



# **Probiotics and immune modulation; reducing risk for cold and flu**

ARTHUR OUWEHAND

ACTIVE NUTRITION, DUPONT NUTRITION & HEALTH

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# What are probiotics?

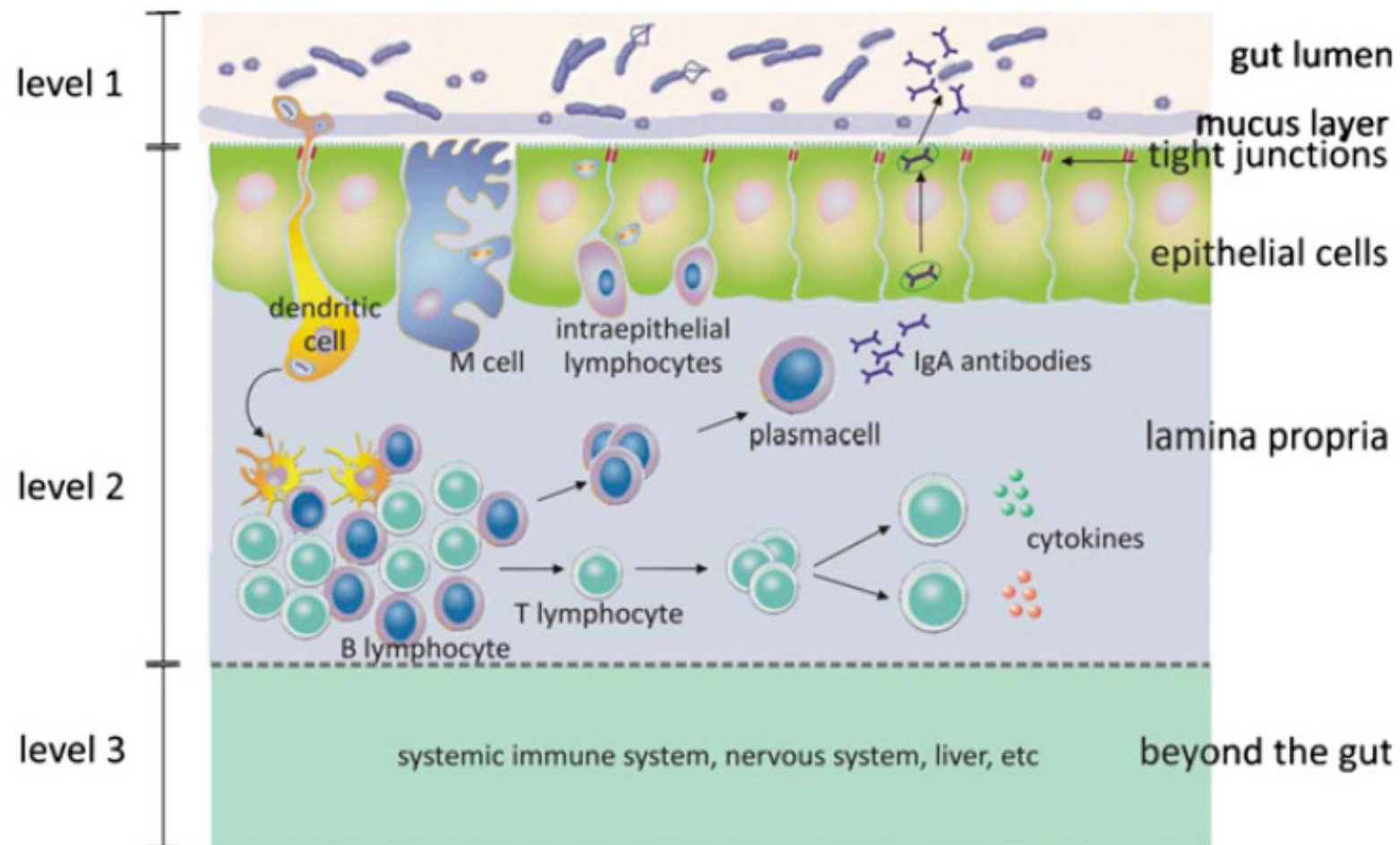


Live microorganisms that, when administered in adequate amounts, confer a health benefit on the host (Hill et al. 2014)

>10<sup>9</sup> CFU/dose (?)

