

# **Infant Bacterial Therapeutics**

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# First distribution deal for IBP-9414 in place

Agreement with Megapharm for IBP-9414 for the Israeli market and the Palestinian Authority's territories.

Collaborate to include Israeli medical centers in Phase III trial

Megapharm responsible for local registration, price negotiation and marketing

- IBT will receive 70% of revenue after an initial period

# **Infant Bacterial Therapeutics AB**

#### Founded in 2013 in Stockholm, Sweden

#### IPO in 2016, currently listed on Nasdaq Stockholm

- Market cap SEK 2 500 M (\$258 M)
- Cash position as of June 30, 2019 SEK 540 M (\$55 M) sufficient to fund IBP-9414 to market

#### Pivotal Phase III Trial for our lead development program IBP-9414

- Patients recruited in EU and US
- Orphan Drug Designation in EU and US
- Rare Pediatric Disease Designation

# The IBT concept

 Altering the human microbiome to treat diseases related to poor gut function



 Newborn infant microbiome is dynamic







 Human bacterial strains derived from human breast milk



Published clinical proof-of-concept signal

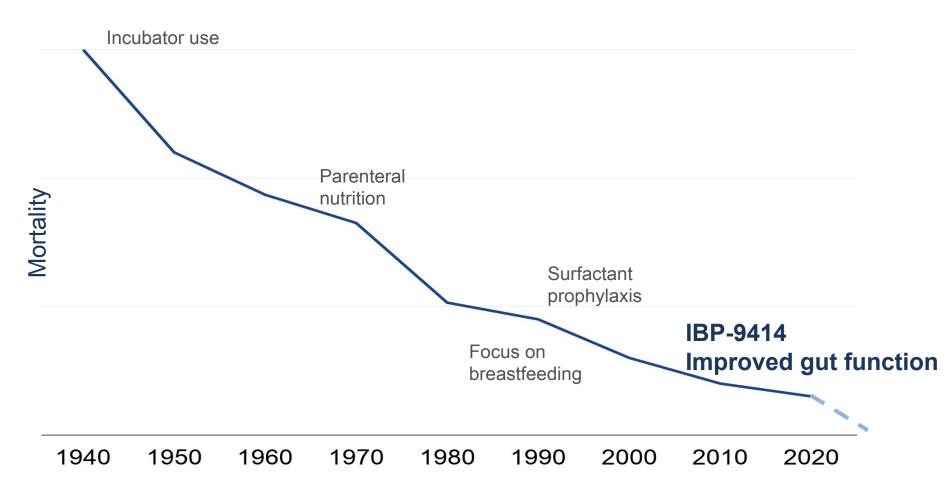


Prophylactic Probiotics to Prevent Death and Nooccomial Infection in Preterm Minto A. Rojan, Janny H. Lozano, Mana X. Rojekira, Vivana A. Rodriguez, Adartin A. Bondon, James A. Bandiko, Olema C. Ratir, Adriana Ballesteros, Maria D. Garcia-Hanker, Maria E. Tamoyo, Olema C. Ratir, Adriana Ballesteros, Maria M. Artikla and Manuschiker and Ballesteros, Maria M. Pediatrics 2012;139,012 (2012). September 2012;130,012 (2012).



