

# “Technology-Transfer- Case Studies”

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- Asstt. General Manager, BCIL



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# *Project Management*

# School of International Biodesign (SIB)- Enabling the Future of Frugal Medtech Innovation Globally

## SIB PARTNERS



BCIL, New  
Delhi



AIIMS,  
New Delhi



IIT, New  
Delhi



Department of  
Biotechnology,  
New Delhi



Stanford  
University,  
USA



Indo-US  
S&T  
Forum,  
New Delhi



QUT,  
Australia



Tottori  
University,  
Japan

# School of International Biodesign

BCIL is the Management Agency for Fellowship Programme under School of International Biodesign ( SIB)



**AIIMS, New Delhi**



**IIT, New Delhi**



**Stanford University, USA**



**Hiroshima University, Japan**



**Queensland University of  
Technology, Australia**



**Tottori University, Japan**

# Technology Management and Transfer



Streamline SOP's and Agreements

Intellectual Property Management

Technology Transfer

Inter-Institutional and Academia- Industry Collaborations

# School of International Biodesign- Key Outcomes

SIB-Policies and procedures  
stream-lined

- Ownership clarity,
- Revenue sharing model
- 20 Formats and Agreements  
Drafted and Standardized

SIB-Industry Collaborations

- J&J
- Siemens Information systems  
limited (SISL)

16 technologies  
transferred

NINE Start-Up Companies



46 Patent  
application filed  
&  
4 Granted  
Patents

38 medical  
device  
innovations  
developed so far

21 Trademark  
registrations, 6  
Industrial designs  
filed, 2 & 9  
Industrial design  
and trademarks  
granted  
respectively