- ☺ *Lactobacillus* sp.
- ☺ *Bifidobacterium* sp.
- ☺ *E. coli*, *Enterococcus*, yeast, *Bacillus*, .....

# Levels of immune modulation by probiotics





## Probiotics reduce cold & flu risk in children



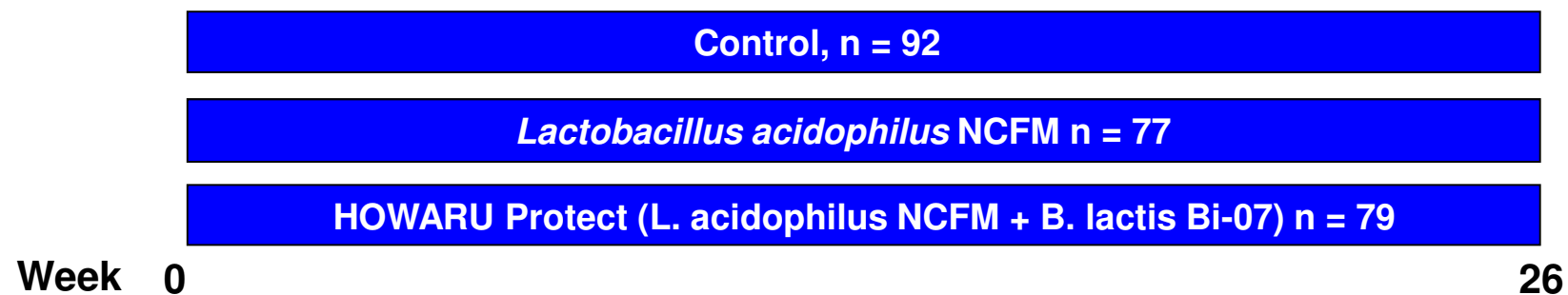
26-week, prospective, double-blinded, placebo controlled study

From November to May

326 children randomised over three treatments

Children aged 3-5 years in a daycare center in Shanghai, China

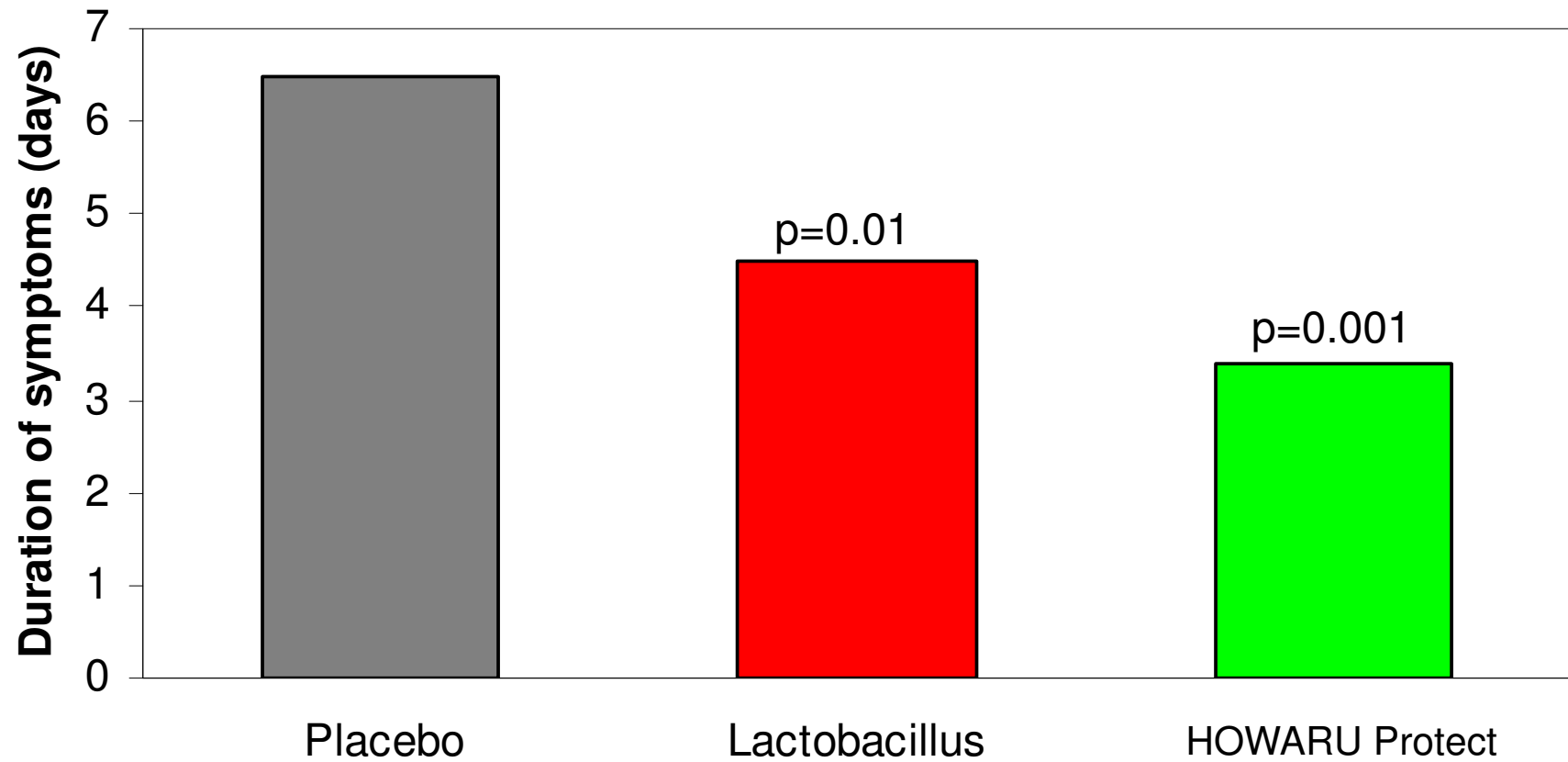
Dose: Daily,  $5 \times 10^9$  CFU twice a day or placebo