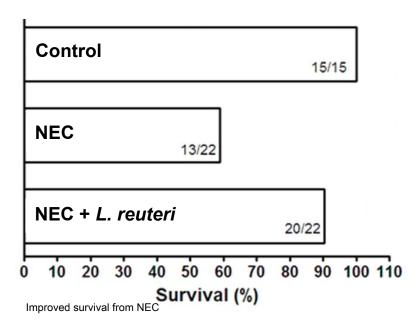


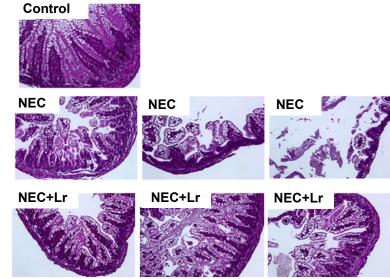
# Breakthroughs in preterm infant care



### L. reuteri protects from NEC in animal models







Reduced intestinal damage

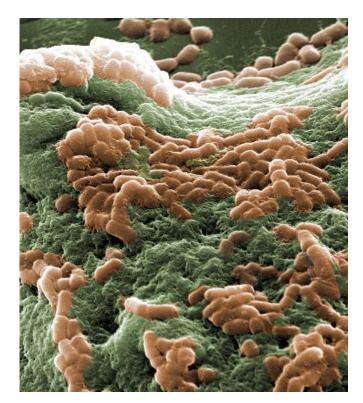
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# Lactobacillus reuteri

#### **Active substance of IBP-9414**

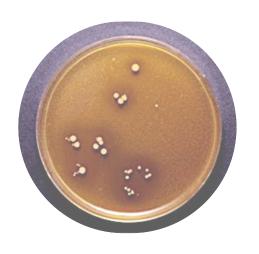


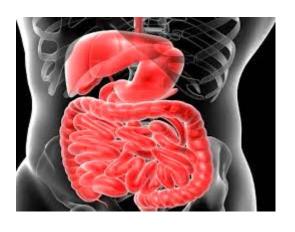
Lactobacillus reuteri present on women's breasts

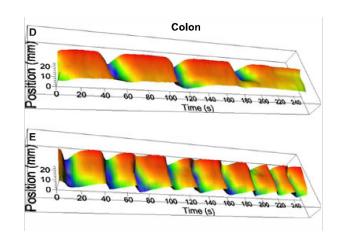


Lactobacillus reuteri (orange) adhering to intestinal mucus

#### L. reuteri - mechanisms of action in the GI tract







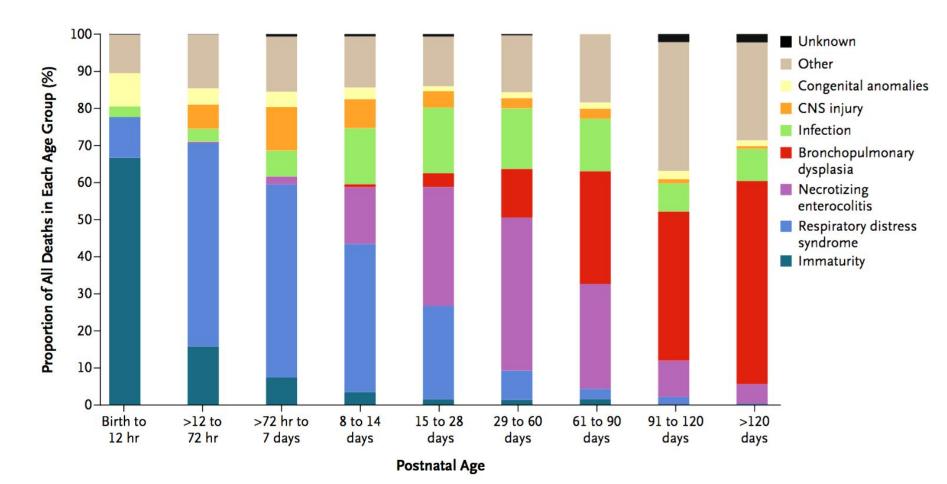
**Combats dysbiosis** 

**Reduces inflammation** 

Improves gut motility

#### Improved gut function including prevention of NEC

#### **Causes of death**





# **Necrotizing enterocolitis (NEC)**

- NEC is severe inflammation of the bowel in preterm infant where 20-40% need complicated and costly surgery
- Survivors have long-term consequences such as short-bowel syndrome, abnormal growth, cognitive, visual and hearing impairments
- There is no therapy available today

NEC is one of the leading causes of death in the Neonatal intensive care unit (NICU) with up to 40% mortality rate killing 1500 US and 3700 EU infants each year

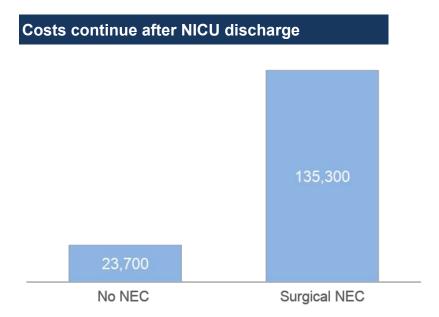


Simpson 2010, Clark 2012

#### **Economic burden of NEC**



NEC Economic Burden is estimated to be 20% of the total cost of initial care and USD 5 Billion spent annually on NEC in the US.



