nets (ITNs)
- Close supervision and technical support to nurses during
implementation phase
- Cross-sectional study to determine malaria parasitemia and
hemoglobin levels in pregnant women receiving SP

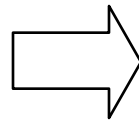
IPT - Intermittent Preventive Treatment for Malaria in Pregnancy

Results



Administration of SP:

- 1st ANC visit: 75.9%
(98.4% correctly)
- 2nd ANC visit: 95.7%
(96.9% correctly)



Use of ITNs:

(use the night before the visit)

- 1st ANC visit: 4.5%
- 2nd ANC visit: 13.5%

IPT - Intermittent Preventive Treatment for Malaria in Pregnancy

Results

1. Prevalence of Malaria Parasitemia

0 doses of SP	37.4%
1 dose of SP	4.4%
2 doses of SP	2.8%
3 doses of SP*	7.4%

2. Prevalence of Anemia (hemoglobin < 8.0 gr/dL)

Doses de SP	All women	Primigravidae
0	8,0%	11.7%
1	6,3%	6.5%
2	4.4%	5.3%
3	2.9%	7.1%*

* (few women in this group - not statistically significant)

IPT - Intermittent Preventive Treatment for Malaria in Pregnancy

Conclusions and Recommendations

- IPT was safe and effective in the pilot areas
- Good performance of staff involved in the implementation
- Good acceptance of nurses and pregnant women
- Need for monitoring resistance of *P.falciparum* to SP
- Inclusion of IPT in pre-service curriculum for nurses

IPT - Intermittent Preventive Treatment for Malaria in Pregnancy

Implications for Policy Decision Making

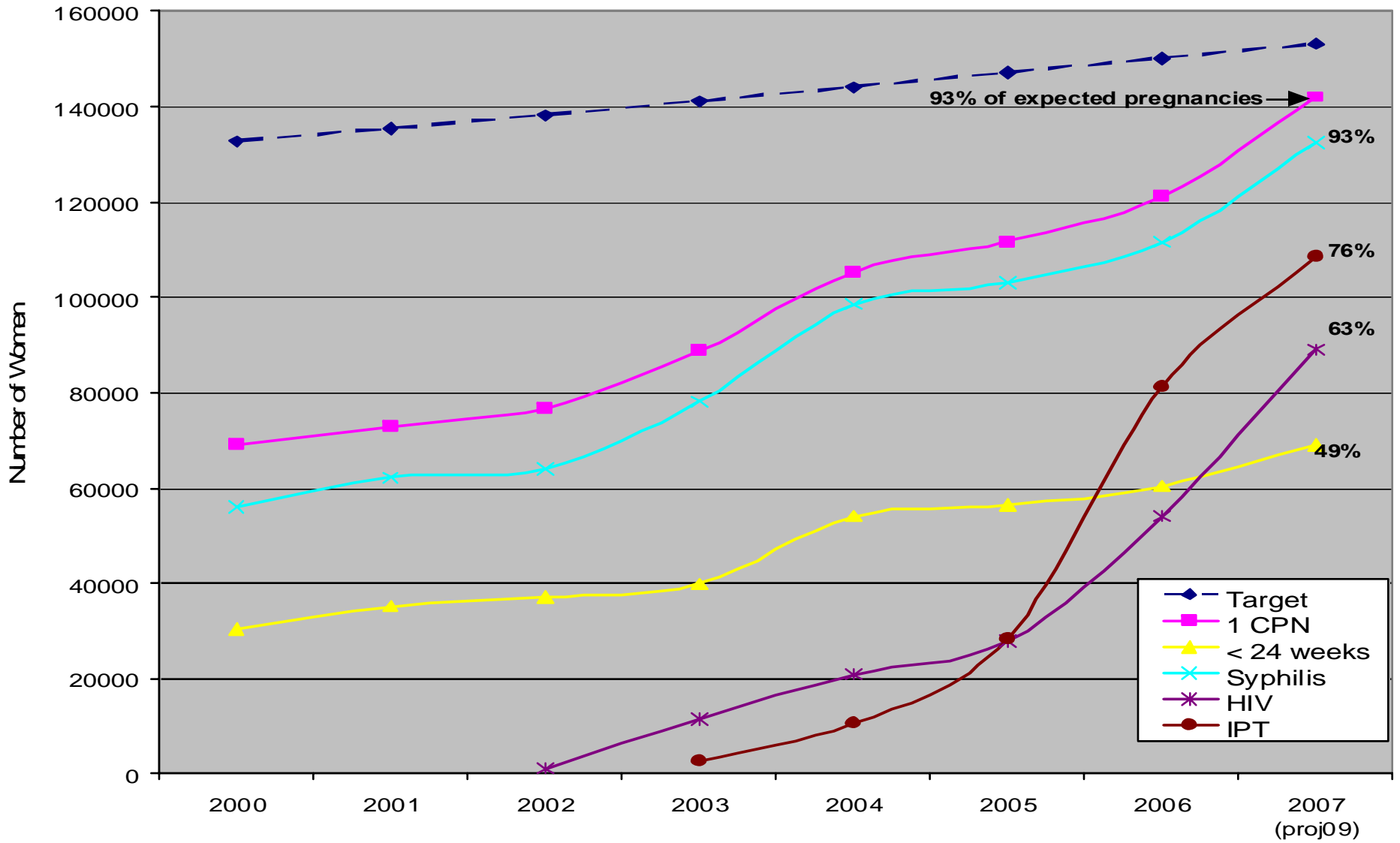
- National policy for IPT and ITNs independently of HIV sero-status
- IPT data integrated in the ANC registry books and program logs
- All health facilities offering ANC in Sofala and Manica provide IPT
 - Currently ~85% of women attending first ANC visit
- Monitoring for incompatibilities between programs in the ANC (syphilis, IPT, PMTCT) :
 - Potential co-administration of SP/CTX or SP/NVP