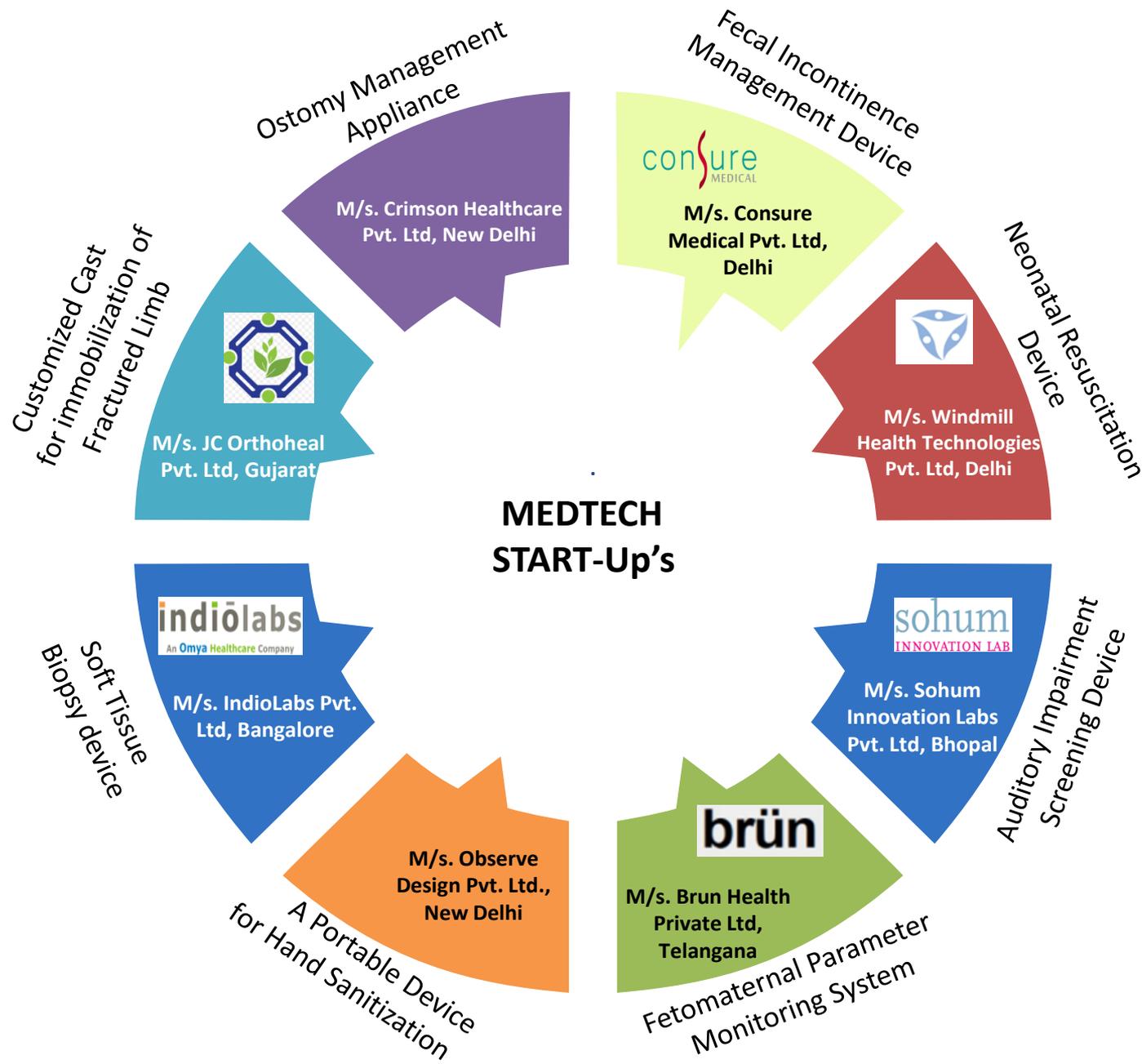
Neonatal  
Resuscitation  
Device

Fecal Incontinence  
Management System

Limb Immobilisation  
Device



# Entrepreneurship Development & Tech-Transfer





Fecal Incontinence Management Device

1

2 Neonatal Resuscitation Device

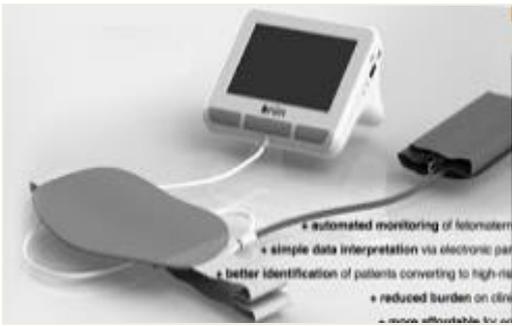


Auditory Impairment Screening Device

3

4 Ostomy Management Device





## Fetomaternal Parameter Monitoring System

5

## 6 Portable Device for Hand Sanitization



## Soft Tissue Biopsy Device

7

## 8 Customized Cast for Immobilization of Fractured Limbs



# Technologies Commercialized



Neonatal Resuscitation Device



Fecal Incontinence Management Device



Limb Immobilization Device

# 2.

# Enabling Ownership Clarity of IP for Commercialization

Four Collaborators-One Program

Who owns the IP

Joint IP

Commercialization Issues



Department of Biotechnology



Stanford University, CA



IIT, New Delhi



AIIMS, New Delhi



BCIL



Ownership by One Neutral Body

Commercialization rights to BCIL

16 Technologies transferred,  
Four products commercially launched

3.

# Strategic Collaborations for Facilitating Technology Validation and reach-out

## Technology Commercialization

Validation required

Identification of Partners by BCIL

Tottori University, Japan  
expertise in electronics

QUT University, Australia -  
Animal studies

Alto University, Finland-  
Product Design

Strategic Collaborations driven by BCIL

Technology validation in leading Foreign and Indian Institutes



# 4. Regulatory Hurdle Overcame For the Successful Transfer

**Technology**  
**Bio-pesticide formulation 'Bollcure' with major activity against cotton bollworms**



Regulatory clearance identified as major hurdle towards technology transfer

✓ BCIL facilitated funds from DBT to get regulatory clearance

*Licensed to 3 Indian Companies*

*Licensed to a US Company*

# ENABLING FUNDING TO LICENSING PARTNERS FOR COMMERCIALISATION OF TECHNOLOGIES

5.