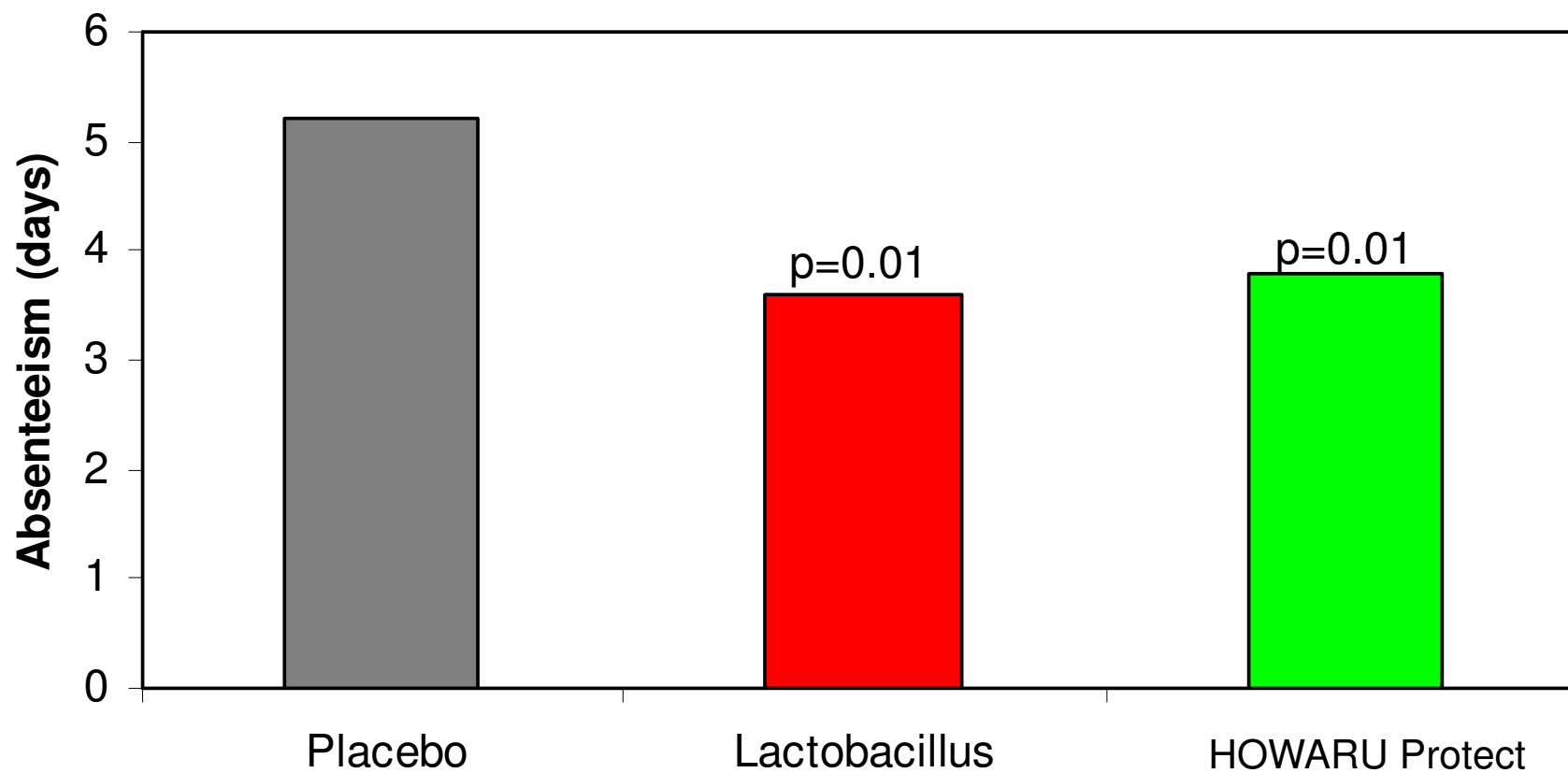
Monitored:

- Symptoms of respiratory tract infection
- Gastrointestinal complaints
- Fever
- Antibiotic use

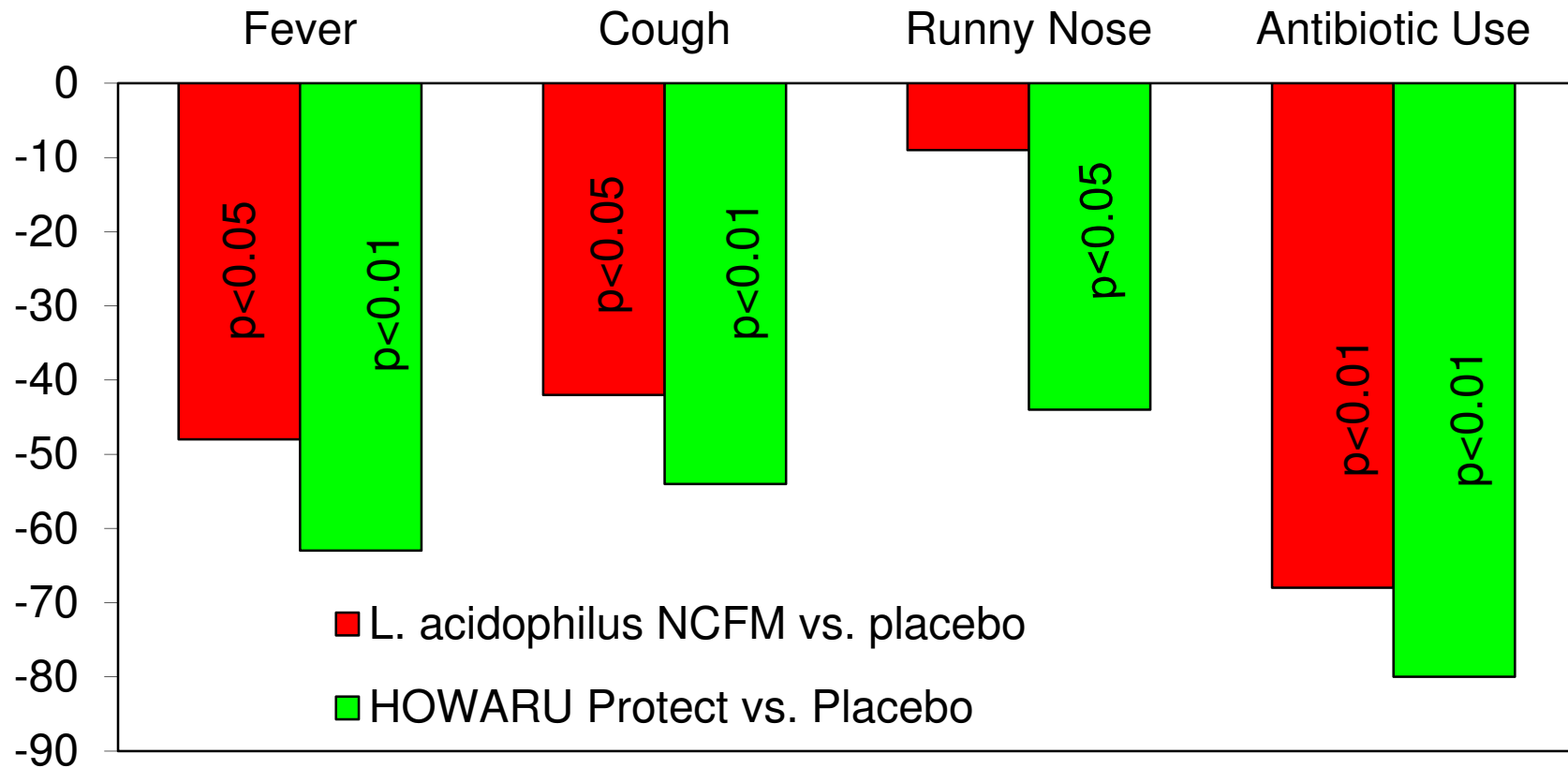
# Symptom duration



## Absenteeism (due to disease)



# Symptom change in symptom incidence







**HOWARU Protect Adult**  
**HOWARU Protect Sport**

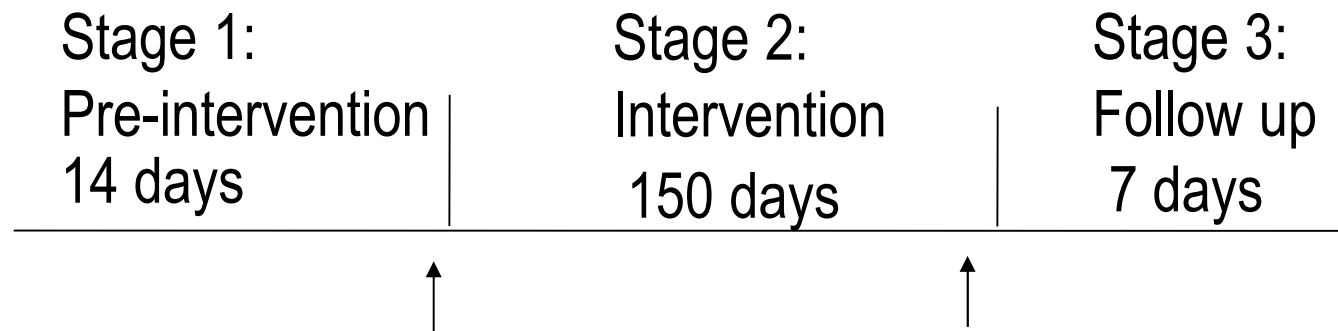
Triple blind, randomised, placebo controlled

- Age:  $36 \pm 12$  years
- Physical activity:  $8.3 \pm 3.8$  h/week
- Number of subjects 464 (Placebo=148, HP Adult=155, HP Sport=161)

Study product:

- Placebo
  - Microcrystalline cellulose
- HOWARU Protect Adult  $10^{10}$  CFU/day
- HOWARU Protect Sport  $10^{10}$  CFU/day