Am. J. Trop. Med.
Hyg., 77(2), 2007,
pp. 228–234

Lancet Infect Dis.
2006 Feb;6(2):100-11

Bulletin of the World Health
Organization. November
2007, 85 (11)

Integrated Management of Antenatal Care, Sofala and Manica Provinces, 2000-2007



Integration of TB/HIV Programs

1. IMPLEMENTATION

End of 2005 (Initially in one city then extended to the rest of the health facilities with TB program in the province)

Activities:

- 1) HIV Testing in all sites with TB diagnosis/treatment
 - TB staff trained for pre-test and post-test counseling
- 2) Improvement of HIV+ patients referral to the HIV clinics
- 3) CTX for patients TB/HIV in the TB program as part of TB treatment
- 4) Education for TB patients about TB/HIV co-infection and HIV prevention

Integration of TB/HIV Programs

Results

- In 2006 all health facilities in Sofala province testing for HIV
- Last quarter of 2007 70% (1126) of the TB patients tested for HIV by TB program staff:
 - 65% HIV positive
 - 99% receiving CTX prophylaxis

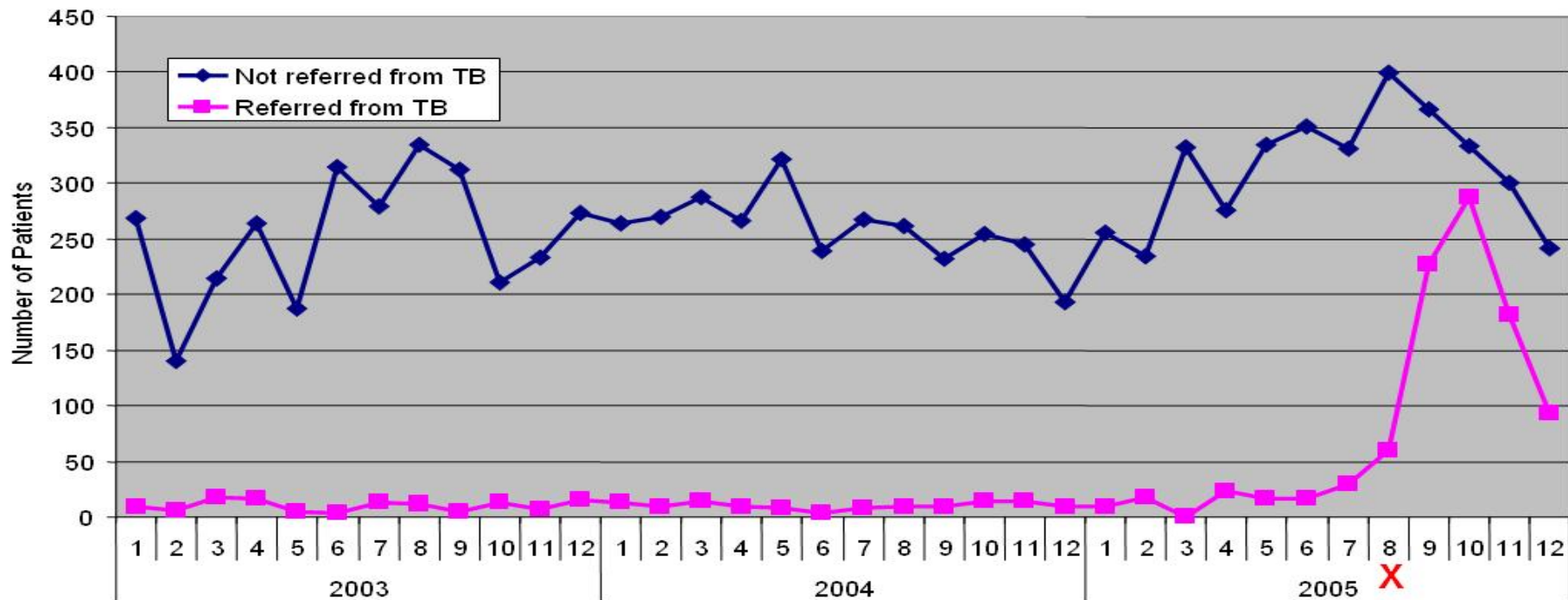


↑ acceptability (patients and TB program staff)

