Imunoglukan P4H® and Childhood Respiratory Health

Explore the clinical evidence

Prepared by Godsfavour Oghifo
Nutrition Research Scientist, elénzia MEDICAL

Imunoglukan P4H® contains pleuran, a β-(1,3/1,6)-D-glucan isolated from Pleurotus ostreatus. Pleuran-containing Imunoglukan formulations have been investigated in paediatric clinical studies examining recurrent respiratory tract infections (RRTIs), respiratory health and immune-related outcomes.[1–9]

Explore the published clinical evidence alongside findings from a new prospective UK real-world study conducted by elénzia MEDICAL.

The paediatric clinical evidence at a glance

Randomised controlled evidence	Large prospective observational evidence	Complementary paediatric evidence	New UK evidence
2 RRTI trials[2,9]	Including a multinational study of 1,030 enrolled children[6]	Immune and asthma-specific research. [3,7,8]	Prospective real-world study

What is Imunoglukan P4H®?

β-Glucans are a heterogeneous group of naturally occurring polysaccharides. Their biological properties can vary according to source, molecular structure, solubility, molecular weight and branching, meaning that findings from one β-glucan preparation cannot necessarily be extrapolated to another.[10]

Pleuran is an insoluble β-(1,3/1,6)-D-glucan isolated from the oyster mushroom Pleurotus ostreatus.[11] It is the β-glucan investigated in the pleuran-containing Imunoglukan formulations described in this evidence summary.

Figure 1. Pleuran and Imunoglukan P4H®.
Pleuran is a β-(1→3/1→6)-D-glucan isolated from *Pleurotus ostreatus*. The molecular structure shown is a representative schematic. [11]

How might pleuran interact with the immune system?

Pleuran is an insoluble β-(1→3/1→6)-D-glucan isolated from Pleurotus ostreatus. β-Glucans can be recognised by pattern-recognition receptors on innate immune cells, particularly Dectin-1, as well as receptors including complement receptor 3 (CR3). Receptor recognition

can influence cellular processes including phagocytosis, cytokine signalling and other innate immune responses.[10–13]

For orally administered fungal β-glucans, proposed mechanisms include interaction with the gut-associated immune system, including uptake through intestinal immune structures and subsequent interaction with macrophages and dendritic cells. These processes may contribute to immune signalling beyond the gastrointestinal tract; however, the mechanisms underlying the systemic effects of orally administered β-glucans remain incompletely understood.[10,12,14]

Importantly, β-glucans are structurally diverse. Their biological activity can be influenced by factors including source, linkage pattern, branching, molecular weight and solubility. Mechanistic findings from one β-glucan preparation therefore cannot automatically be extrapolated to pleuran or Imunoglukan P4H®. [10–12]

From mechanism to clinical evidence

These immunological mechanisms provide biological plausibility for studying pleuran in respiratory health, but mechanistic evidence alone does not establish clinical efficacy. Clinical outcomes should therefore be interpreted from the human studies directly.

Watch this video on how Imunoglukan P4H® interacts with the immune system.

What does the published clinical evidence show?

The paediatric evidence base comprises nine publications arising from eight clinical studies, including randomised controlled trials, prospective observational studies and complementary investigations of immunological and respiratory outcomes. Some study populations overlap across publications, and study designs, formulations, populations and outcome definitions differ. The evidence should therefore be considered according to study design and independence rather than simply by the number of publications.[1–9]

Randomised controlled evidence in RRTIs

Jesenak et al., 2013
Multicentre, randomised, double-blind, placebo-controlled trial | n=175
Children with a history of RRTIs received Imunoglukan P4H® syrup containing pleuran + vitamin C or a vitamin C comparator.
KEY FINDING
During treatment, 36% of children in the pleuran + vitamin C group experienced no respiratory infection compared with 21% in the comparator group ($p<0.05$).[2]

The study also reported fewer influenza/influenza-like illnesses and lower respiratory tract infections in the active group. The publication contains an inconsistency in the group-specific sample sizes reported in the Methods and Table 1; the total study population was 175.[2]

Jesenak et al., 2025 – RRTI trial
International, multicentre, randomised, double-blind, active-comparator trial | 249 enrolled; 217 completed
Children with RRTIs received a chewable formulation containing pleuran + vitamin D + zinc or an active comparator containing vitamin D + zinc for three months. [9]
KEY FINDING
Mean total RTIs were 2.35 ± 1.25 in the pleuran group versus 2.77 ± 1.78 in the comparator group (p=0.042), corresponding to a 15.2% lower mean number of RTIs reported by the authors. [9]