Urine based Fertility Testing Kit technology transferred to a Indian Company

Monitored the post transfer activities closely



BCIL identified a funding scheme of the Government relevant to their project nature

Assisted/Advised the licensing partner with application to the scheme

# 6.

## Facilitating Technology Validation

Medical  
Diagnostic  
Technology

ICMR Technology Transferred to an Indian Company

Third party Validation Essential



BCIL Identifies Institute with Animal Facilities for validation (NIN, Hyderabad)



BCIL facilitated Validation of the technology by reputed Institute through its linkages



# Technology-Transfer-MSME\Large Enterprise

## 7.

# “Technology Valuation” for Realising Appropriate Deal Value

**Technology**  
**An Emergency Medical Device for Cardiac**  
**Patients, developed at AIIMS**



**Class- III, Technology Intensive device**  
**IP protected in India, Europe, USA, Israel and Australia**

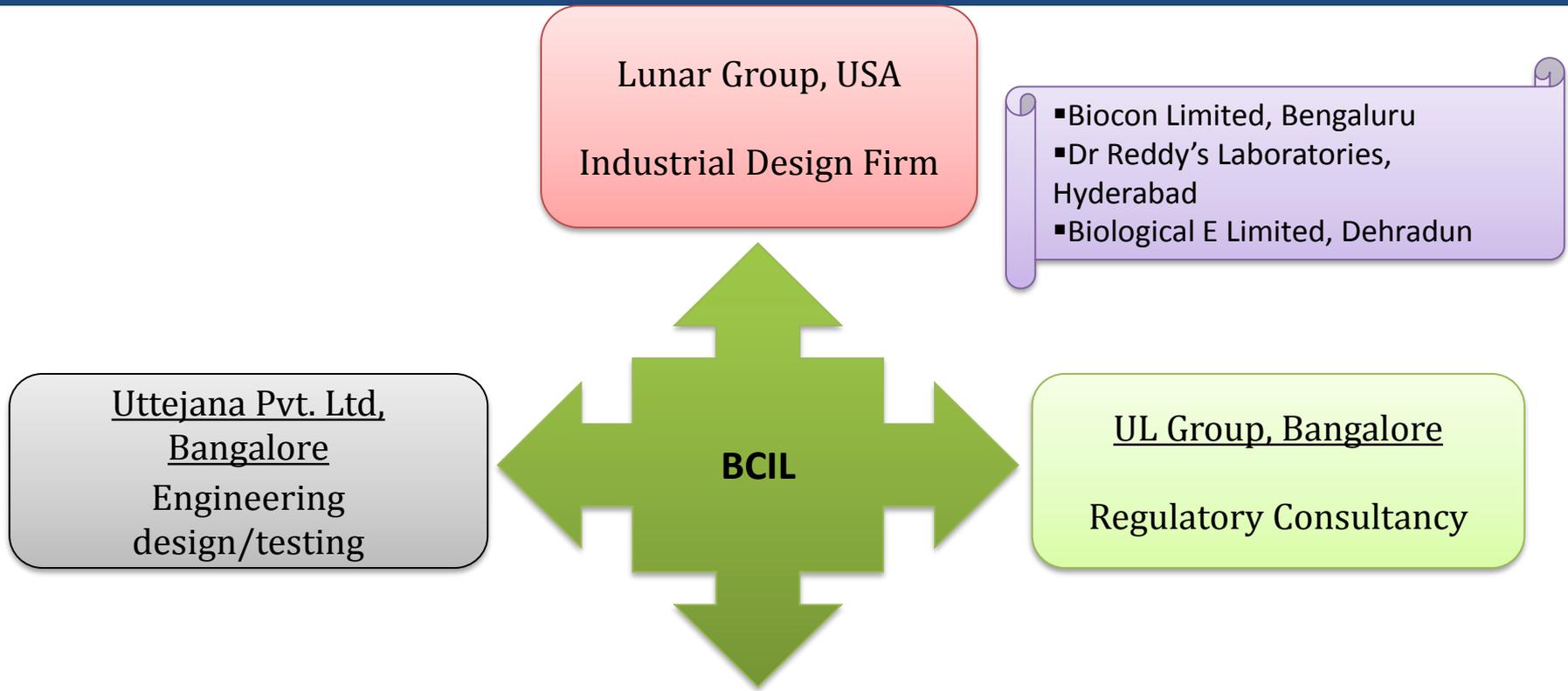


Key Assumptions	
Assumption	#
Number of Hospitals, who will need device	50,113
Growth in Demand	2%
Average Selling Price(ASP) per device	4000 USD