Integration of TB/HIV Programs

- Analysis of routine data (TB program registry books, origin of patients registered at the HIV clinic)

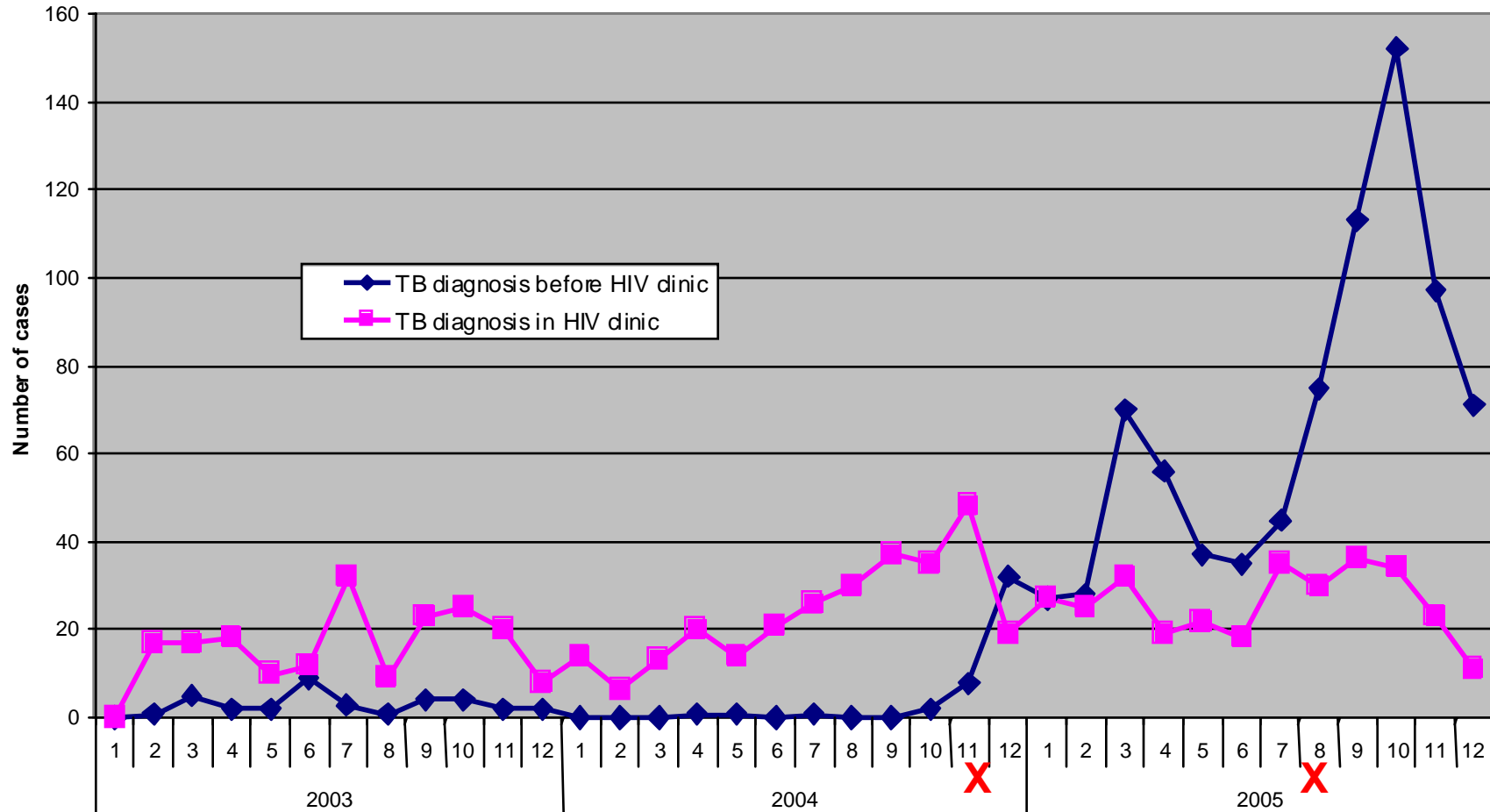
Individuals Tested in one VCT in Beira, Referred vs. Not Referred from the TB program, 2003-2005



Average 25/mo (7 months prior) → 184/mo (7 months after), $p=.002$

- Remained significant after adjustment for time ($p=.003$)

Number of TB cases in Beira's HIV clinic, patients with diagnosis of TB before and after registration at the HIV clinic, 2003-2005



Average 49/mo (7 mos prior) → 96/mo (7 mos after), $p=0.001$

- Remained significant after adjustment for time ($p=.020$)

Integration of TB/HIV Programs

Implications for policy decision making

- Demonstrated that integration and scale up of the intervention is possible at low cost
- Effective strategy to link two vertical programs with overlapped population
- Adopted by Mozambique as national policy
- All provinces now testing for HIV in the TB program



It is possible...

be patient and
persistent,

advocate,
advocate,
advocate!

Thanks!