Common cold episodes were also lower in the pleuran group (1.53 ± 1.22 vs 1.88 ± 1.25; p=0.040). This trial evaluated a chewable pleuran + vitamin D + zinc formulation rather than the liquid pleuran + vitamin C formulation used in several earlier studies. [9]

Prospective observational evidence

Jesenak et al., 2010
Multicentre open clinical study | n=215
KEY FINDING
153/215 children (71.2%) experienced a >50% reduction in RRTI frequency compared with the preceding period. [1]
INTERPRETATION
Uncontrolled study using historical infection frequency as the comparison.

Sapena Grau et al., 2015
Prospective multicentre observational study | 166 enrolled; 151 analysed
KEY FINDING
Mean RTIs decreased from 8.88 ± 3.35 in the historical comparison period to 4.27 ± 2.21 during study follow-up (p<0.001). [4]
INTERPRETATION
Historical comparison; Spanish cohort.

Paśnik et al., 2017
Prospective open-label study | 194 enrolled; 191 analysed
KEY FINDING
Mean RTIs decreased from 8.71 ± 1.89 in the corresponding previous period to 4.18 ± 2.13 during the study period (p<0.001). [5]
INTERPRETATION
Historical comparison; Polish cohort.

Rennerova et al., 2022

International, multicentre, open-label prospective study | 1,030 enrolled; 994 analysed

KEY FINDING

Mean total RTIs were 7.07 ± 2.89 in the corresponding previous-year period and 3.87 ± 3.19 during the study period ($p<0.001$); the authors reported a 45.3% reduction. [6]

INTERPRETATION

Historical comparison. Previously published Spanish and Polish cohorts contributed to this multinational dataset and should not be treated as wholly independent populations.

Complementary paediatric evidence

Jesenak et al., 2014 – secondary immunological analysis

A secondary publication arising from the same randomised clinical cohort reported in Jesenak et al. (2013). The analysis examined allergic/inflammatory markers and reported a reduction in peripheral blood eosinophilia and stabilisation of total IgE, particularly among atopic participants. It should not be counted as an independent clinical trial. [3]

Kunc et al., 2025 – salivary IgA pilot study

A single-centre prospective open-label pilot study evaluated a pleuran + vitamin D + zinc chewable formulation in children aged 6–11 years with recurrent infections and/or allergy/asthma (n=49). Salivary secretory IgA increased over the short intervention period. The study was uncontrolled and assessed a surrogate immunological outcome. [7]

Jesenak et al., 2025 – allergic asthma trial

An international multicentre, double-blind, active-comparator trial randomised 230 children aged 7–17 years with partially controlled perennial allergic asthma; 206 completed the study. The study reported age-dependent findings for asthma control and RTI frequency. This is complementary asthma-specific evidence rather than a general RRTI population. [8]

Evidence relationship note

The 2014 publication is a secondary analysis of the 2013 RCT cohort. The Spanish 2015 and Polish 2017 cohorts contributed to the 2022 multinational analysis. These publications should not be presented as nine wholly independent clinical trials.