## India Market Revenue Model-Device

Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8
No of Devices sold	50,113	51,115	52,138	53,180	54,244	55,329	56,435	57,564
% Market share captured	0.0%	0.0%	0.0%	0.50%	3.00%	5.0%	7.0%	10.0%
Total Units Sold	-	-	-	266	1,627	2,766	3,950	5,756
ASP			\$4,000.00	\$4,000.00	\$4,000.00	\$4,000.00	\$4,000.00	\$4,000.00
Revenue (USD)	-	-	\$0	\$10,63,606	\$65,09,271	\$110,65,760	\$158,01,906	\$230,25,634

# Ensuring Confidentiality during Vendor Engagements



**Agreements for contractual engagement drafted to ensure maintenance of:**

- ❖ IP Ownership
- ❖ Inventorship
- ❖ Confidentiality
- ❖ Prevention of reverse engineering

## Valuation contd....



**Expected revenue from product sales from 5 year of Sales: Rs. 373.53 Crores**

**Licensing fee proposed 3% of the gross sales Rs. 11.20 Crores (Upfront payment and royalty)**

**Key outcomes**

**Valuation helped in negotiations backed with Market Data and Expected Revenue Stream**

**Very Good Licensing Royalty Benefits Expected**



8.

## *Technology-Transfer to Start-up Company*

# NeoBreathe

The world's first foot operated resuscitation system.



Windmill Health  
Because saving lives should be simple.



Significantly easier to use. Helps save lives.

# Windmill's Story: Inception

- **Innovator: Dr. Avijit Bansal**
- **Team:** Dr. Ayesha Chaudhry, Dr. Ramesh Agg, Dr. Rakesh Lodha AllMS, Dr. Vinny Bhutani Stanford, Dr. Sudipto IIT
- **Previous life:** Pulmonary Physician, SIB Fellow
- **Genesis of Idea:** Experience of resuscitation during residency
- **Observation:** Resuscitation is difficult, so much to do, one hand taken by bagging
- **Insight:** Lack of resuscitation skill kills lacks of babies at birth each year

# Windmill's Story: Need Identification and Funding

- Need: A way to empower frontline health workers to resuscitate newborns effectively
- Solution: NeoBreathe – The world's first foot operated resuscitation system
- Invented at: AIIMS (IP and Tech transfer supported by BCIL)
- Spin off Startup: Windmill Health (Founded 2012)
- Founded by: Avijit Bansal and Ayesha Chaudhary
- Funding (total ~ INR 4 Cr) by



# NeoBreathe

The world's first foot operated resuscitation system.

