Drugs in Context

drugsincontext.com

REVIEW

Holistic care in mild upper respiratory tract infections (MURTIs): an approach to individualized care management

Andrew Smith[1], Guillermo Estrada Riolobos[2], Marco Biagi[3], Andreas Michalsen[4,5], Laura Sadofsky[6], Ann Herzeel[7], Patrick Poucheret[8]

[1]School of Psychology, Cardiff University, Cardiff, UK; [2]Spanish Society Clinical Family and Community Pharmacy (SEFAC), Paseo de las Delicias, Madrid, Spain; [3]Department of Food and Drug, University of Parma, Parma, Italy; [4]Institute of Social Medicine, Epidemiology and Health Economics, Charité – Universitätsmedizin Berlin, Corporate Member of Freie Universität Berlin and Humboldt-Universität zu Berlin, Berlin, Germany; [5]Department of Internal Medicine and Nature-Based Therapies, Immanuel Hospital Berlin, Berlin, Germany; [6]Centre for Biomedicine, Hull York Medical School, University of Hull, Hull, UK; [7]Community Pharmacist, Brussels, Belgium; [8]Qualisud, Université de Montpellier, CIRAD, Institut Agro, IRD, Avignon Université, Université de La Réunion, Montpellier, France

Abstract

Although mild upper respiratory tract infections (MURTIs) are typically self-limiting and benign, they can substantially impair a patient's quality of life. The wide range of pathogens causing MURTIs often necessitates a symptomatic treatment approach rather than a pathogen-specific treatment. The present article introduces a patient-centred classification system that distinguishes between self-care-oriented, pharmacist-oriented and physician-oriented patients. Building on this framework, we propose a 360° holistic care model that considers contextual factors and addresses the whole person, under the premise that the effectiveness, safety and suitability of the treatment are tailored to the individual's symptoms and circumstances. To support practical implementation, a stepwise guide for MURTI management is presented, encompassing all steps from initial patient assessment to pharmacological and non-pharmacological treatment approaches, lifestyle advice, patient education, and follow-up care. This structured approach not only facilitates symptom resolution but also promotes long-term health by empowering patients with the knowledge, tools and support they need to maintain their well-being. By shifting the focus from isolated symptom management to comprehensive care, our 360° holistic care model may enhance the overall treatment experience and outcome for patients affected by MURTIs.

Download the **Plain Language Summary** of this article: https://www.drugsincontext.com/wp-content/uploads/2025/12/dic.2025-7-12-PLS.pdf

Keywords: evidence-based practice, holistic health, integrative medicine, patient-centred care, practice guideline, professional–patient relations, respiratory tract infections, self-care.

Citation

Smith A, Estrada Riolobos G, Biagi M, Michalsen A, Sadofsky L, Herzeel A, Poucheret P. Holistic care in mild upper respiratory tract infections (MURTIs): an approach to individualized care management. *Drugs Context*. 2025;14:2025-7-12. https://doi.org/10.7573/dic.2025-7-12

Introduction

Various pathogens cause mild upper respiratory tract infections (MURTIs), yet MURTIs are primarily associated with viral infections. MURTIs affect specific anatomical areas, including the nose, sinuses, pharynx and larynx, as well as the nervous and vascular systems.[1,2] The inflammatory response causes symptoms such as sore throat, nasal congestion or discharge, sneezing, headache, fatigue, malaise, and cough.[3,4] Whilst the onset of symptoms is typically staggered, the disease rapidly progresses to a stage where multiple symptoms are present simultaneously. Smith et al.[1] introduced the term

'MURTI' to distinguish these infections from the broadly used but imprecise term 'common cold', which typically refers to nasopharyngitis or a head cold.[5,6]

Although self-limiting and benign, MURTIs can significantly decrease the patient's quality of life for several weeks.[3,4] Additionally, MURTIs are responsible for substantial health-related costs, including absenteeism from work and medical expenses.[7] Due to the variety of viruses that cause MURTIs, no cure is available; instead, they are managed symptomatically.[8] Whilst isolated symptom relief can provide temporary comfort, patients often seek holistic strategies that promote overall well-being.[1] Out of a large variety of home remedies, over-the-counter (OTC) medications, vitamins and other food supplements, particularly herbal products and essential oils, such as those containing menthol, eucalyptol (1,8-cineole) or camphor, are commonly used for perceived relief and improved sleep quality.[1,9]

Despite the high prevalence of these mild infections, our knowledge of patient health behaviours during MURTIs is limited.[10] Patients may employ a combination of self-care methods, pharmacy support consultations, and general practitioner (GP) consultations (Figure 1).[11] Each individual's path depends on factors like symptom severity, impact on daily life, underlying health conditions, personal preference, and access to healthcare resources.[12,13] Depending on their preferred care pathway, patients with MURTI can be categorized as:

1. *Self-care-oriented patients*: Self-care actions for MURTI treatment are encouraged by the World Health Organization (WHO).[11] Frequently used methods include home remedies or OTC medication, resting or staying in bed, and increasing fluid intake.[11] Globally, self-care is gaining importance and relevance for maintaining health and well-being.[14] However, some self-care practices may lead to health complications and further costs.[10] In recent years, social media has become an increasingly important source of medical information.[15,16] Healthcare providers (HCPs) must be aware of this trend and well-prepared and trained to identify and address misinformation and misconceptions during consultations.[16]
2. *Pharmacist-oriented patients*: Patients with MURTIs turn to pharmacists for OTC medication and health advice.[1] In many countries, pharmacists are easily accessible and convenient HCPs offering free consultations and therapeutic education.[10] They have the clinical and pharmacological expertise to manage MURTIs, but may lack training in specific primary care protocols.[17,18]
3. *Physician-oriented patients*: Acute upper respiratory tract infections are the most common reason for medical consultations globally.[19] Patients visit GPs because they perceive their symptoms as prolonged or severe.[20] Whilst up to 50% expect an antibiotic prescription, others seek reassurance, advice on self-care, alternative treatments or a prediction of the illness's length.[20]

Variations in patient care pathways and differing practices amongst HCPs contribute to inconsistent management of MURTIs.[21] Consensual, evidence-based recommendations are lacking to ensure adequate care.[17,21] This present position paper, written by a multidisciplinary expert panel, emphasizes the importance of a comprehensive approach simultaneously considering physical symptoms, mental well-being and socioeconomic status.[22] The 360° holistic care model presented herein has been developed to provide a framework specifically for pharmacists. As first-line consultants, they are ideally positioned to guide patients at low risk through structured assessments of their symptoms and care management strategies, and they ensure timely referral to physicians for red flag symptoms or clinical deterioration.[1] To facilitate the implementation of this model, we propose a practical stepwise guide designed to support pharmacists in providing holistic, patient-centred MURTI management in their daily practice.

