

Effective Strategies for Retinopathy of Prematurity Screening in rural centers - *The KIDROP experience*



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No Financial Interest

A Leading Hospital in a Tier 2 Town

BW 1080 gm, POG 28 weeks



Risk Factor	Status
Sepsis	✓
RDS	✓
NEC	✓
Poor Wt Gain	✓
IVH	✓
ROP	Screened at Day 70 of life

The Challenge

Anatomical Site of blindness in children in 43 countries *

	EME	FSE	LAC	MEC	China	India	OAI	SSA
Globe	10	12	12	15	26	24	21	9
Cornea	1	2	8	8	4	28	21	31
Lens	8	11	7	20	19	11	19	9
Uvea	2	5	2	4	1	5	3	4
Retina	25	44	47	38	25	22	21	24
Optic Nerve	25	15	12	7	14	6	7	10
Glaucoma	1	3	8	5	9	3	6	7
Others	28	8	4	3	2	1	2	6

RICH

POOR


* Clare Gilbert, LSHTM

Retinopathy of Prematurity – India's 'epidemic' problem



ROP Epidemic: Leading cause of infant blindness
2 million at risk.

47% incidence. 10% blindness



Every two hours 3 infants reach
threshold for treatment in India*

** Extrapolation based on GOI Data (2007) and PGI, Chandigarh, NICU Incidence*

ROP screening is unfortunately
NOT
universal

Narayana Nethralaya Initiative

KIDROP's Triple T Strategy

- Tele- ROP
- Train peripheral ophthalmologists (ROP fellowship)
- Talking to and Training pediatricians & gynecologists



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Myths & Barriers

Myth : ROP is not a rural disease

Indian J Pediatr

DOI 10.1007/s12098-012-0707-y

1
3
2

ORIGINAL ARTICLE

4 Retinopathy of Prematurity in a Rural Neonatal Intensive 5 Care Unit in South India—A Prospective Study

6 Bhavana Hungi • Anand Vinekar • Narendra Datti •
7 Pushpalatha Kariyappa • Sherine Braganza •
8 Susheela Chinnaiiah • Krishnamurthy Donthi •
9 Bhujang Shetty

ROP group but was not statistically significant. Of the overall infants screened, 68 (57.6%) were heavier and older than the American screening cut-off. Of these, 36.8% had some stage ROP and 8% required treatment.

Conclusions: This is the first prospective ROP study from a district NICU in India and compares with previously published urban data. If Western-screening guidelines are used in the rural scenario, we risk a significant proportion of infants being missed who may require treatment.

APROP is emerging as a rural problem in India

Outcomes of a Protocol-Based Management for Zone 1 Retinopathy of Prematurity: The Indian Twin Cities ROP Screening Program Report Number 2

SUBHADRA JALALI, SIDDHARTH KESARWANI, AND ANJLI HUSSAIN

Jalali et al Am J Ophthalmol, 2011

APROP reported from 6 districts of Rural Karnataka
State in Southern India

Vinekar A et al, Am J Ophthalmol 2011

The Strategies

Retinopathy of Prematurity

Summary of Recommendations

Retinopathy of prematurity (ROP) is emerging as one of the leading causes of preventable childhood blindness in India.

Screening for ROP should be performed in all preterm neonates who are born < 34 weeks gestation and/or < 1750 grams birth weight; as well as in babies 34-36^{6/7} weeks gestation or 1750-2000 grams birth weight if they have risk factors for ROP.

The first retinal examination should be performed not later than 4 weeks of age or 30 days of life in infants born \geq 28 weeks of gestational age. Infants born < 28 weeks or < 1200 grams birth weight should be screened early, by 2-3 weeks of age, to enable early identification of AP-ROP.

National Neonatology Foundation – Practice Guidelines 2010.

Pejawar R, Vinekar A, Bilagi A. for NNF writing committee on ROP

Low cost enrolment

REDROP

A Novel Low-Cost Strategy for Enrolling Infants into a ROP Screening Program

Vinekar A, Avadhani K et al

Ophthalmic Epidemiol. 2012 Aug 16. [Epub ahead of print]



REDROP

Cost of enrollment per infant was
< Rupees 5 (USD 10 cents)



Why they didn't come....