Accumulated cost USD between 6-36 months

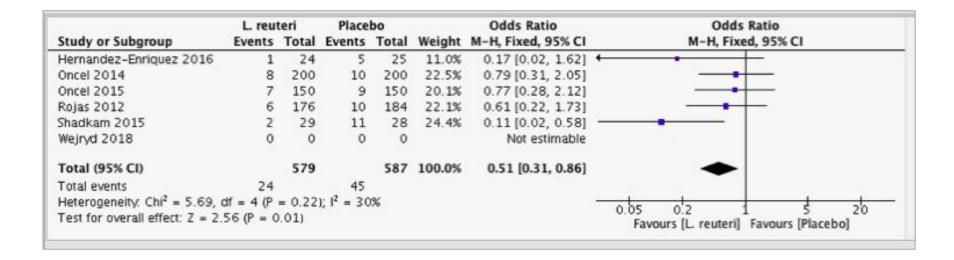
Long term costs associated with sequelae such as impaired growth, short bowel syndrome and poor neurodevelopment

14 (13)

### Publications with clinical signal of NEC reduction

		NEC	incidence
	Number of Infants	Control	With L. reuteri
Rojas et al. 2012	750	5,4 %	3,4 %
Oncel et al. 2014	400	5,0 %	4,0 %
Oncel et al. 2015	300	6,0 %	4,7 %
Shadkam et al. 2015	60	36,7 %	<b>\</b> 6,7 %
Hernandez-Enriquez et al. 2016	44	25,0 %	4,2 %
Spreckels et al. 2018	104	9,0 %	4,0 %
Wejryd et al. 2019	134	12,0 %	10,0 %
Hunter et al. 2012/Dimaguila et al. 2013	354	15,1 %	1,6 %
Sanchez-Alvarado 2017	225	14,6 %	5,3 %
Rolnitsky et al. 2017	937	6,0 %	2,9 %
Jerkovic-Raguz et al. 2016	100	8,0 %	4,0 %

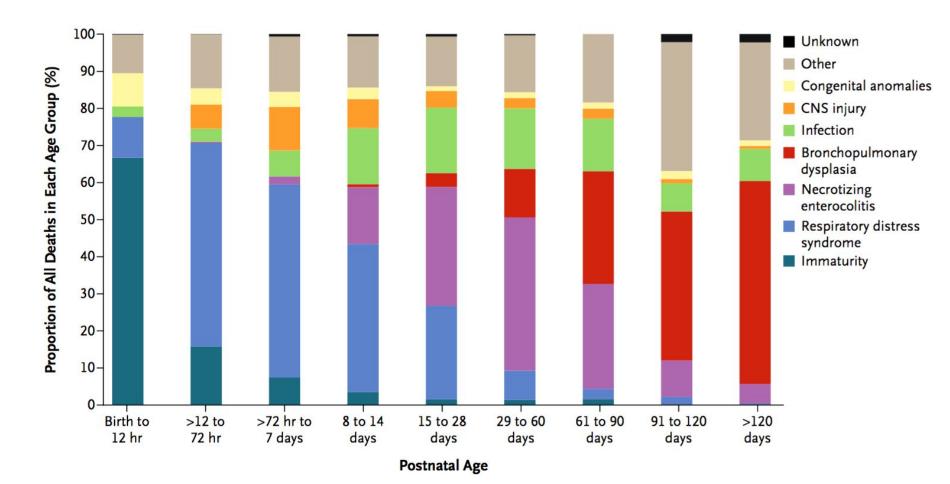
### **NEC** clinical signals



# Meta-analysis: NEC <1500g all randomized controlled trials gives an Odds Ratio of 0.51

#### **Causes of death**





# Feeding the preterm infant

Establishing enteral (mouth) feeding in preterm infants is a primary clinical goal to **attain normal growth,** important for e.g. cognitive development.