The 360° holistic care model

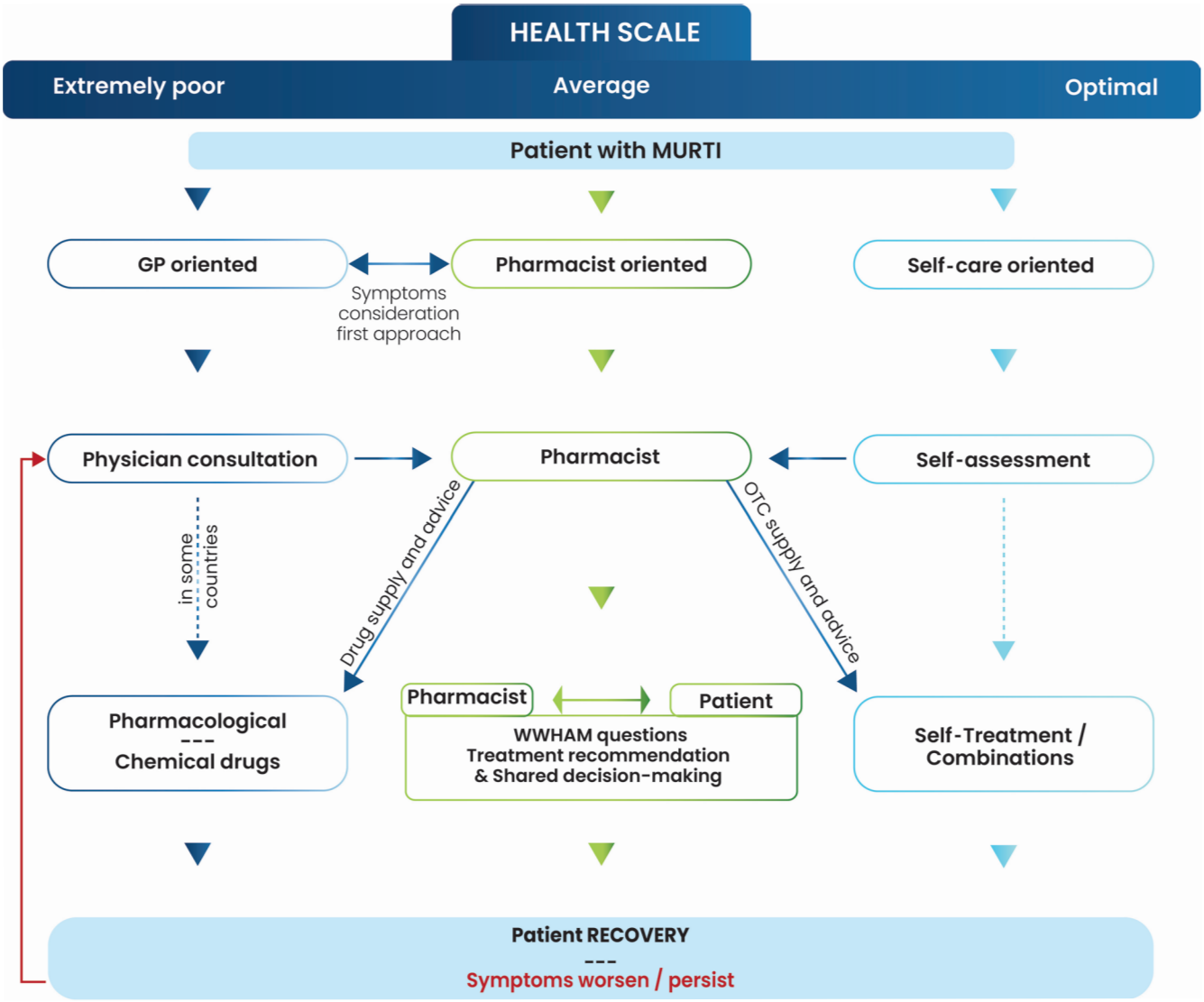
Whilst the choice of therapy remains dependent on the treatment's effectiveness, safety, and suitability for the individual's symptoms and circumstances, comprehensive care also considers contextual factors, addressing the whole person before developing any treatment plan.[1] To achieve this, three core concepts form the principles of our 360° holistic care model (Figure 2).

Integrative approach

The ancient Greek philosopher Aristotle believed that a happy life requires fulfilling several conditions, including physical and mental well-being. This perspective remains relevant today in the management of MURTIs. An integrative approach must go beyond assessing physical symptoms and incorporate socioeconomic and lifestyle factors, such as sleep quality, nutrition and stress, to support faster and more effective recovery.[1,23,24]

Pharmacists need to form a comprehensive picture of the patient's global health status. This includes the presence and severity of symptoms, as well as the individual's overall well-being. For example, behavioural malaise is associated with MURTIs and causes reduced alertness, which affects patients' mood and safety at work. Adequate sleep and effective stress management are

Figure 1. Overview of current patient pathways in the management of MURTIs. Mild upper respiratory tract infections (MURTIs) can affect individuals across the entire health spectrum, ranging from extremely poor to optimal. The flow diagram outlines subsequent pathways, including physician-oriented, self-care or pharmacist-oriented entry points based on perceived symptoms. Patients consulting pharmacies undergo a structured assessment and medication dispensing, where appropriate.



GP, General Practitioner; OTC, over-the-counter medication; WWHAM, see section '*Stepwise guide to MURTI patient management*'.

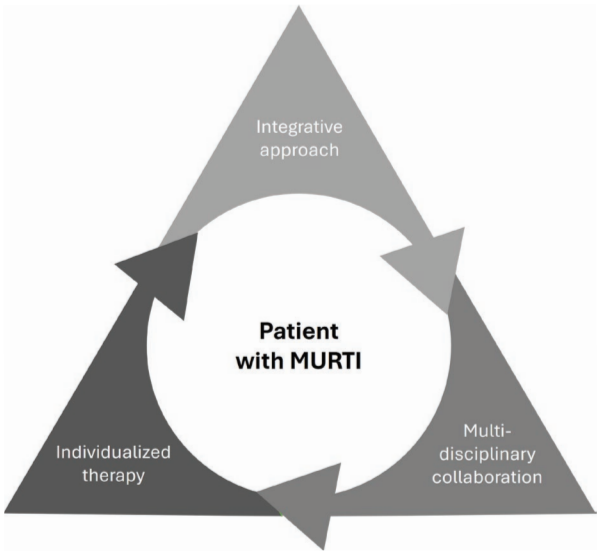
essential for recovery, as nasal congestion and cough can significantly impact sleep quality and impair mental performance.[3,25]

Multidisciplinary collaboration

Managing MURTIs should encompass various HCPs, including pharmacists, GPs, otorhinolaryngologist specialists where appropriate, and naturopathic doctors, along with other resources like social media, self-care and online pharmacies.[1] Each profession brings unique expertise to provide patient-centred care by addressing individual preferences, needs and values.[26,27]