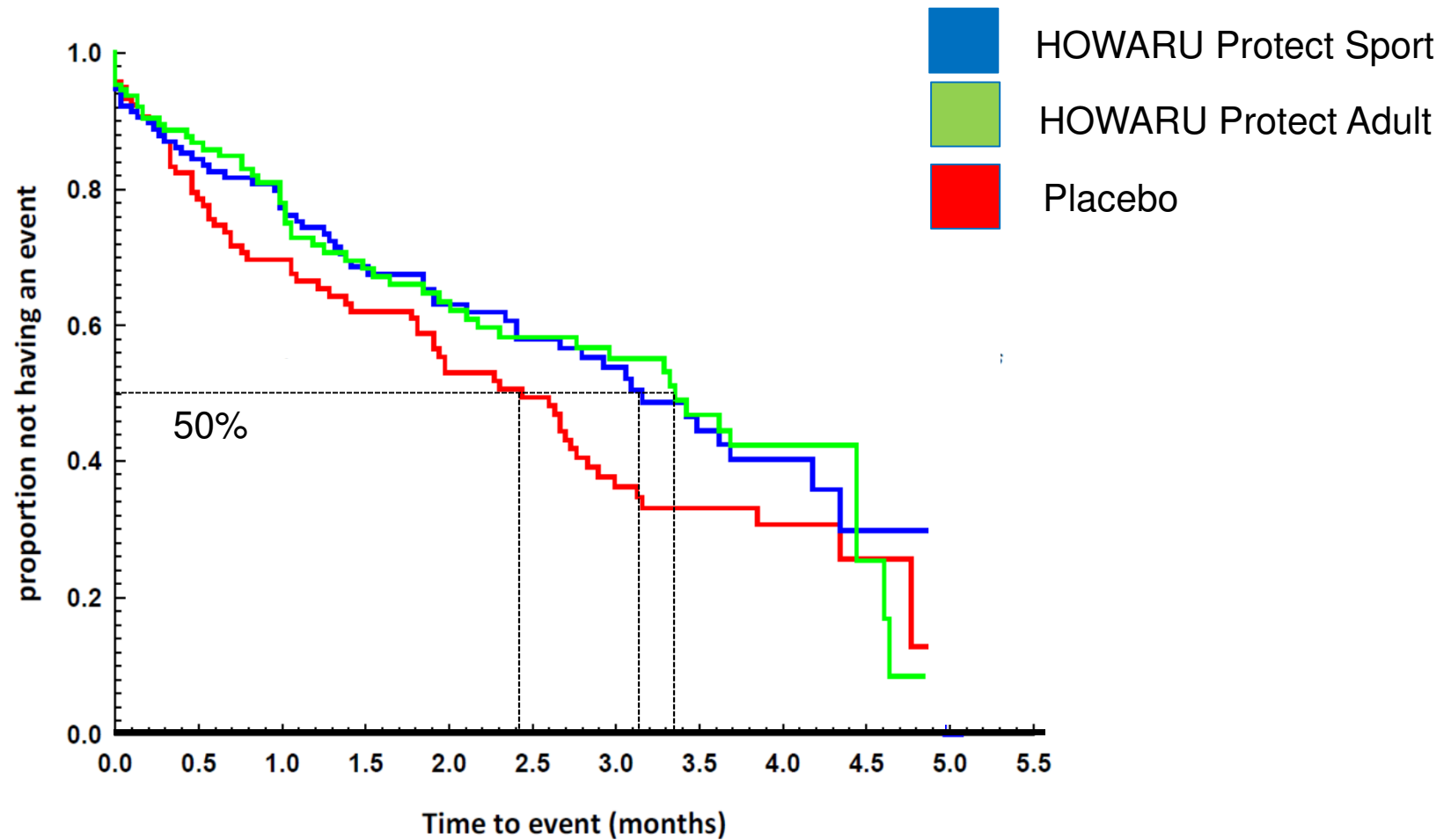
## Study timeline over 5 month winterperiod