Reasons for NOT coming for ROP screening	Percentage (rounded) (%)
Mobile number switched off / non-existent (could not remind)	63
Distance	8
No permission from male member	20
Health issues	6
No reason	3
Gender Bias?? 82% of those who did not come were females. 72% of those who came were males	





First PPP in Infant Blindness in India - ROP

2.3 Crores (2009-2012)

Innovative Initiative by Govt. of Karnataka

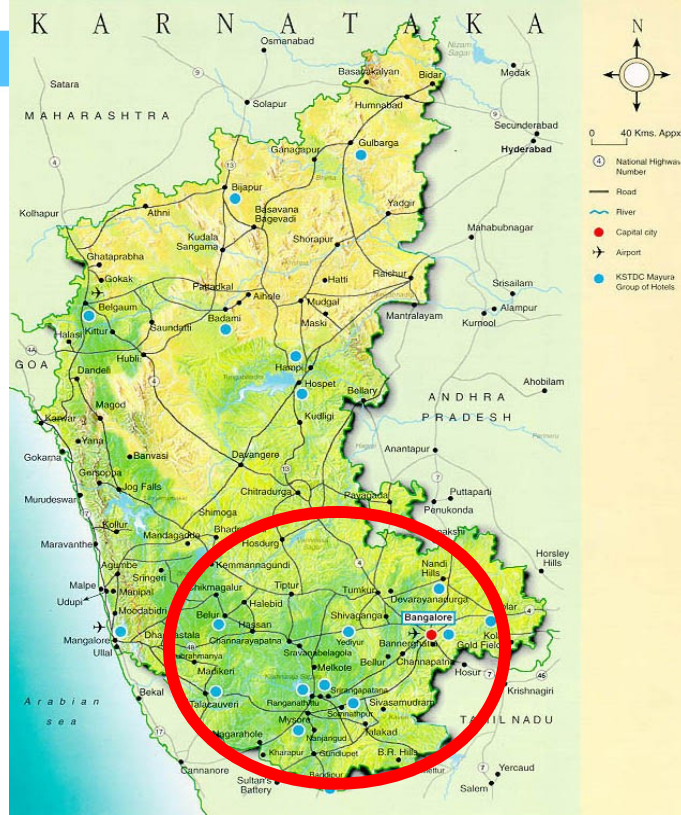
12 districts in Karnataka – North and Central zones

- Training;
Ophthalmologists &
OA
- “Reading Site”
- Treatment
- Funding for Camera
& Laser
- Logistics : Support:
Mobilization of the
infants – screening
and treatment



VS





Other States:
Maharashtra
Gujarat
Rajasthan

Narayana Nethralaya **KIDROP** Trial (Karnataka Internet Assisted Diagnosis of **ROP**) 2007 to date