Pharmacists play a key role within this model by offering evidence-based guidance on self-care and medication, thus mitigating the risks of inappropriate self-treatment and misinformation from social media.[1] The pandemic prompted pharmacists to take a more proactive role in patient care. They are increasingly seen as health coaches, offering remote consultations and home delivery of medications as well as point-of-care testing (e.g. C-reactive protein, influenza, COVID-19, respiratory syncytial virus), and involvement in vaccination services.[28] Introducing pharmacist prescribing for minor ailments, such as MURTIs, would

Figure 2. The 360° holistic care model. The principles of this model are based on three interconnected core concepts: (1) an integrative approach considering the patient as a whole, including their physical and mental well-being, needs and preferences; (2) multidisciplinary collaboration with pharmacists in a key role and other healthcare professions bringing their unique expertise to provide patient-centred care; and (3) individualized care resulting in patient-specific management by considering disease phase and symptoms, socioeconomic and demographic profile, comorbidities and personal preferences. MURTI, mild upper respiratory tract infection.



further help alleviate pressure on primary care services and allow pharmacists to address patient needs directly.[29] Pharmacists thus require specific training and guidance to fulfil this role and prepare them for increased responsibilities.[30]

Individualized therapy

Pharmacists should create treatment plans based on the patient's socioeconomic and demographic profile, taking into account comorbidities, current symptomatic stage of the MURTI (Table 1), preferences for chemical or phytochemical treatments, and overall well-being.[1] Effective management requires a tailored approach considering the illness's current stage and the staggered appearance of symptoms. A scratchy throat, nasal congestion, runny nose and headache characterize the early phase. During the peak phase, usually days 2–5, nasal congestion becomes the most bothersome symptom, accompanied by pain and secretory symptoms. The recovery phase begins around day 6, with the cough becoming more prominent.[31]

MURTI management might start in healthy individuals with immune support (prevention), progress to early symptom treatment (antivirals and/or anti-inflammatory agents), and finally treatment of full infections that require multi-level symptom relief.[6]

Below, we present a structured, stepwise approach to translating this 360° holistic care model into practice, outlining how pharmacists can assess, guide and support patients with MURTIs at each stage. The authors considered the available medical and pharmaceutical recommendations for MURTI management as a general framework for the present article, as there is an absence of official recommendations. The data were obtained within the framework of a narrative review to support decision-making in the management of MURTIs by providing a synthesis of the main available evidence-based options for patient care. As a narrative review, it gives a broad global overview of the literature, thereby aligning with the international or holistic approach of MURTI management.

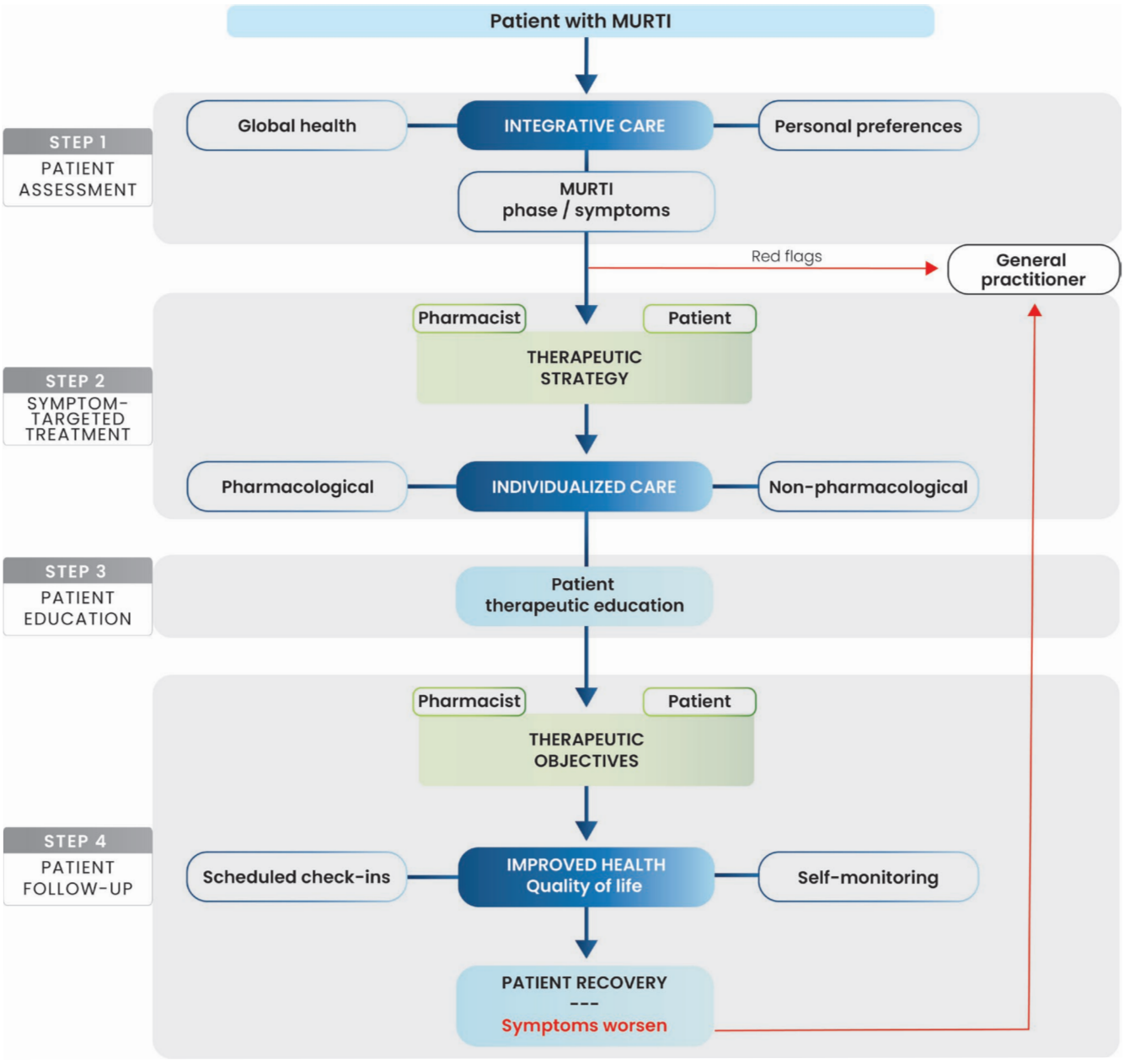
Stepwise guide to MURTI management

Figure 3 provides a step-by-step guide to MURTI management for pharmacists, covering the entire patient journey described in Steps 1–4.