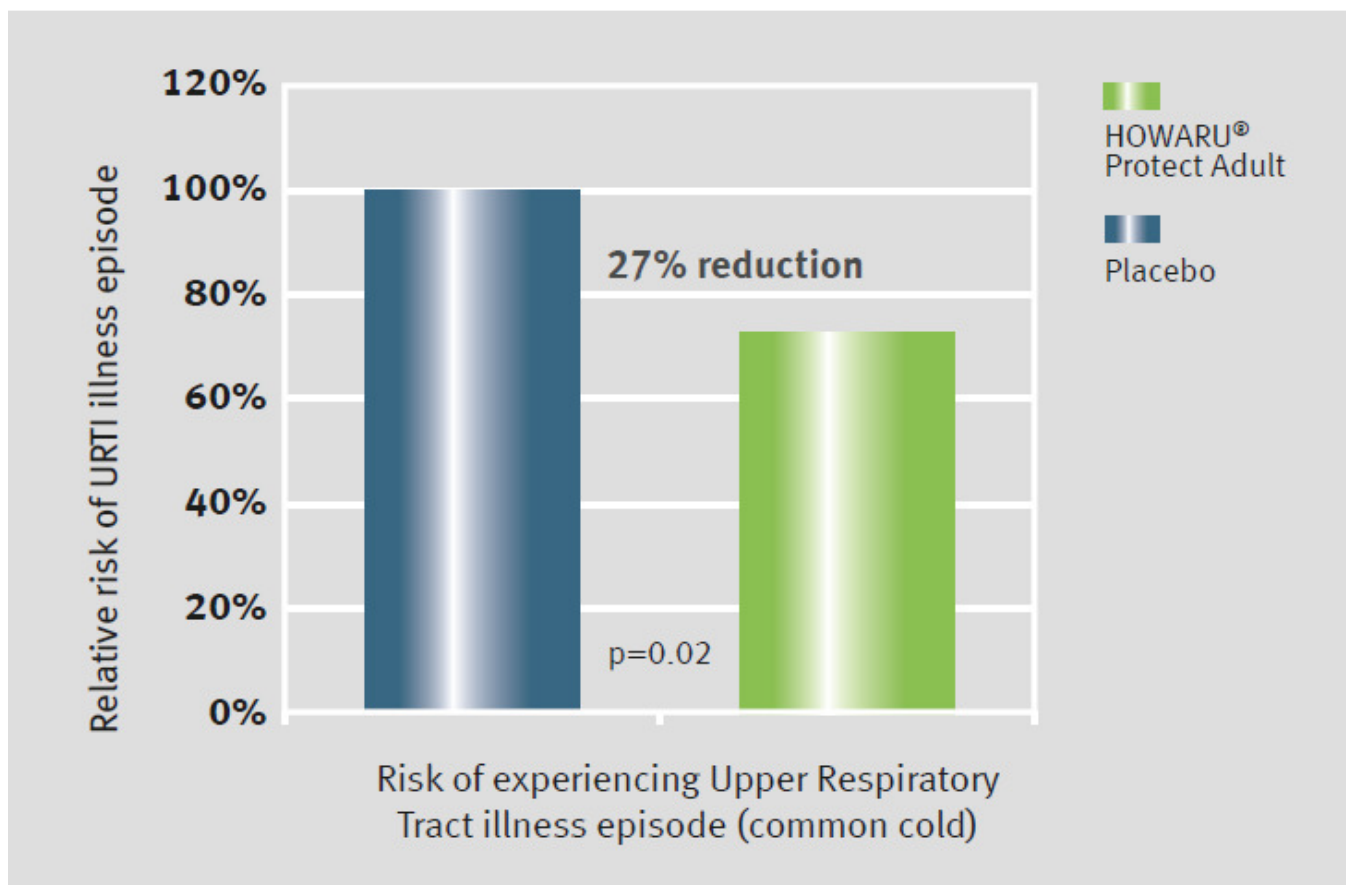
Sampling pre- and post-supplementation

Daily illness and physical activity log

# Effect of HOWARU Protect consumption on time-to-illness



# Effect of HOWARU Protect consumption on RTI incidence



## HOWARU Protect Kids:

- Shortens duration of respiratory tract infection
- Reduces absenteeism due to disease
- Reduces need for antibiotics
- Combination appears to work better than single strain