Karnataka coverage area

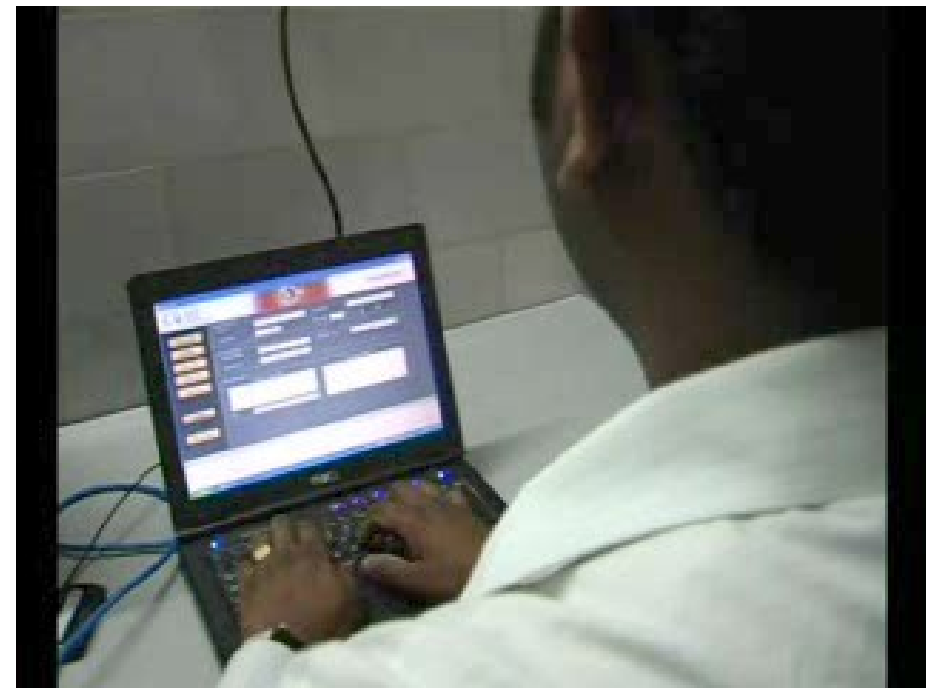
18 districts

74 hospitals

3

Independent
teams

Day	Zone 1	Zone 2 (NK)	Zone 3 (CK)
Mon	Mandya, Mysore, Chamrajnagar	Raichur	Davangere
Tue	Bangalore BBMP	Gulbarga	Chitradurga
Wed	Tumkur dist Hosur (TN)	Bidar	Bellary
Thu	Kolar	Bijapur	Haveri
Fri	Tumkur Pavagada	Bagalkot	Dharwad
Sat	Bangalore Urban	Koppal	Gadag



Average speed of uploads

Internet Speed	Time to Upload 1 patient's images (14 images per infant)
128 kbps	14 -16 min
256 kbps	6-8 min
1 mbps	2-3 min
3.1 mbps	< 2 min
3G (under test) on iPad	< 1 min

Ophthalmic Camera

PATIENT SITE



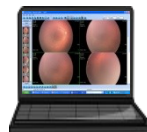
Upload

Ophthalmic TelePACS Server



Progressive Viewing

Ophthalmic Worklist & Viewer



Remote Viewing

ANY SITE

ANYWHERE



- Studies captured by digital Fundus camera
- Uploader installed on Fundus camera workstation
- Uploader encrypts, compresses losslessly and transmits Studies to Server over LAN or WAN

- Stores Studies for download.
- Provides user services over the WEB such as:
 - Viewer download
 - Worklist creation
 - Workflow management.
 - Admin functions
 - User authentication

- Remote Ophthalmologist logs-in at the Server over WEB.
- Downloads viewer one time from server.
- Downloads worklist from server.
- Selects studies to download from the worklist.
- Downloads studies realtime and progressively views
- Uses Viewer tools to analyze images.

- Creates reports via WEB reporting feature or Word upload.
- Electronically signs and sends to Patient Site or forwards to consultant.

TRAINING @ KIDROP



TREATMENT AT THE OUTREACH

Laser treatment & patient counseling in the Rural Outreach



KIDROP

- 2008 : NN Initiative
- 2009 MOU with NRHM Karnataka
- 2010 : Training
- 2011 (to date) Implementation
- **Total : 23578 sessions**
- **18 districts**
- **614 laser procedures**

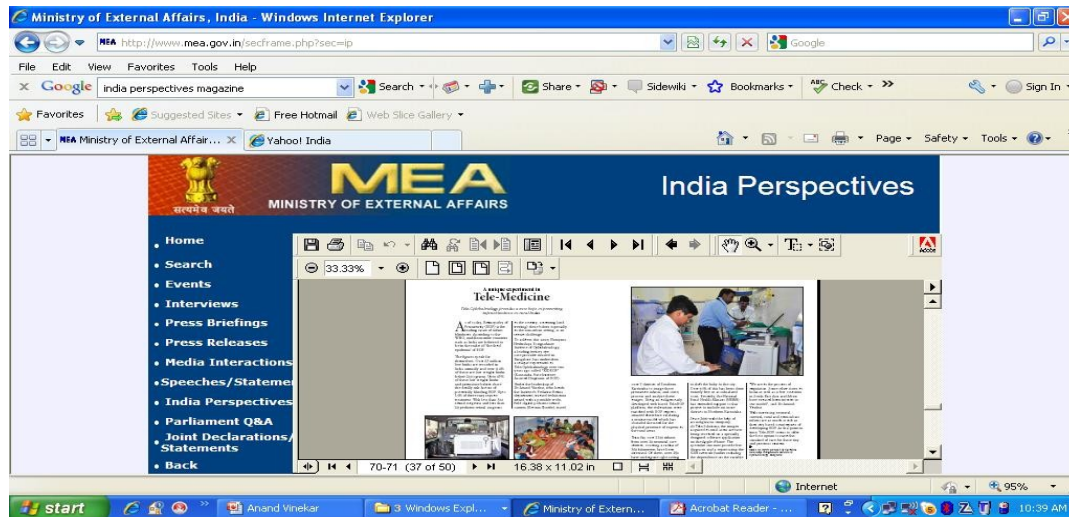
Which is the best strategy ?