Convenient, hassle free

Premium functionality

Easy to use and learn

Precise control

Single person operated

Enhanced safety

Efficient multitasking

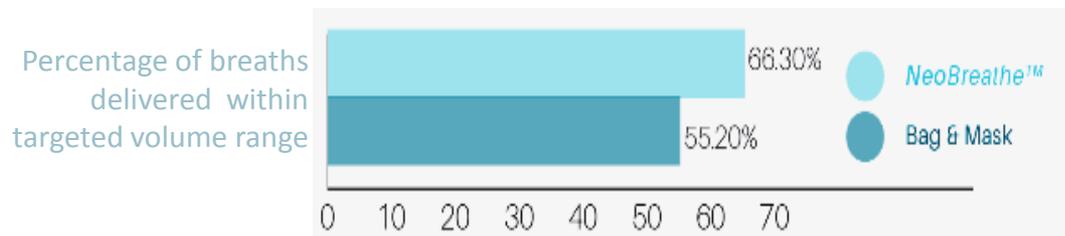
Suction integrated



*Convenience. Confidence. Control*

# Technical Validation at AIIMS NeoBreathe Improves Ventilation

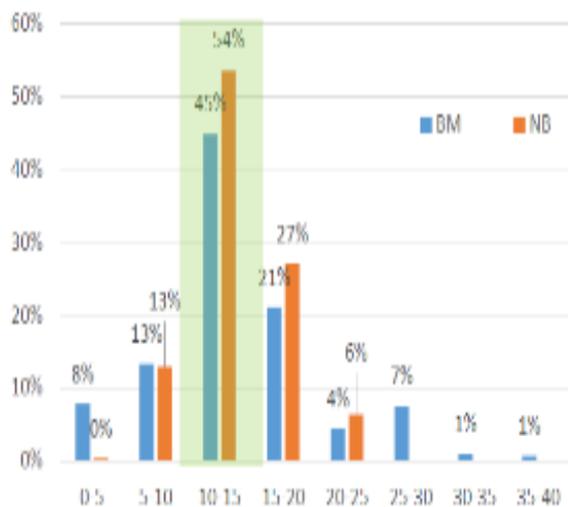
## Novice users



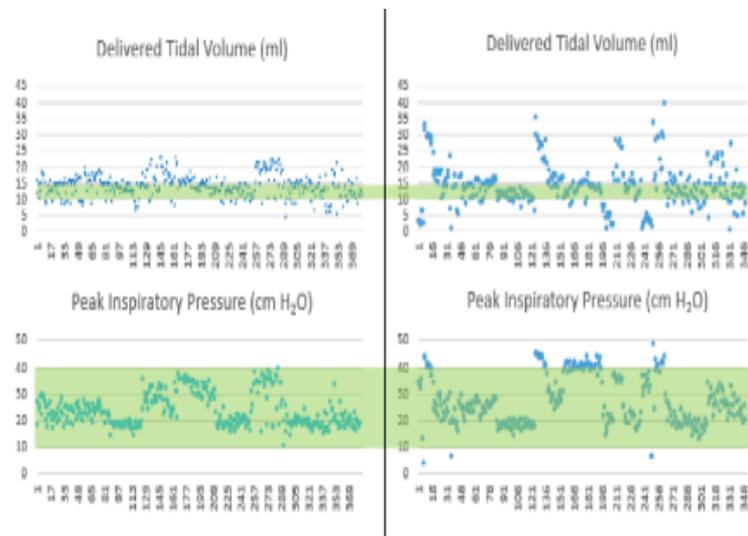
Comparative user evaluation, first time users, no prior exposure to either device, n=29

Somashekhar et al, presented at PAS 2016, Baltimore

## Nurses



Percentage of breaths delivered within targeted volume range



NeoBreathe™

Self-Inflating-Bag Mask

Comparative user evaluation, NICU nurses, n=9, Unpublished data collected by Windmill Health

# User Feedback, Market Release in India

“So clever! Why didn’t I think of this before!”