Prolonged parenteral (needle feeding) nutrition increases cost and causes complications including: cholestasis, increased risk of BPD, pulmonary vascular resistance, infections and sepsis.

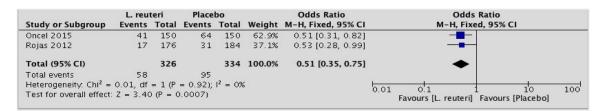
#### Feeding Tolerance - clinical signals and consequences



# Time to full enteral feeding -1.28 days [-1.85, -0.72]

	L. reuteri Placebo							Mean Difference	Mean Difference		
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% CI	IV, Fixed, 95% CI		
Hernandez-Enriquez 2016	23.5	12.6	24	28.2	14.6	20	0.5%	-4.70 [-12.85, 3.45]	+		
Oncel 2014	9.1	3.2	200	10.1	4.3	200	57.0%	-1.00 [-1.74, -0.26]	<del></del>		
Oncel 2015	9	3.1	150	10.4	4.7	150	38.8%	-1.40 [-2.30, -0.50]			
Shadkam 2015	12.8	4.3	29	16.8	6.6	28	3.7%	-4.00 [-6.90, -1.10]	<b>←</b>		
Total (95% CI)			403			398	100.0%	-1.28 [-1.85, -0.72]	-		
Heterogeneity: Chi <sup>2</sup> = 4.66, d	df = 3 (F	0.2	(O); I <sup>2</sup> =	36%							
Test for overall effect: $Z = 4$ .	49 (P <	0.000	01)						Favours [L. reuteri] Favours [Placebo]		

# Feeding intolerance events *OR 0.51 [0.35, 0.75]*



# Days on Parenteral Nutrition -1.67 days [-2.94, -0.41]

Study or Subgroup	L. reuteri Placebo					)		Mean Difference	Mean Difference		
	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% CI	IV, Fixed, 95% CI		
Hernandez-Enriquez 2016	15.8	13.7	24	16.2	16	20	2.0%	-0.40 [-9.30, 8.50]	•		
Oncel 2015	8.2	4.5	150	9.9	6.6	150	98.0%	-1.70 [-2.98, -0.42]	— <del>—</del> —		
Total (95% CI)			174			170	100.0%	-1.67 [-2.94, -0.41]	-		
Heterogeneity. $Chi^2 = 0.08$ ,	df = 1 (F	0 = 0.7	78); I <sup>2</sup> =	0%							
Test for overall effect: $Z = 2$ .	59 (P =	0.010	)						Favours [L. reuteri] Favours [Placebo]		

Days in hospital -5.25 days [-8.46, -2.05]

Study or Subgroup	L.	reuter	i	Placebo				Mean Difference	Mean Difference	
	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% CI	IV, Fixed, 95% CI	
Hernandez-Enriquez 2016	39.3	22.8	24	50.6	25.4	20	4.9%	-11.30 [-25.69, 3.09]	<del></del>	
Oncel 2015	42.4	24.1	150	48.4	29.2	150	27.9%	-6.00 [-12.06, 0.06]		
Rojas 2012	32.5	17	176	37	20.7	184	67.2%	-4.50 [-8.41, -0.59]	<del></del>	
Total (95% CI)			350			354	100.0%	-5.25 [-8.46, -2.05]	•	
Heterogeneity. Chi <sup>2</sup> = 0.88,	df = 2 (F	= 0.6	54); I <sup>2</sup> =	- 0%				-	10 10 10	
Test for overall effect: $Z = 3$ .	22 (P =	0.001	)						Favors L. reuteri Favors placebo	



#### **Endorsed Phase III Pivotal Trial**

- IBT has developed the IBP-9414 program in cooperation with the regulators and with considerations of KOLs experience and clinical practice