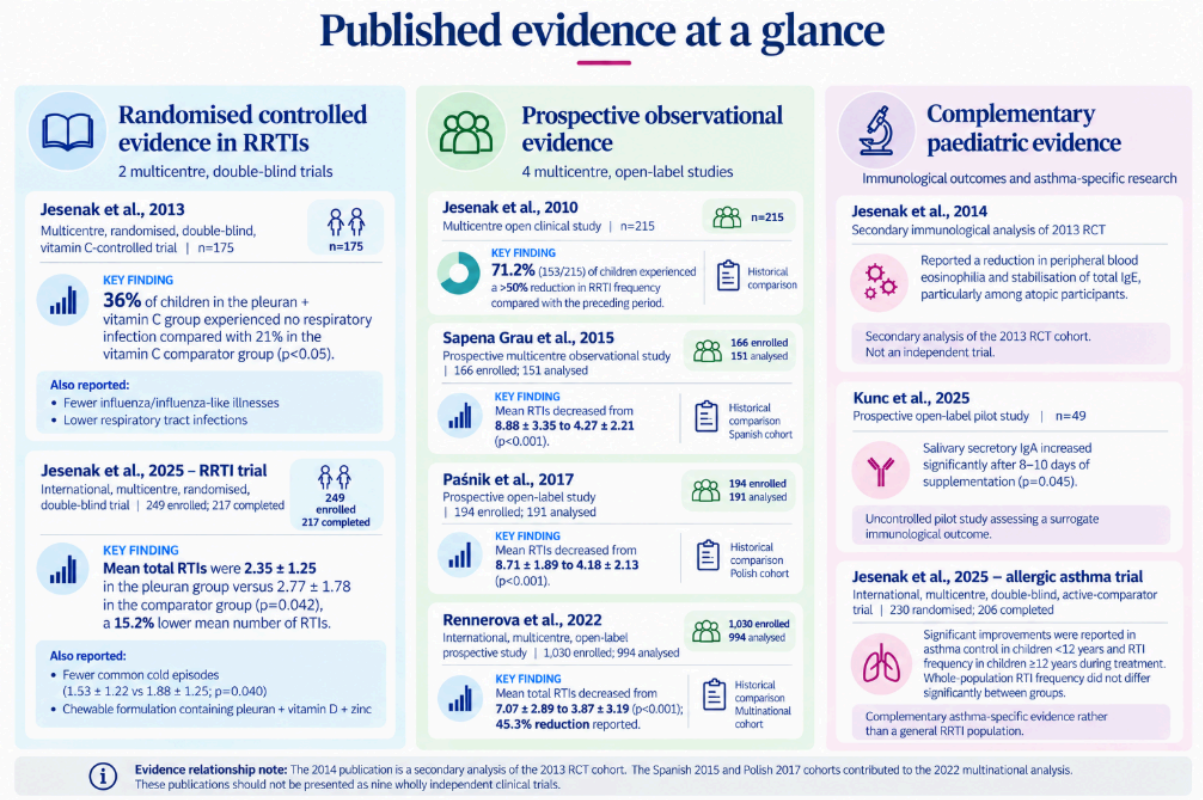


Figure 2. Published paediatric clinical evidence for pleuran-containing Imunoglukan formulations.
Summary of randomised controlled, prospective observational and complementary paediatric evidence. [1–9]

New UK prospective real-world evidence

Source: elénzia MEDICAL. Childhood Immunity Study. Unpublished prospective study report, 2026.

A 20-week, open-label, single-arm study evaluated children aged 4–11 years with a history of RRTIs. An 8-week pre-supplementation observation phase was followed by 12 weeks of Imunoglukan P4H® supplementation. Parents or legal guardians recorded respiratory health prospectively using the Ingredients for Life™ mobile application.

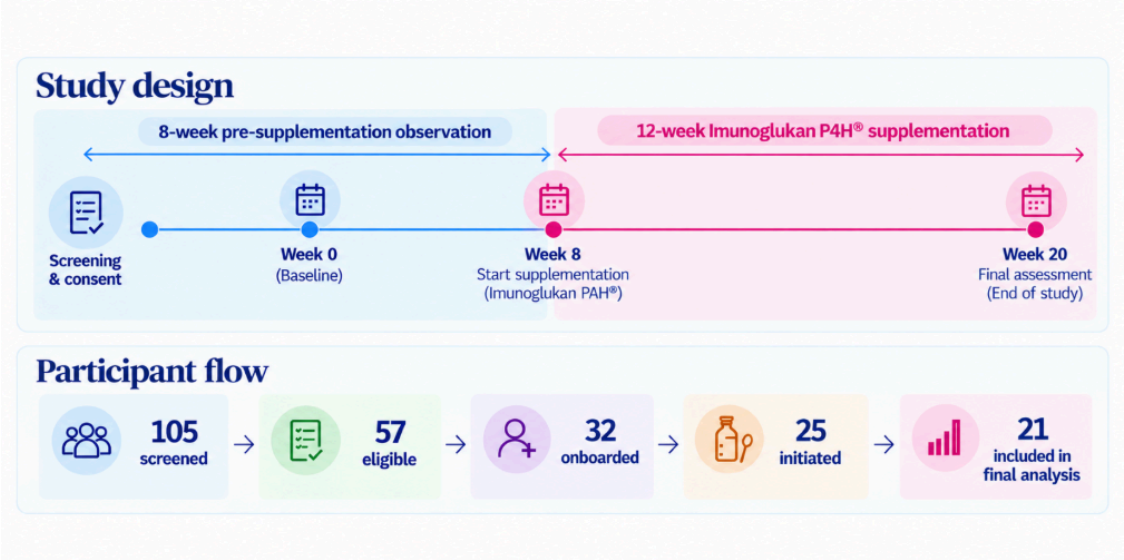


Figure 3. Design and participant flow of the UK prospective real-world study.