## HOWARU Protect Adult:

- Reduces incidence of respiratory tract infection

# **Probiotics provide public health and economic benefits to society**

Irene Lenoir-Wijnkoop, Laetitia Gerlier

Jean-Louis Bresson, Claude Le Pen

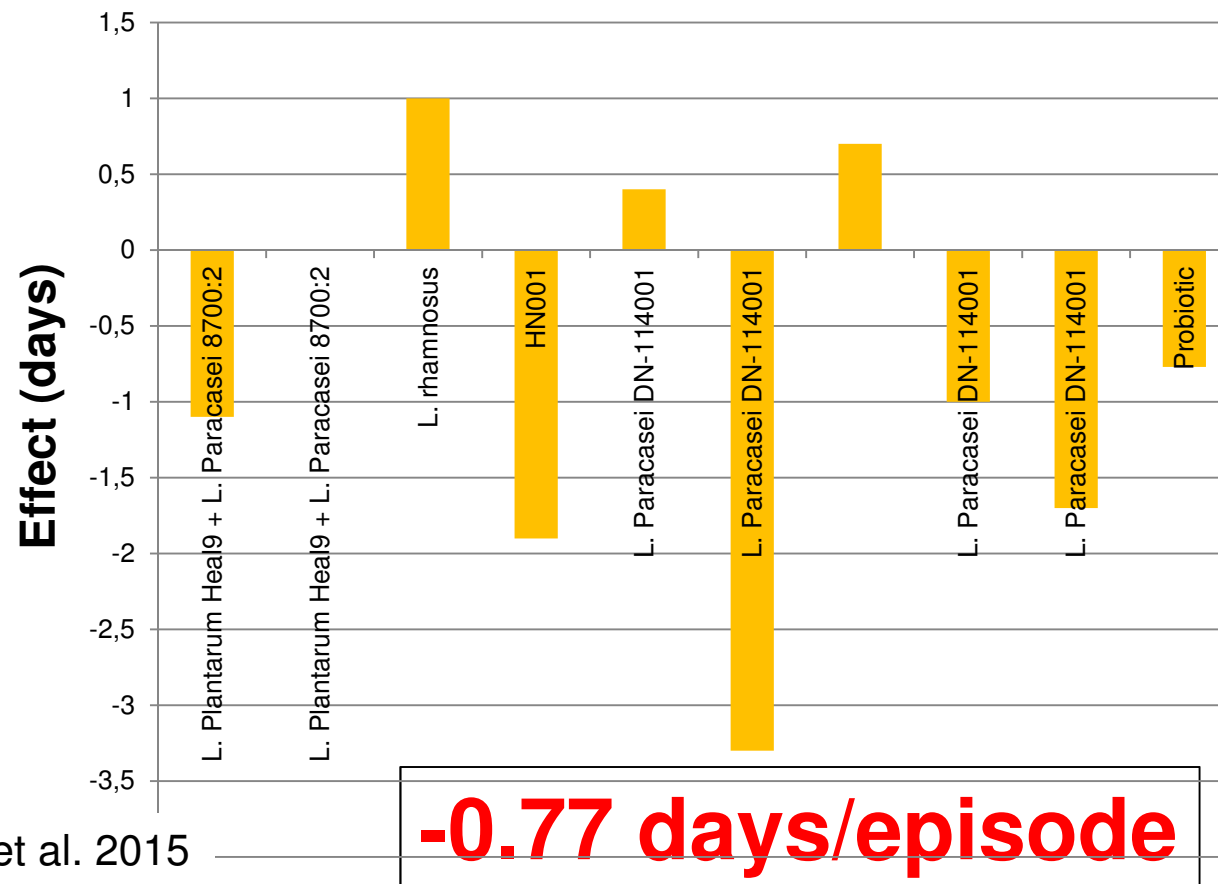
Gilles Berdeaux

# Probiotics reduce the risk/duration of respiratory tract infections

## Effectiveness of probiotics on the duration of illness in healthy children and adults who develop common acute respiratory infectious conditions: a systematic review and meta-analysis

Sarah King<sup>1</sup>, Julie Glanville<sup>1\*</sup>, Mary Ellen Sanders<sup>2</sup>, Anita Fitzgerald<sup>1</sup> and Danielle Varley<sup>1</sup>

*British Journal of Nutrition*



Lenoir-Wijnkoop et al. 2015



Construct a population:

- Size  $n=59\,316\,541$  (3-79 years)
- Age groups (3-9, 10-24, 25-64, 65-79 years)
- Smokers/passive smokers
- Community setting (daycare, school, work, etc.)
- Respiratory tract infection characteristics
- Simulate 1/1000

**Risk factors**

## What if all the French ate probiotics?



- 2.4 million fewer days with RTI
- 291 000 fewer courses of antibiotics
- 581 000 fewer days sick leave

Cost (that can be saved):

- GP visit
- Medication (antibiotics, non-antibiotics)
- Sickleave

These costs are different for:

- Society
- National Health Care System
- Family

**If all French ate probiotics, they would save:**



- Society: €84.4 million
- NHS: €14.6 million
- Family: €16.2 million

Not all RTI's reach GP's ↑

The winter used for RTI incidence was mild ↑

Part of the population already eats probiotics ↓

Additional cost of probiotics ↓↑

Herd immunity ↑

Despite these uncertainties the study indicates substantial potential savings consuming probiotics

## How does this compare?




Better than vitamin C

Similar as handwashing

Worse than gloves, masks and gowns

Similar to neuramidase inhibitors (Tamiflu)



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