Step 1: patient assessment

The first step in MURTI management is a structured and consistent patient assessment, involving collecting the

Figure 3. Stepwise guide for MURTI management. Patients consulting a pharmacist undergo a 4-step consultation, each step including a specific and dedicated analysis. Their final combination structures the holistic and individualized care management for mild upper respiratory tract infections (MURTIs). Step 1 covers patient assessment, where the patient's global health status, including comorbidities and medication history, personal preferences, including needs, socioeconomic situation and demographic data, as well as MURTI phase and symptoms are assessed. Any red flags at this point or worsening of symptoms throughout the process would result in a referral to a general practitioner. Step 2 covers symptom-targeted treatment. A comprehensive therapeutic strategy is developed through shared decision-making between the pharmacist and the patient, resulting in 360° individualized care based on a tailored combination of pharmacological (chemical and phytochemical drugs) and non-pharmacological (lifestyle management and adaptation, support of immune function) primary and secondary care (see Table 1 and Figure 4 for treatment options), aiming at multiple symptom management. This 360° concept is completed by patient education in Step 3, that is, the empowerment of patients through health literacy, treatment advice and preventive measures. This directly leads to patient follow-up in Step 4, starting with the therapeutic objective, that is, the therapeutic results and outcomes expected from holistic care, including improved health and quality of life by reduction of MURTI duration and symptomatology, improved sleep and thereby immunity, as well as overall enhanced wellbeing, as assessed in scheduled check-ins or by self-monitoring, up to full recovery.



patient's history (e.g. demographics, medical and medication history), determining the reason for seeking care and enquiring about current symptoms. Whilst interviewing the patient, pharmacists must assess the health status, health literacy, and presence of red flags or risk factors requiring a medical referral.[32,33]

The pharmacy consultation pathway traditionally uses the WWHAM questions to gather key information:[34]

- **W**ho is the medicine for?
- **W**hat are the symptoms?
- **H**ow long have the symptoms been present?
- **A**ction taken?
- **M**edication used?

It is essential to determine the current stage of the illness (early, peak or recovery) and consider the patient's expressed values, preferences and goals of MURTI care before managing symptoms in step 2.

Step 2: symptom-targeted treatment

MURTIs are managed symptomatically, with treatment tailored to meet individual needs. A patient-centred approach integrates shared decision-making[35] and addresses symptoms as entry points to improve quality of life and support recovery. The pharmacist develops a comprehensive strategy that should include both pharmacological and non-pharmacological interventions, focusing on overall well-being rather than treating symptoms in isolation (Table 1). The use of customized, staggered treatments that target multiple symptoms is recommended.[1]

Pharmacological treatment approach

This approach encompasses both chemical and phytochemical treatment options (Table 1). Amongst the chemical treatments, analgesics, local anaesthetics, antiseptics, antipyretics, sympathomimetics, antitussives, antihistamines, anticholinergics, mucolytics and expectorants are frequently used in MURTI management.[1,6,19]

Paracetamol, acetylsalicylic acid and ibuprofen are the most commonly used OTC analgesics and antipyretics for managing MURTI symptoms such as fever, sore throat, myalgia, headache, sinus pain and malaise. Clinical evidence supports the efficacy and safety of these drugs in the context of MURTIs, despite a limited number of dedicated clinical trials being available.[19] Local anaesthetics, such as lidocaine and benzocaine, are often found in throat lozenges and sprays for their pain-relieving effect; however, they can be associated with side-effects such as tongue numbness.[19]

Another drug class commonly found in throat lozenges, sprays and mouthwashes is antiseptics. Agents such as amylmetacresol, 2,4-dichlorobenzyl alcohol (and combinations thereof), phenol, chlorhexidine, povidone-iodine and cetylpyridinium chloride have demonstrated antiviral and antibacterial activity in vitro; however, translating these findings into clinical efficacy in treating sore throats remains challenging.[19]

Sympathomimetics are often used as nasal decongestants due to their vasoconstrictive action. Oxymetazoline and xylometazoline can be administered topically in the form of nasal sprays or drops, leading to a rapid onset of decongestion. In contrast, phenylephrine, ephedrine or pseudoephedrine are available in oral dosage forms, with a slower onset of decongestive effects due to their metabolism. Whilst the efficacy of topical nasal decongestants is well-demonstrated in clinical trials, the effectiveness of oral decongestants remains a matter of controversy.[19]

Antitussives include opiates and their derivatives, such as codeine or dextromethorphan, as well as sedating antihistamines such as brompheniramine, diphenhydramine, chlorpheniramine, doxylamine, triprolidine, promethazine and carbinoxamine. Sedating antihistamines are often used in multi-symptom OTC cough and cold preparations in combination with analgesics, decongestants, antitussives and expectorants. Clinical evaluation of their efficacy remains challenging due to the lack of standardized methods to assess cough in clinical trials and the absence of a gold-standard comparator agent. Overdose risks associated with opioids and sedating antihistamines are particularly concerning in paediatric populations, whilst the availability of dextromethorphan is increasingly restricted due to its potential for recreational misuse.[19]

Ipratropium bromide has anticholinergic properties, and its efficacy in reducing nasal secretion and sneezing has been proven in several randomized placebo-controlled trials. In contrast to antihistamines, anticholinergics have no sedating effect, making them a better choice for daytime therapy.[19] For an additional decongestive effect, anticholinergics can be combined with nasal decongestants.[19,36]

One of the most commonly used OTC expectorants worldwide is guaifenesin. Expectorants are proposed to facilitate the clearance of mucus from the respiratory tract by reducing its viscosity. Due to guaifenesin's long-standing use since the 1950s, its mechanism of action has not been thoroughly studied. Bromhexine, ambroxol and N-acetylcysteine are mucolytic agents often used in MURTI treatment. Mucolytics alter the composition of airway mucus, making it more fluid and thereby aiding mucociliary expectoration. However, the efficacy of both expectorants and mucolytics in MURTIs is controversially discussed.[19]

Table 1. Overview of MURTI pathophysiology, treatment options and self-care advice. Treatment options and self-care advice are organized by disease stage (prevention phase, early phase, peak phase and recovery phase) and related symptoms. This chart includes commonly encountered examples but is not exhaustive; not all options are detailed in the text. The most beneficial treatment options for patients are highlighted in bold and ranked according to the strength of scientific evidence (based on recent randomized placebo-controlled trials, meta-analyses and systematic reviews) for phytochemicals, as well as the immediate positive impact and ease of use for self-care and non-pharmacological options. Remaining lower items are presented for reference of use.