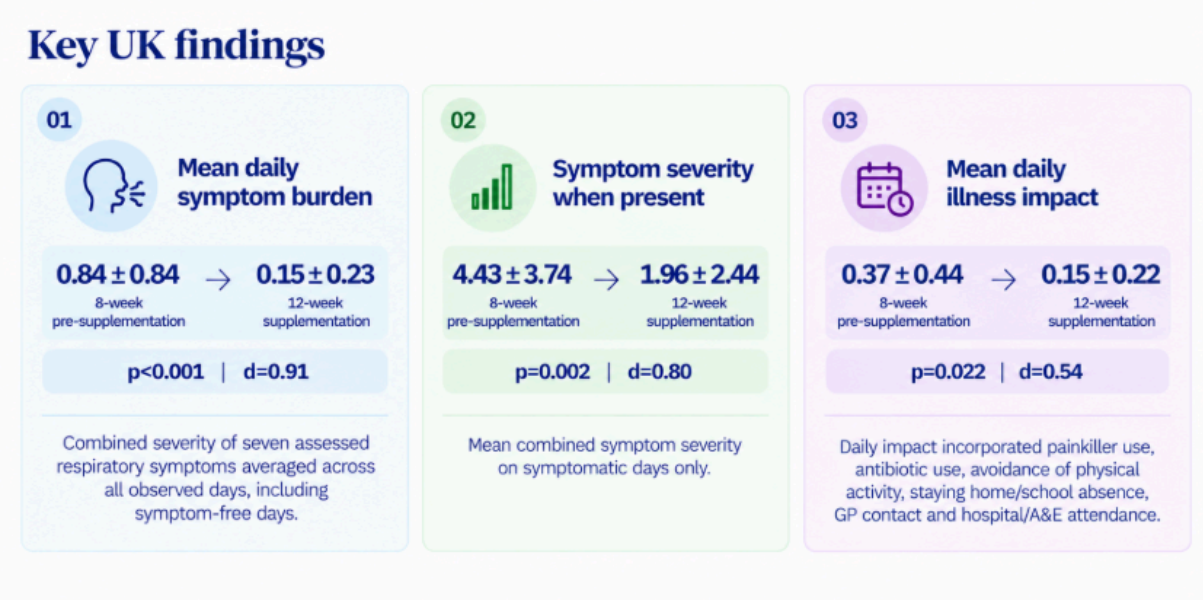


Figure 4. Changes in symptom burden, symptom severity when present and illness impact during the UK prospective study. Values represent participant-level means during the 8-week pre-supplementation and 12-week supplementation phases.

Outcome definitions

Mean daily symptom burden: Daily sum of severity ratings across seven assessed respiratory symptoms (each scored 0–3; possible daily range 0–21), averaged across all observed days, including symptom-free days.
Symptom severity when present: Mean daily summed symptom severity score (same seven symptoms; possible daily range 0–21) on symptomatic days only.
Mean daily impact: Daily sum of six binary indicators of illness-related impact, painkiller use, antibiotic use, avoidance of physical activity, staying home/school absence, GP contact and hospital attendance (possible daily range 0–6), averaged across observed days.