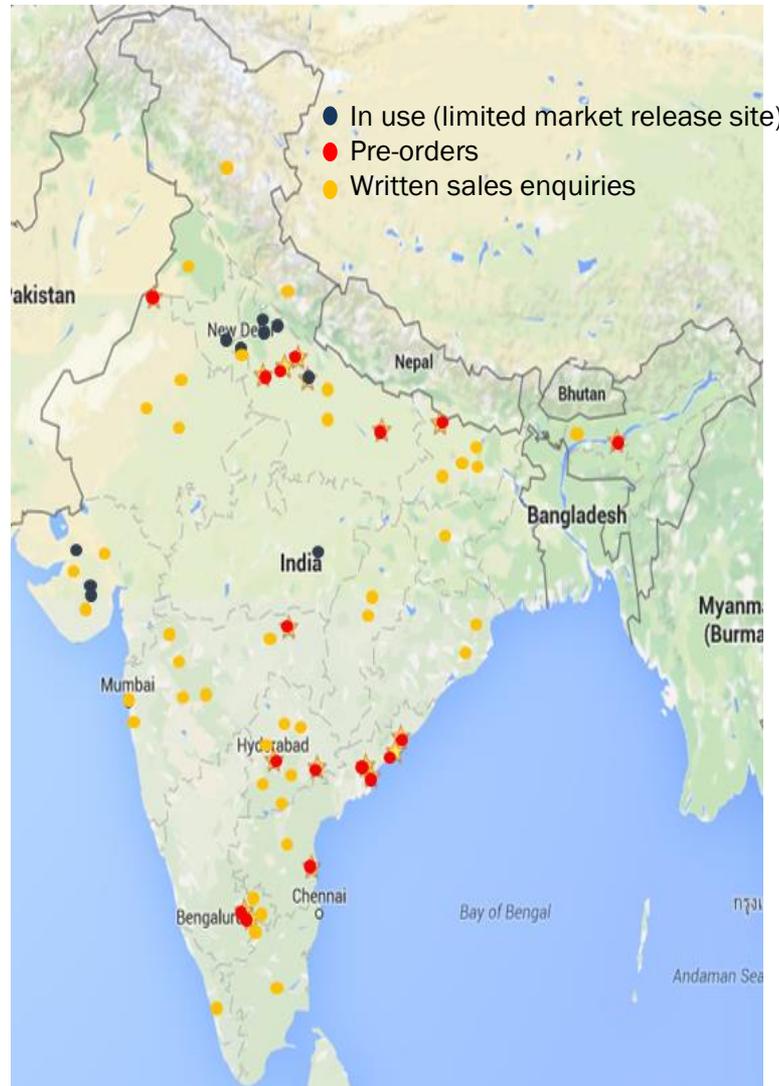
Dr. Manuel Sanchez Luna,  
President, The European Union of  
Neonatal  
and Perinatal Societies, Spain

“Pilot has gone well. We’ll likely need 1500 units – 1 for each birthing center.

Dr. Rajshree Bajaj  
Deputy Director Child Health,  
National Health Mission,  
Madhya Pradesh

“This single device provides everything  
Pediatricians currently miss in resuscitation”

Dr. Sandeep Gupta,  
Director, Dharampal Hospital, one of India’s largest NICUs



“I feel like have 2 extra hands, I need this today, not 5 months later!”

Dr. Atul Agarwal, MD  
District Instructor, NRP, Bareilly  
(Customer)

“I need 2 more urgently!”

Dr. Gaurav Agarwal,  
HOD Paediatrics, KOSMOS Hospital,  
Moradabad  
(Customer)

“My JRs in the OT are loving it!”

Dr. Surender Bisht,  
SDN District Hospital, East Delhi  
National Level NRP Trainer  
(Customer)

National  
Technology Day



National Award 2017 for commercialization  
of indigenous technology

Windmill Health  
Technologies Pvt. Ltd.

HE Sh. Pranab Mukherjee, President of India (Center), Hon. Minister, Science and Technology Dr. Harsh Vardhan (L)  
Dr. Avijit Bansal, Founder, CEO, Windmill Health (R), Vigyan Bhavan, New Delhi, 11<sup>th</sup> May 2017



Invented at

SCHOOL OF INTERNATIONAL  
**BIODESIGN**  
at AIIMS, New Delhi

R&D Partners

STANFORD BYERS CENTER FOR  
**BIODESIGN**



Supported by & IP owned by



Department of  
Biotechnology,  
Govt. of India

Commercial Launch Partner



**PHOENIX**  
Phoenix Medical Systems (P) Ltd.



**NeoBreathe™**

World's first foot operated  
newborn resuscitation system



**Windmill Health**

*Saving lives should be simple*  
contactus@windmillth.com  
0120-4350607  
www.windmillth.com

Research and development generously supported by



**BILL & MELINDA  
GATES foundation**



Grand Challenges Canada  
Grands Défis Canada

Activate Windows  
Go to Settings to activate Windows

9.