MURTI pathophysiology		
Definition Upper airway non-complicated infection Self-limiting disease (immunocompetent patient) **Anatomy area** Nose, sinus Pharynx, larynx	**Aetiology** Viral mainly **Symptoms** General Throat Nasal Cough	**Pathology phases** Prevention phase (non-symptomatic) Peak phase (staggered then simultaneous symptoms) Recovery phase (decreasing symptomatology) **Quality of life** Sleep disorder Decreased immunity Decreased quality of life

Pharmacological treatment options as a function of symptoms

Prevention phase		Early and peak phases		Recovery phase	
Symptoms	**Treatment**	**Symptoms**	**Treatment**	**Symptoms**	**Treatment**
No symptoms	**Chemical** • Antiseptics[a] • No available vaccinations[b]	**Throat** • Sore throat • Dysphonia • Pharyngitis • Hoarseness	**Chemical** • Antiseptics[a] • Analgesics[c] • Local anaesthetics[d] (throat lozenges, spray or mouthwash)	**Residual symptoms** Decreasing symptoms (mainly residual cough, fatigue, psychological stress)	**Chemical** • Antitussives[k] • Analgesics[c] (if symptoms linger)
			Phytochemical • **Propolis** • Ginger (*Zingiber officinale* Roscoe) • Menthol		

(*Continued*)

Smith A, Estrada Riolobos G, Biagi M, et al. *Drugs Context*. 2025;14:2025-7-12. https://doi.org/10.7573/dic.2025-7-12
ISSN: 1740-4398

Table 1. (Continued)

Pharmacological treatment options as a function of symptoms					
Prevention phase		**Early and peak phases**		**Recovery phase**	
Symptoms	**Treatment**	**Symptoms**	**Treatment**	**Symptoms**	**Treatment**
	Phytochemical • ***Pelargonium sidoides* DC** • ***Propolis*** • ***Cistus incanus*** • L. *Echinacea purpurea* (L.) Moench • Liquorice (*Glycyrrhiza* spp.)	**Nasal** • Sneezing • Nasal discharge • Nasal congestion • Sinus pain	**Chemical** • Antihistamines[e] • Anticholinergics[f] • Nasal decongestants (sympathomimetics)[g] • Analgesics[c]		**Phytochemical** • **Asian ginseng (*Panax ginseng* C.A. Meyer)** • **Elderberry (*Sambucus nigra* L.)** • Ginger (*Zingiber officinale* Roscoe) • Ashwagandha (*Withania somnifera* (L.) Dunal)
			Phytochemical • ***Pelargonium sidoides* DC** • **1,8-cineole or Eucalyptus oil** • ***Cistus incanus* L.** • Elderberry (*Sambucus nigra* L.) (within 48 hour after symptom onset) • Menthol, camphor • Specific fixed combinations[h]		
		General • Low-grade fever • Malaise • Myalgia • Headache	**Chemical** • Antipyretics[c] • Analgesics[c]		
			Phytochemical • ***Cistus incanus* L.** • **Elderberry (*Sambucus nigra* L.)** (within 48 hour after symptom onset) • Liquorice (*Glycyrrhiza* spp.)		
		Cough • Productive ('wet') cough • Non-productive ('dry') cough	**Chemical** • Expectorants[i] • Mucolytics[j] • Antitussives[e,k]		
			Phytochemical • ***Cistus incanus*** • **L.Thyme, ivy** • **1,8-Cineole or eucalyptus oil** • Primrose • Ginger (*Zingiber officinale* Roscoe) • *Pelargonium sidoides* DC • Menthol, 1,8-cineole and other essential oils and aromatic compounds[l]		

(*Continued*)

Table 1. (Continued)

Self-care advice and non-pharmacological options					
Prevention phase		**Early and peak phases**		**Recovery phase**	
Symptoms	**Treatment**	**Symptoms**	**Treatment**	**Symptoms**	**Treatment**
No symptoms	• **Spread-preventing measures** –Hand hygiene –Mask use –Cough and sneezing etiquette –Limited exposure • **Iota-carrageenan** • **Hypertonic saline rinses** • Hydrotherapy[m] • General factors: –Stress reduction and management (mindfulness meditation) –Proper nutrition –Physical activity –Sleep hygiene –Smoking cessation • Immune support • Breathing techniques[n]	**Throat**	• **Iota-carrageenan** • **Zinc** • **Honey** • Saline gargle • Vitamin C and D • Demulcents[o]	**Residual symptoms**	• **Rest, sleep and stress management** • **Balanced nutrition** • **Maintain hydration** • Breathing techniques[n] • Humidification by inhalation *(if symptoms linger)* • Gradual return to physical activity • Demulcents[o]
		Nasal	• **Iota-carrageenan** • **Saline nasal spray or irrigation** • Sleep improvement[p]		
		General	• **Zinc** • Caffeine • Vitamins A, C, D and E, beta-carotene, folic acid • Selenium, iron, copper • Point-of-care testing[q]		
		Cough	• **Honey** • **Saline** (inhalation, lozenges) • Breathing techniques[n], nose breathing • Sleep improvement[p] • Sufficient hydration (lukewarm non-carbonated water or herbal teas with mucous membrane moisturizing properties) • Demulcents[o]		

[a]Such as amylmetacresol, 2,4-dichlorobenzyl alcohol (and combinations thereof), phenol, chlorhexidine, povidone iodine and cetylpyridinium chloride.
[b]Vaccinations are available against COVID-19, influenza and respiratory syncytial virus but not against mild upper respiratory tract infections (MURTIs).
[c]Such as paracetamol, ibuprofen and acetylsalicylic acid.
[d]Such as lidocaine and benzocaine.
[e]Sedating antihistamines such as brompheniramine, diphenhydramine, chlorpheniramine, doxylamine, triprolidine, promethazine and carbinoxamine.
[f]Such as ipratropium bromide.
[g]Such as oxymetazoline, xylometazoline, phenylephrine and pseudoephedrine.
[h]Fixed combination of gentian root, verbena, sorrel, elderflower and cowslip, and fixed combination of gentian root, primula flower, sorrel herb, elderflower and verbena herb (BNO 1016).
[i]Such as guaifenesin.
[j]Such as ambroxol, N-acetylcysteine and bromhexine.
[k]Opiates and its derivatives, such as codeine and dextromethorphan.
[l]Such as camphor, turpentine oil, cedar leaf oil, nutmeg oil, African geranium, gentian root, elderflower and vervain herb.
[m]Such as Kneipp affusions, sauna or cold foot baths.
[n]Including controlled hyperventilation, breath retention and cold exposure.
[o]Herbal products containing polysaccharides such as glycerol, liquorice (*Glycyrrhiza* spp.), plantain (*Plantago* sp.), marshmallow (*Althaea officinalis* L), Iceland moss (*Cetraria islandica L*) and elm bark (*Ulmus rubra* Muhlenberg).
[p]Sleep quality can be supported by phytomedicine (please refer to phytochemicals for nasal and cough symptoms during early and peak phase).
[q]Tests are available, for example, C-reactive protein, COVID-19, respiratory syncytial virus and influenza.