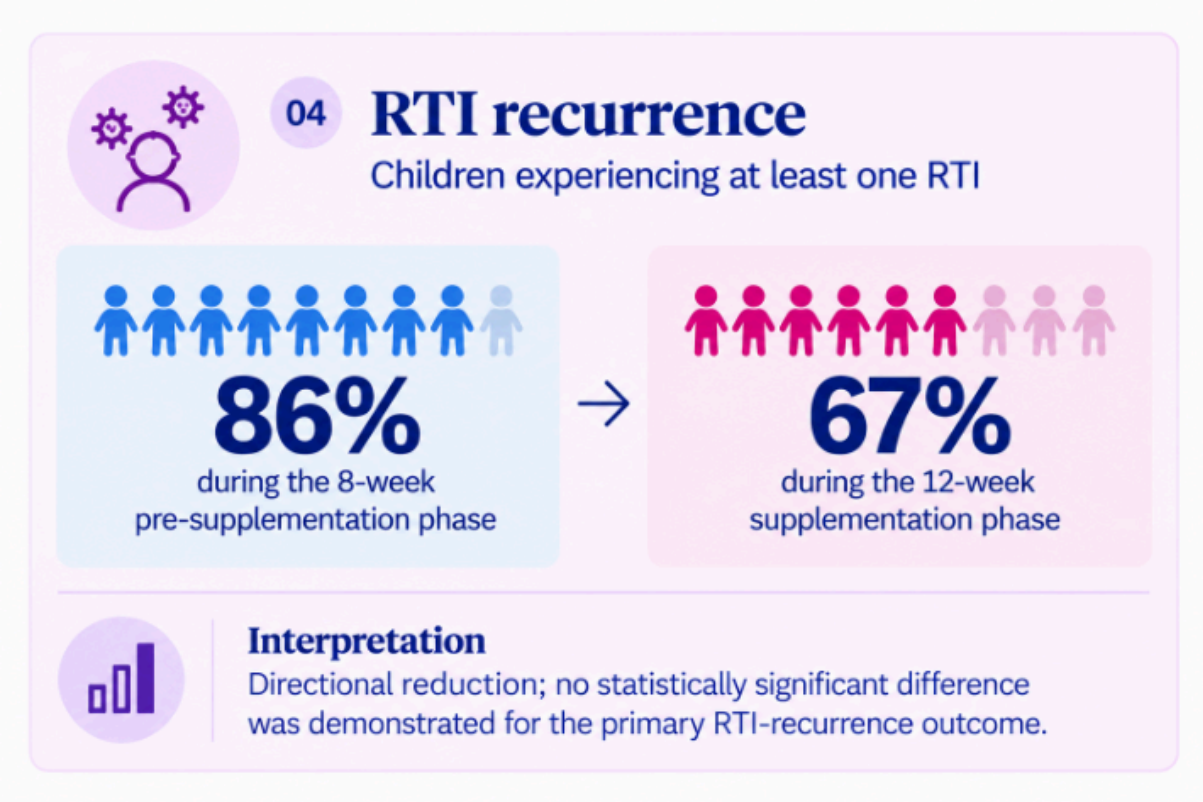


Figure 5. RTI recurrence during the UK prospective study.
Proportion of children experiencing at least one RTI during each study phase. The difference in the primary RTI-recurrence outcome was not statistically significant.