CTX/IND approval received in UK, Spain, Hungary, France and USA, application filed in Israel





# Phase III: The Connection Study design

#### Multiple primary endpoint study

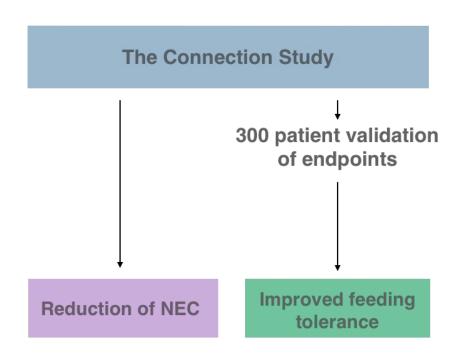
Primary objective: Evaluate the efficacy of IBP-9414 vs. Placebo on the prevention of NEC and on sustained feeding tolerance

Inclusion: Birth 23 - 32 weeks gestation, 500g -1500 g birth weight

First dose: Within 48 hours of birth

Treatment period: up to 12 weeks

Follow-up: 5 weeks



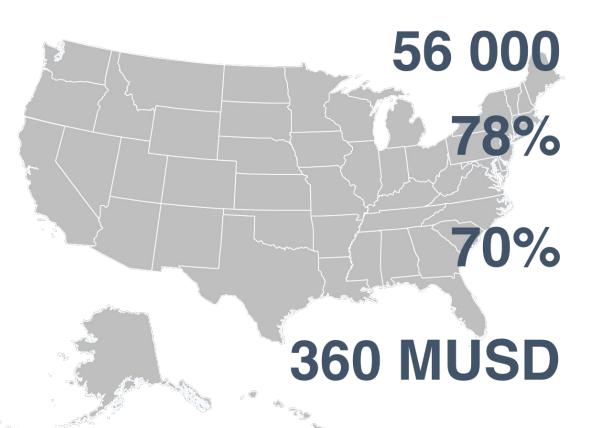
2158 patients



# A valuable pharmaceutical



### Results of market analysis by ClearView Healthcare Partners



Number of infants born under 1,500 grams in the United States annually

Physician preference share demonstrates neonatologists show high willingness to prescribe IBP-9414

Of addressable patients are anticipated to receive care at an institution that includes IBP-9414 on formulary

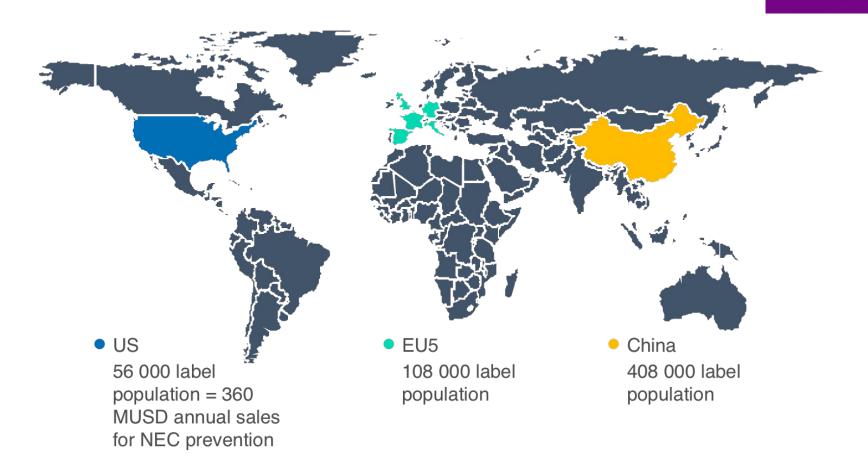
Estimated annual revenue potential in US based on ClearView market research

1 500 infants die from NEC in the United States each year



# A global need

# 15 Million Pre-term births annually



# IBP-9414 our lead Phase III program

Ticks all relevant pillars for the development of a successful drug

Medical need

Mechanism of action

Clinical data

Safe

Aligned regulatory agencies

**GMP** manufacture

Market exclusivity

Aligned payers

