Analytic Hierarchy Process

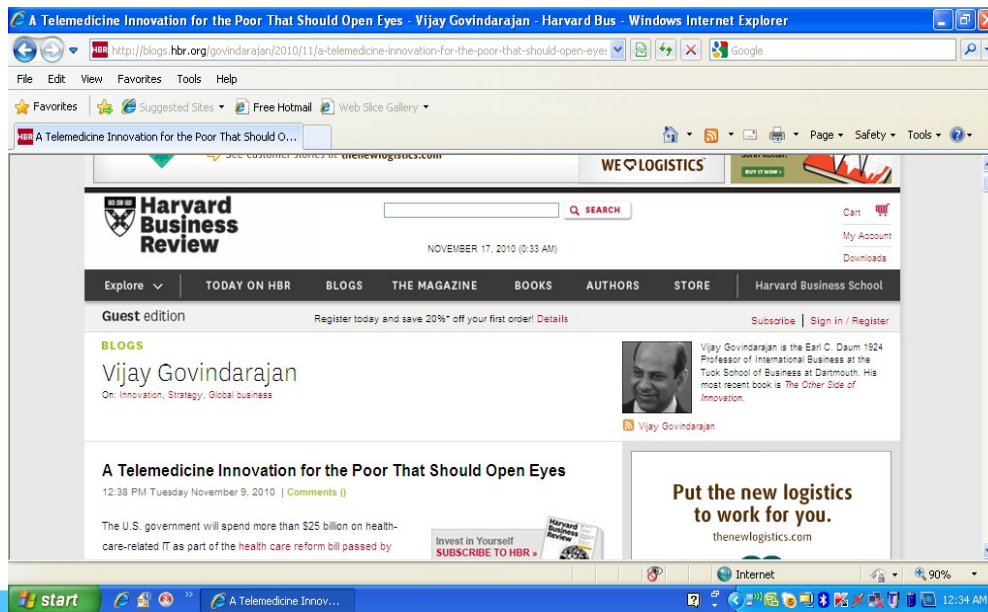
Strategy	Highest Burden	Coverage of susceptibles (%)
Mothers coming to city with their infants	Patient	10-14%
ROP specialists screening in rural areas once a week	Individual Organization	34-58%
District Hospitals have one RETCAM each	Organization	88-95%
KIDROP	Balanced	>90%

Study in association with IIM Bangalore Jan-Feb 2011

KIDROP - past achievements



“... a unique experiment in Tele-Ophthalmology provides hope to rural infants”



Harvard Business Review cites KIDROP as an example of ‘reverse innovation’

"Light of the Eyes"

Movie on KIDROP by NRHM : May 2012

NRHM, Karnataka
presents

Light of the Eyes...

a film on KIDROP

Karnataka Internet Assisted Diagnosis of Retinopathy of Prematurity

Completing

5 years

Preventing Infant Blindness Using Technology & Passion

Sep 2007 - June 2012

2007 - 2012
Preventing Infant
Blindness
Using Technology
& Passion

2007 - 2012
Preventing Infant
Blindness
Using Technology
& Passion

2007 - 2012
Preventing Infant
Blindness
Using Technology
& Passion

KIDROP 12 Months
(North and Central Kibera)
2007 - 2012

Preventing Infant
Blindness

The Journey Continues...

1. Journey Begins.....
2. India's first Retcam Shuttle
3. 1st International invited talk on ROP
4. Award from Dalai Lama
5. Tele ROP-platform established
6. World's 1st ROP App on an iPhone
7. India's 1st PPP in ROP (NRHM, Karnataka)
8. A Top 10 Medical Innovation
9. Thrombocytopenia: A new risk factor !
10. Harvard Business Review cites KIDROP
11. MEA calls KIDROP "Unique & Successful"
12. Positive Health Hero award
13. New technique of infant OCT imaging
14. Govt. teams- training begins
15. Pune team trained
16. 10,000 babies crossed !
17. Rajiv Gandhi Award for Excellence
18. IIM Ahmedabad: KIDROP case study
19. A new OCT finding in ROP: IOVS
20. North Karnataka screening starts !
21. KIDROP Facebook page launched
22. Marquis Who's Who of the World
23. NRHM makes a movie on KIDROP
24. Gujarat team trained
25. Central Karnataka equipment installed
26. 600th laser performed !



THANK YOU

Working towards a
world without ROP
blindness*

** Video on YouTube*

Follow the KIDROP Program on
FACEBOOK

facebook

www.facebook.com/KIDROP