These recognized pharmacological interventions are standard therapy options covering the whole range of common-cold symptoms; however, some patients might prefer more 'natural' alternatives. Well-established treatments for MURTIs recognized by regulatory authorities include plant-derived molecules and (traditional) herbal medicinal products with demonstrated efficacy and safety in the management of MURTI symptoms. Their pharmacological activity encompasses immunomodulatory effects, support of respiratory function, mitigation of oxidative stress and inhibition of viral propagation.[37] They can be administered systemically, topically or inhaled. Selective herbal products for acute respiratory infections can significantly reduce the need for antibiotics and shorten sick leave, as shown in an extensive retrospective cohort study.[38]

Inhaling essential oils, such as those containing menthol, 1,8-cineole, thymol, and other balsamic monoterpenes or small volatile compounds, during a cold can improve breathing, reduce coughing, increase alertness and enhance sleep quality, and thereby improve immunity.[1] Essential oils have a good safety profile for nasal mucosa and can also be suitable as adjunctive agents for early symptoms.[39] They are effective at very low concentrations and have a broad spectrum of antimicrobial and antiviral activity for topical use.[40] As an example, eucalyptus oil demonstrates anti-inflammatory, antioxidant, free radical scavenging, and mucolytic or secretolytic effects, as well as an indirect bronchial spasmolytic effect, and indirect antiviral and antimicrobial effects.[41,42] It is valuable in treating respiratory tract infections, including the common cold,[43] acute non-purulent rhinosinusitis[44] and bronchitis.[45] Research suggests that administering cineole from eucalyptus early can reduce symptom severity and duration, improve quality of life, and enhance overall treatment outcomes.[43]

Volatile oils, such as those containing thymol, exert local effects, including mucolytic, bronchodilatory and antiseptic actions. Ivy leaf extracts, rich in saponins, act as expectorants and possess antispasmodic properties. Balsamic molecules are also effective after oral administration: in patients with acute cough due to MURTIs, fixed combinations of thyme and ivy decreased cough intensity and Bronchitis Severity Score and improved health-related quality of life.[46,47] A systematic review and meta-analysis confirmed reductions in both the frequency and severity of acute cough with herbal remedies containing thyme, ivy or primrose.[48]

Propolis is another promising natural remedy for treating and preventing pharyngitis. Rich in flavonoids, typically >15% in dry extracts obtained from Euro-Asian poplar type propolis, and including galangin, chrysin and pinocembrin,[49] this bee product has been demonstrated to modulate immune responses in vitro and in vivo and to inhibit the release of pro-inflammatory cytokines, with effects comparable to flurbiprofen.[50,51] Moreover, poplar-type propolis has also been demonstrated to reduce viral load in cell-based models.[52] Quality control of propolis is essential and should include testing for potential contamination with pyrrolizidine alkaloids.[53]

Liquorice (*Glycyrrhiza* spp., including *Glycyrrhiza glabra* L. and *Glycyrrhiza uralensis* Fisch. ex DC) is one of the most important medicinal plants in traditional Chinese medicine. Apart from a non-pharmacological demulcent effect (discussed later), *G. glabra* has well-studied anti-inflammatory, antiviral and immunomodulatory actions.[54] Two preparations of *G. uralensis* were shown to inhibit human respiratory syncytial virus (RSV) infection in vitro by interfering with viral attachment and internalization, and by stimulating interferon secretion.[55] *Pelargonium sidoides* DC special extract Eps®7630, a herbal medicine approved by the EMA, has been shown to reduce rhinovirus infection by modulating viral binding proteins and by activating immune response in the respiratory tract.[56] Moreover, it has shown potential to reduce antibiotic use in adults with acute cough due to lower respiratory tract infections.[57]

Two herbal combinations demonstrated efficacy in patients with acute rhinosinusitis after 2 weeks; one is a combination of gentian root, verbena, sorrel, elderflower and cowslip that led to statistically significant and clinically relevant improvement,[58] the other is a patented combination of gentian root, primula flower, sorrel herb, elderflower and verbena herb (BNO 1016, 480 mg daily).[59]

A *Cistus incanus* L. extract rich in polymeric polyphenols (CYSTUS052) exhibited antiviral activity against a highly pathogenic avian influenza A virus (H7N7) in vitro and a mouse infection model.[60] Furthermore, compared to placebo, symptom scores in 160 patients with MURTIs treated with this extract decreased significantly throughout treatment, which might be related to the observed decrease in C-reactive protein.[61]

Data from five clinical studies of 936 adults show that *Sambucus nigra* L. berry can reduce the duration and severity of common cold and influenza symptoms when taken within 48 hours of the onset of an acute respiratory viral infection.[62]

Evaluating *Echinacea's* efficacy is complicated by variations in plant material, extraction methods and additional components.[63,64] However, expressed juice from *Echinacea purpurea* has a well-established use in short-term prevention of MURTIs and *Echinacea* preparations are widely utilized in Europe and the USA.[64]

Medicinal plants have shown potential in supporting the complex and often prolonged recovery phase following MURTIs, particularly by adaptogens. These botanicals are known for their ability to non-specifically enhance the body's resistance to various stressors whilst reducing physical and psychological fatigue.[65] Amongst the most studied adaptogenic plants, Asian ginseng (*Panax ginseng* C.A. Meyer) roots are one of the most well-established options, particularly in cases of chronic fatigue.[66] Conversely, in situations where psychological stress plays a prominent role, *Withania somnifera* (L.) Dunal (Ashwagandha) has demonstrated both efficacy and safety, offering valuable support during mental exhaustion and emotional strain.[67]

Ginger and its bioactive components, including gingerol, shogaol, zingerone and paradol, exert antioxidant and anti-inflammatory properties by inhibiting the production of pro-inflammatory molecules.[68] The traditional use of ginger (*Zingiber officinale* Roscoe) rhizoma for the relief of common cold symptoms has been described in the European Union herbal monograph HMPC monograph,[69] in Chinese and African pharmacopoeias, and the German Commission E Monograph, whilst the Health Canada natural health product monograph mentions the use of ginger as an expectorant and antitussive to relieve symptoms of bronchitis, cough and colds.[70]

Our understanding of the mechanisms of action of treatments is continuing to evolve. Advances in analytical and pharmacological research have revealed that the multifaceted effects of monoterpenes and monoterpenoids, such as menthol, camphor and eucalyptus oil, target symptoms, including cough, nasal congestion, pain and sleep disturbances.[9] The effects are partly mediated by modulation of temperature-sensitive transient receptor potential ion channels involved in cough and pain,[71] or inhibition of ATP release from rhinovirus-infected cells following secondary stimulation.[72] Additionally, the immunomodulatory activity of *Echinacea* alkylamides has been linked to the cannabinoid system.[73] These insights support the role of such extracts in reducing overall symptom burden and enhancing recovery.