## *Technology-Transfer to PSU*

# Case study



## Limb Immobilisation Device



# Problem

# 15M\*

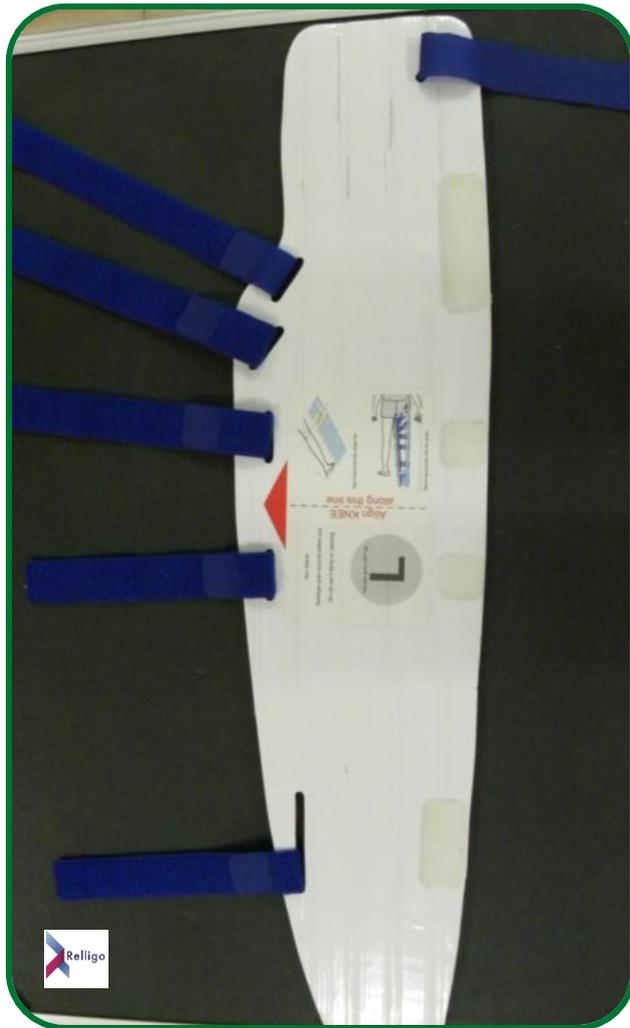
Road Traffic Accidents (RTAs)  
per annum in India



# 8%\*

Increase per annum

# Value proposition



- Designed for prehospital care
- Easy to apply – 2 simple steps
- One size fits all
- Single device for right or left limb
- Immobilizes for six hours
- Radiolucent
- Low cost
- Disposable
- Eco-friendly

# Market analysis-by BCIL



	<b>RTA Injuries</b>	<b>Non-RTA Injuries</b>
Number of Patients	15M <sup>#</sup>	28M <sup>##</sup>
Patients with lower limb injuries	5.4M <sup>*</sup>	4.2M <sup>**</sup>
Total number of patients	9.6M (per year)	
Median cost of treatment (\$4 - \$12)	\$6 (Rs.300)	
Potential market size (est.)	\$58M (Rs. 290Cr) (per year)	

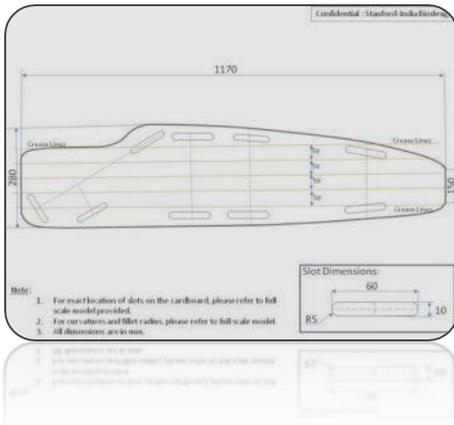
# 2010 figures - Source : BCIL Team analysis

## Nitin Garg & Adnan a. Hyder, Road traffic injuries in India: A review of the literature, Scandinavian Journal of Public Health, 2006; 34: 100–109

\*Assuming 60% of 9M cases of limb injuries in RTA in 2010

\*\*Assuming 15% of number of pts from Non RTA injuries -

- Prior art search and patentability analysis
- Drafting and Filing- Provisional and Complete Patent Application
- PCT application filed – considering other emerging markets.
- Filed response to PC search report under Article 19.