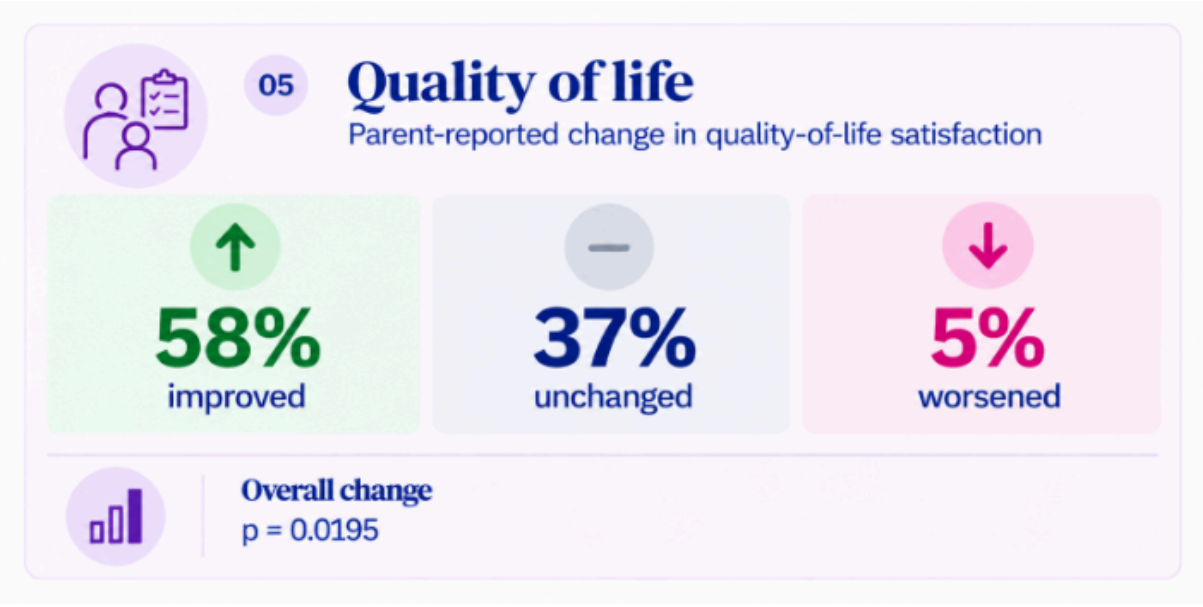


Figure 6. Parent-reported change in quality-of-life satisfaction during the UK prospective study.

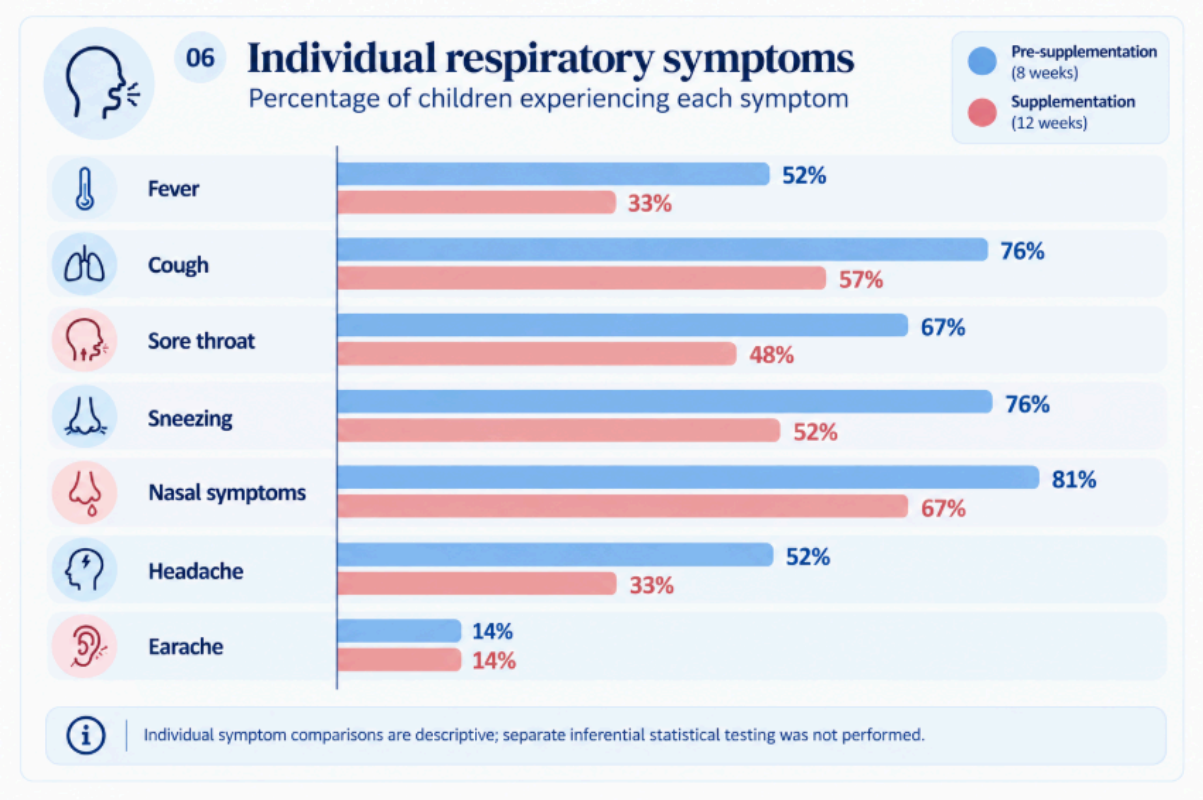


Figure 7. Individual respiratory symptoms reported during the UK prospective study.
Percentages represent children experiencing each symptom during each phase. Individual symptom comparisons are descriptive; separate inferential statistical testing was not performed.

How should the evidence be interpreted?