Herbal medicines are often viewed as safe and are commonly used in conjunction with other chemical or plant-based medications. However, it is essential to be mindful of potential drug interactions as well as the contraindications and adverse effects of each medication, to ensure a safe and effective treatment plan. Scientific assessment of (traditional) herbal medicine is challenging due to many factors that must be considered. They may originate from plant sources that exhibit variability in species, cultivation conditions and biologically active components.[74]

In summary, phytochemicals offer the advantage of a multi-target approach and can be used in conjunction with standard therapies (Figure 4); many individuals preferring a holistic approach to healthcare may find them particularly attractive. The existing products are effective, but their use should be expanded to reduce the reliance on antibiotics. The availability of these products at home ensures immediate use when the first symptoms appear, thereby achieving optimal effectiveness.

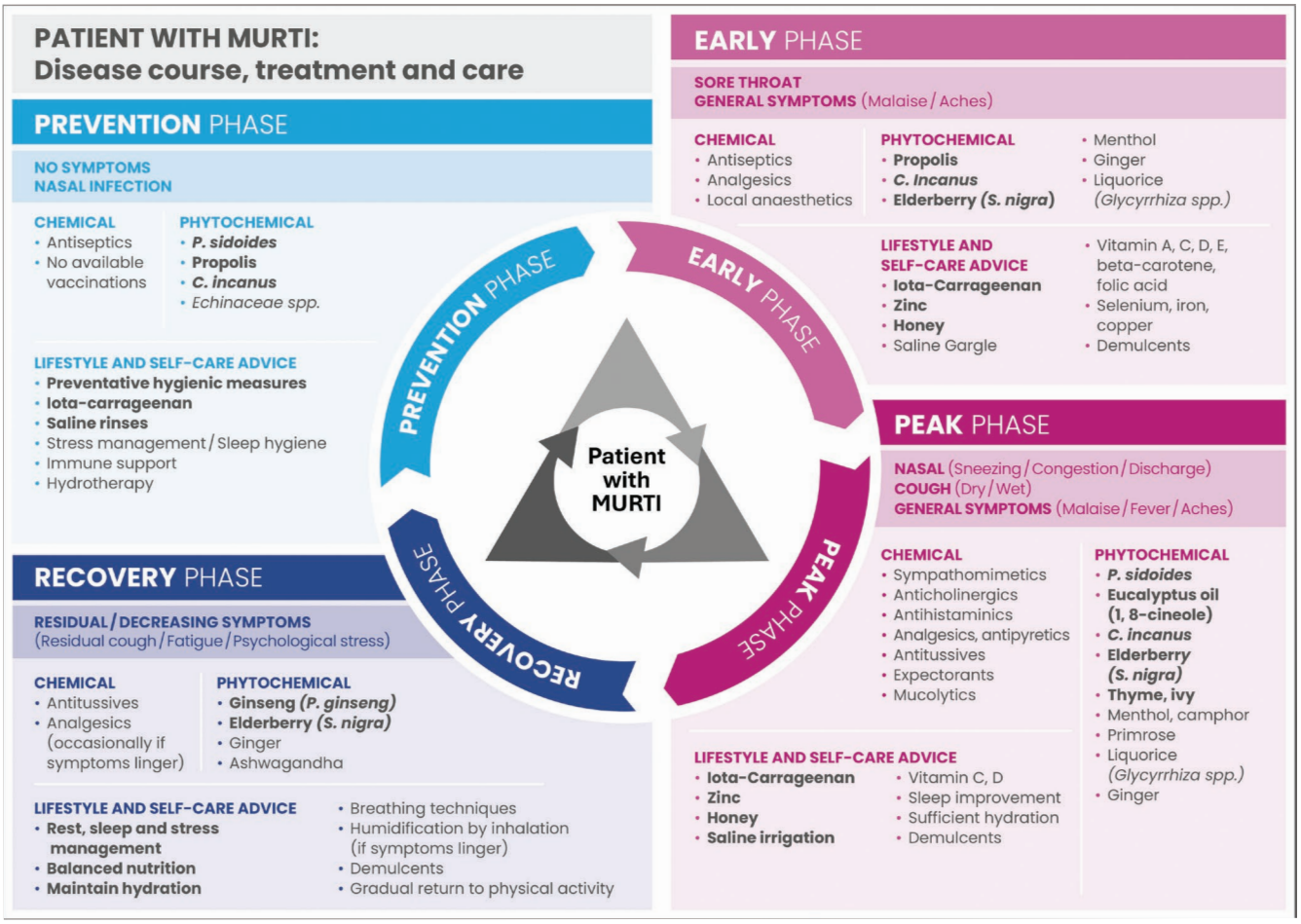
Non-pharmacological interventions

Demulcents are agents with soothing and irritation-relieving properties on the oral and pharyngeal mucosa[75] such as glycerol, liquorice (*Glycyrrhiza* spp.), plantain (*Plantago* sp.), Iceland moss (*Cetraria islandica* L.), marshmallow (*Althaea officinalis)* and honey. The soothing effect of demulcent herbs is mediated by polysaccharides that adhere to irritated mucosal membranes, forming a mucilaginous barrier. Furthermore, demulcents may reduce coughing if the symptom is a reflex response to hyperactive or irritated receptors in the oropharynx, as seen in cases of a dry cough.[76] Efficacy of a traditional demulcent herbal tea containing elm bark (*Ulmus rubra* Muhlenberg), marshmallow root and liquorice root (*G. glabra* L.) as a herb and dry aqueous extract for symptomatic treatment of pharyngitis was proven in a randomized controlled trial. Iota-carrageenan, a large polysaccharide molecule extracted from red edible seaweeds, traps positively charged respiratory viruses as they pass through respiratory fluids, thereby preventing them from reaching cell surfaces.[77] Studies have shown that iota-carrageenan is effective in the treatment and prevention of MURTIs,[77,78] making it a potential broad-spectrum antiviral agent for MURTI management.[79]

Whilst symptoms persist in the patient, self-care advice includes home remedies such as saline. Saline is vital in nasal or respiratory hygiene through various applications, including nasal irrigation, gargling and aerosol administration. Its hydrating properties provide moisture to the respiratory epithelia and enhance the distribution of alveolar lining fluid, contributing to a reduction in bioaerosols and viral load. Saline also facilitates mucus gelation, making it easier to cough up and swallow mucus, and supports mucociliary clearance by promoting ciliary activity. Moreover, saline influences myeloperoxidase activity in epithelial or phagocytic cells to produce hypochlorous acid.[80,81] Clinically, saline-based nasal or respiratory care has effectively mitigated symptoms of seasonal coronaviruses and other common cold viruses.[80,82,83]

Honey is a well-established treatment for cough, with demulcent, antioxidant, anti-inflammatory and antimicrobial properties. Due to the risk of botulism, honey