- Design freeze : Fully functional prototypes
- Detail Engineering
- Vendor development
- Soft Tooling
- Manufactured multiple units

## Normal subjects



Project: Lower limb immobilization  
Form & Fit study – Part I (Patient centric)

Started India Research

Title: \_\_\_\_\_ Date: \_\_\_\_\_

Demographic Data:  
Name: \_\_\_\_\_ Sex: M/F Age: \_\_\_\_\_ yrs  
Height: \_\_\_\_\_ cm Weight: \_\_\_\_\_ kg

Anthropometric dimensions:

Length of limb (from ASIS to the heel)	Circumference of the limb below the regional gender	Distance of the limb above the knee	Distance of the limb above the knee (leg)	Circumference of the limb above the knee
_____	_____	_____	_____	_____

Link Covered: \_\_\_\_\_

Immobilization: \_\_\_\_\_

Overall Patient (per cent) Before: \_\_\_\_\_ After: \_\_\_\_\_

Verbal feedback of the subject:

1. Comfort level of a subject	Poor	Average	Good	Excellent
2. Are Velcro's too tight?	Yes	No	I don't know	

Remarks: \_\_\_\_\_

Photographic documentation

Confidence: \_\_\_\_\_

Project: Lower limb immobilization  
Form & Fit study – Part II (User centric)

Started India Research

Title: \_\_\_\_\_ Date: \_\_\_\_\_

User's Information:  
Name: \_\_\_\_\_ Affiliation: \_\_\_\_\_

User's Experience:

	Poor	Average	Good	Excellent
1. Handling the device				
2. Positioning the device under the limb of the patient				
3. Rigidity of the device to conform to the shape of the limb				
4. Strength of the band				
5. Ease in wearing/removing the device				
6. Considering a permanent device option				
7. Durability				
8. Portability				

User Feedback:

1. Can the person use this device intelligently?	Yes	No	May be
2. Will you dispose off this device after single use?	Yes	No	May be
3. Where do you think this device will not work? (e.g. bed/wearing parts etc)			

Rank following device overall:

Chassis Splint	OSM splint	Disaster plank	Chressed SB device
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Photographic documentation

Confidence: \_\_\_\_\_

- Purpose :
  - ✓ Form and fit analysis
  - ✓ Functionality evaluation
  - ✓ Usability testing
- Successful outcomes
- Design modifications

## Trauma patients



Femoral fracture



Tibial fracture



During X-Ray



# Technology licensed to HLL Lifecare Ltd



- HLL Lifecare Limited, Thiruvananthapuram, a leading healthcare public sector undertaking
- To ensure product reach-out to Indian masses
- Established marketing networks

Activity	Time period from the date of execution of the License Agreement
Commercial launch in at least one State	Within 6 months
Commercial launch in at least three State	Within 12 months
Commercial launch in at least ten State	Within 30 months

**Business Plan of HLL made part of License Agreement for performance tracking**

- Transfer of technology Know-how: Technology Transfer dossier
- Frequent Post-transfer review meetings
- BCIL team: Working closely with Inventors and HLL Officials

- BCIL explored opportunities with DRDO, Indian Air Force
- Samples provided to DRDO for multi-centric independent evaluation
- Feedback from DRDO positive
- Expressed interest in bulk purchasing for Indian Armed forces across the country.

# Product launch



Product launched in the presence of Prof. K. Vijay Raghavan, Secretary, DBT; Dr. M. K. Bhan, Former Secretary, DBT; Prof. R. K. Shevgaonkar, Director, IIT-Delhi and Dr. Rao, Joint Secretary, Ministry of Health and Family Welfare.





Thank  
You

[suchitamarkan@gmail.com](mailto:suchitamarkan@gmail.com)  
[suchita@biotech.co.in](mailto:suchita@biotech.co.in)