The paediatric clinical literature provides a **developing but heterogeneous evidence base** for pleuran-containing Imunoglukan formulations. Across the published literature, findings generally favour pleuran-containing formulations for respiratory outcomes, but the strength of inference differs substantially according to study design, population, formulation and outcome assessed. [1–9]

Evidence from randomised controlled trials

Randomised, double-blind trials provide the strongest evidence within the current evidence base. In children with RRTIs, the 2013 trial reported a higher proportion of children remaining free from respiratory infection with Imunoglukan P4H® plus vitamin C than with vitamin C alone, while the 2025 RRTI trial reported a lower mean number of RTIs with a pleuran + vitamin D + zinc formulation compared with vitamin D + zinc. [2,9]

These controlled findings are important because they reduce some of the uncertainty inherent in comparisons with previous infection history. However, the two RRTI trials evaluated different pleuran-containing formulations, treatment periods and outcome measures, so their numerical findings should not be interpreted as directly comparable estimates of the same effect.

What does the observational evidence add?

The prospective observational studies consistently reported fewer RTIs during study follow-up than during historical comparison periods. These studies include substantially larger and more diverse paediatric populations, with the 2022 multinational study enrolling more than 1,000 children across seven countries. [1,4–6]

This evidence provides useful information about how pleuran-containing formulations have performed in broader clinical settings. However, historical comparisons cannot determine how much of the observed change is attributable to supplementation. Respiratory infection frequency in children can vary with season, age and previous infection history, while regression to the mean may also contribute when children are selected specifically because of a history of frequent infections.

Complementary evidence broadens the picture

Additional studies have explored outcomes beyond the number of respiratory infections. These include immunological markers, salivary secretory IgA and respiratory outcomes in children with allergic asthma. [3,7,8]

These findings provide supporting biological and clinical context, but they should not be interpreted as equivalent to evidence from RRTI-specific clinical trials. Some assess surrogate immunological outcomes, some involve different paediatric populations, and the 2014 immunological analysis arose from the same clinical cohort as the 2013 RRTI trial.

What does the UK study add?

The UK prospective study addresses a somewhat different question. Rather than relying primarily on the number of discrete RTI episodes, parents recorded their child's respiratory health day by day, allowing changes in symptom burden, symptom severity when illness was present, illness-related functional impact and quality of life to be examined prospectively.

During the supplementation phase, statistically significant within-participant reductions were observed in **mean daily symptom burden, symptom severity when present and mean daily illness impact**, alongside an improvement in parent-reported quality-of-life satisfaction. The proportion of children experiencing at least one RTI also changed from 86% during pre-supplementation observation to 67% during supplementation, although **a statistically significant difference was not demonstrated for this primary RTI-recurrence outcome**.

This distinction is important: the UK findings add detail about the **day-to-day burden and impact of respiratory illness**, but they do not provide controlled evidence of efficacy.

Important interpretation

The UK study was small, open-label and did not include a concurrent control group. The findings therefore represent within-participant changes and cannot establish that

Imunoglukan P4H® supplementation caused the observed improvements. Larger controlled studies would be needed to confirm these findings.

Putting the evidence together

Taken together, the evidence base contains **controlled evidence, larger prospective observational evidence and complementary mechanistic and real-world findings**. The overall pattern is supportive of further investigation of pleuran-containing Imunoglukan formulations in paediatric respiratory health, while differences between studies mean that individual findings should be interpreted within their specific design and population.

In particular, percentages reported across studies should not be compared as though they represent the same treatment effect. For example, the **45.3% reduction** reported in the 2022 observational study refers to a change in mean RTI episodes compared with a historical period; the **15.2% lower mean RTI number** in the 2025 RRTI trial represents a between-group comparison; and the UK **86% to 67%** finding represents the proportion of children experiencing at least one RTI across two study phases. These are different outcomes and analytical comparisons. [6,9]

Safety, tolerability and acceptability

Across the published paediatric studies reviewed, pleuran-containing Imunoglukan formulations were generally reported to be well tolerated in the populations and durations studied. [1,4–9]

The UK prospective study also found Imunoglukan P4H® to be well accepted by participating families. Overall product experience was rated as **excellent by 61% and good by 39%** of respondents. Most reported that the product was easy to administer, although a small proportion reported occasional refusal or complaints about taste.

These findings should be interpreted within the size, duration and design of the available studies and do not establish the frequency of rare or long-term adverse effects.

About this evidence summary

This scientific evidence summary was prepared by elénzia MEDICAL, the UK distributor of Imunoglukan P4H®. The UK prospective real-world study presented in this document was conducted by elénzia MEDICAL and has not been published in a peer-reviewed journal.

Scientific references and study links

1. Jesenak M, Sanislo L, Kuniakova R, Rennerova Z, Buchanec J, Banovcin P. Imunoglukan P4H® in the prevention of recurrent respiratory infections in childhood. Cesk Pediatr. 2010;65:639–647.
2. Jesenak M, Majtan J, Rennerova Z, Kyselovic J, Banovcin P, Hrubisko M. Immunomodulatory effect of pleuran (β-glucan from Pleurotus ostreatus) in children with recurrent respiratory tract infections. Int Immunopharmacol. 2013;15(2):395–399. doi:10.1016/j.intimp.2012.11.020.
3. Jesenak M, Hrubisko M, Majtan J, Rennerova Z, Banovcin P. Anti-allergic effect of Pleuran (β-glucan from Pleurotus ostreatus) in children with recurrent respiratory tract infections. Phytother Res. 2014;28(3):471–474. doi:10.1002/ptr.5020.
4. Sapena Grau J, Picó Sirvent L, Morera Inglés M, Rivero Urgell M. Betaglucanos de Pleurotus ostreatus en la prevención de infecciones respiratorias recurrentes. Acta Pediatr Esp. 2015;73(8):186–193.
5. Paśnik J, Ślemp A, Cywinska-Bernas A, Zeman K, Jesenak M. Preventive effect of pleuran (β-glucan isolated from Pleurotus ostreatus) in children with recurrent respiratory tract infections – open-label prospective study. Curr Pediatr Res. 2017;21(1):99–104.
6. Rennerova Z, Picó Sirvent L, Carvajal Roca E, Paśnik J, Logar M, Milošević K, Majtan J, Jesenak M. Beta-(1,3/1,6)-D-glucan from Pleurotus ostreatus in the prevention of recurrent respiratory tract infections: an international, multicentre, open-label, prospective study. Front Pediatr. 2022;10:999701. doi:10.3389/fped.2022.999701.
7. Kunc P, Fabry J, Matiscakova M, Istvankova K, Diamant Z, Majtan J, Jesenak M. Effect of a Pleuran-Based Supplement on Salivary IgA Secretion in Children With Recurrent Respiratory Infections. Curr Ther Res Clin Exp. 2025;102:100780. doi:10.1016/j.curtheres.2025.100780.
8. Jesenak M, Hrubisko M, Chudek J, et al. Beneficial effects of pleuran on asthma control and respiratory tract-infection frequency in children with perennial asthma. Sci Rep. 2025;15:7146. doi:10.1038/s41598-025-91830-2.
9. Jesenak M, Prokopova E, Bozensky J, et al. Novel Chewable Pleuran-Based Supplement Decreases Respiratory Tract Infections in Children: A Randomised Controlled Trial. Adv Ther. 2025;42:6132–6149. doi:10.1007/s12325-025-03393-3.
10. Han B, Baruah K, Cox E, Vanrompay D, Bossier P. Structure-functional activity relationship of β-glucans from the perspective of immunomodulation: a mini-review. Front Immunol. 2020;11:658. doi:10.3389/fimmu.2020.00658.
11. Karácsonyi Š, Kuniak L. Polysaccharides of Pleurotus ostreatus: isolation and structure of pleuran, an alkali-insoluble β-D-glucan. Carbohydr Polym. 1994;24(2):107–111. doi:10.1016/0144-8617(94)90019-1.
12. Chan GCF, Chan WK, Sze DMY. The effects of β-glucan on human immune and cancer cells. J Hematol Oncol. 2009;2:25. doi:10.1186/1756-8722-2-25. PubMed
13. Brown GD, Taylor PR, Reid DM, et al. Dectin-1 is a major β-glucan receptor on macrophages. J Exp Med. 2002;196(3):407–412. doi:10.1084/jem.20020470. PubMed
14. Goodridge HS, Wolf AJ, Underhill DM. β-Glucan recognition by the innate immune system. Immunol Rev. 2009;230(1):38–50. doi:10.1111/j.1600-065X.2009.00793.x.