Figure 4. Treatment options to optimize patient holistic care throughout the pathophysiological phases of MURTIs. A non-exhaustive list of options for chemical and phytochemical drugs is presented, along with lifestyle and self-care advice. Top choices in bold (see also Table 1). Healthcare professionals can select appropriate medications and measures to provide the patient with a holistic treatment plan by (1) individual patient health status, symptoms, needs and preferences, (2) safety labelling and instructions for use, (3) local regulations and recommendations and (4) good medical and pharmaceutical practices. Patients experiencing multiple symptoms simultaneously may be treated with combinations of chemical and phytochemical drugs as the first line of treatment, where appropriate. This orientation shall contribute to limiting the number of chemical drugs administered to the patient, thereby improving tolerance and limiting the risk of adverse effects and drug interactions. MURTI, mild upper respiratory tract infection.



should not be used in children younger than 1 year of age.[84] Systematic reviews have shown that honey reduces cough frequency and severity more effectively than no treatment or placebo and may be as effective as dextromethorphan. However, evidence is limited by study design.[85] Its benefits extend beyond a simple soothing effect, suggesting a systemic action; the type of honey used does not appear to impact efficacy significantly. A meta-analysis confirmed honey's superiority over usual care, highlighting its potential as a natural alternative for cough management.[86]

Increasing fluid intake is often recommended during acute respiratory infection to prevent or treat dehydration and to thin and loosen respiratory secretions and mucus.[87] However, in an observational study, no evidence supported the widespread belief that MURTIs are associated with increased risk of dehydration.[87] Nevertheless, as the participants in this study were not required to have a fever, dehydration cannot be ruled out if febrile illness is associated with MURTIs. Sufficient hydration, as stated in Table 1, should thus always keep the balance between potentially increased needs due to fever and overhydration, potentially leading to fatal acute symptomatic hyponatraemia ('water intoxication').[87]

Breathing techniques, including controlled hyperventilation, breath retention and cold exposure, have been studied for their ability to modulate the autonomic nervous system and innate immune response. Breathing

exercises that induce transient respiratory alkalosis and hypoxia have been shown to elevate epinephrine levels and attenuate the pro-inflammatory cytokine response (e.g. TNF, IL-6 and IL-8),[88] promoting a shift towards an anti-inflammatory immune profile in healthy individuals.[89] Although none of these studies directly investigated patients with MURTIs, the observed immunomodulatory effects provide a plausible rationale for the benefit of breathing techniques.

Besides these non-pharmacological interventions, preventive actions should not be neglected. Although not everyone exposed to a virus will become ill, preventing the spread of a virus within the household is crucial, particularly for young children or individuals with pre-existing health conditions. Preventive measures, such as hand hygiene, disinfecting shared items and following proper cough and sneeze etiquette, can contribute significantly to reducing transmission (Table 1).[90,91]

Vaccinations are available against severe illness caused by RSV, influenza and COVID-19.[92] However, research on MURTI vaccines remains challenging due to the antigenic variability of viruses and the many pathogens involved, including rhinoviruses, RSV, coronaviruses, parainfluenza virus and adenovirus. In a Cochrane review, a single randomized controlled trial on an adenovirus vaccine was identified, which found no significant difference in cold incidence compared to the placebo, thus highlighting insufficient evidence to support the use of the vaccine for prevention in healthy individuals. Even if vaccines are available, their success depends on several intrinsic and extrinsic factors, including sleep,[93] nutritional status[94] and stress.[95] Psychological and behavioural strategies can lead to a better vaccine response, including stress management through exercise and mindfulness meditation, maintaining good sleep hygiene, quitting smoking, adopting a balanced diet and seeking professional support for depression.[94]

The lifestyle factors behind these strategies influence vaccine response and contribute to the incidence and severity of MURTIs, potentially due to an interconnection with the immune system. Research indicates a strong link between sleep and susceptibility to respiratory infections, particularly MURTIs. MURTI symptoms, such as nasal congestion or cough, can impair sleep[3,25] and should be treated with appropriate medication or remedies (Table 1). Shorter sleep duration and poor sleep efficiency are associated with increased vulnerability to colds, in coherence with the relationship between sleep and immunity.[96,97] A systematic review revealed a significantly higher risk for MURTIs if sleep duration is shorter than 7–9 hours.[98] Notably, individuals who sleep less than 7 hours per night are nearly three times more likely to develop a cold than those who sleep 8 hours or more per night.[96]

In line, thermal regulation interacts with the immune system. Whilst fever is a cardinal response to infection,[99] hydrotherapy interventions exert a preventive effect against MURTIs. Cold foot baths significantly increased nasal mucosal blood flow and elevated salivary IgA levels, suggesting enhanced local immune defence in the upper respiratory tract.[100] Regular sauna use has been shown to reduce the susceptibility to acute respiratory infections in young children, leading to fewer sick days.[101] Similarly, Kneipp affusions reduced susceptibility to MURTIs in adults and children.[102]

An interconnection has also been described between the brain and the immune system. Psychological stress leads to immune suppression and may negatively influence health behaviour, making the individual more prone to infection.[103,104] Stress also influences the development of symptoms, with highly stressed individuals experiencing more severe and longer-lasting colds.[105] The interaction between the immune system and the brain is bidirectional, accounting for the malaise associated with MURTIs.[3] Meta-analytical findings confirmed the hypothesis that psychological stress is associated with increased susceptibility to MURTIs, supporting an emerging appreciation of the potential importance of psychological factors in infectious disease.[106] Moreover, studies have associated metabolic inflammation,[107] low fitness level,[108] microbiome dysbiosis[109] as well as malnutrition and undernutrition,[109] with a higher incidence and severity of MURTIs.

Optimal immune function requires proper nutrition and adequate intake of essential micronutrients,[110] though evidence on MURTI prevention through dietary supplements remains inconclusive. Nutraceutical self-care approaches for the common cold often involve the intake of specific nutrients, including zinc, selenium, iron, copper, beta-carotene, vitamins A, D, C and E, as well as folic acid (Table 1 and Figure 4).[111] Regular supplementation of vitamin C at doses of 1–2 g/day has been shown to reduce the duration and severity of the common cold.[111] Similarly, zinc supplementation, ideally within 24 hours of symptom onset, may shorten the typical cold duration by approximately 2 days.[111] Whilst vitamin D supplementation overall protects against the common cold, individuals with a vitamin D deficiency and those not receiving boluses benefit the most.[111]

In summary, preventive measures, including hygiene, sleep hygiene, stress management and proper nutrition,

are essential components of care. Vaccination against certain viral infections is available and should be considered when appropriate. Furthermore, lifestyle factors, such as sleep, stress management and immune support, are key in both preventing and aiding recovery from MURTIs[1] (Table 1). Non-pharmacological treatments, such as iota-carrageenan and home remedies, including saline and honey, can further support recovery. All these interventions are part of traditional, complementary and integrative medicine (TCIM) - a patient-centred, holistic approach to healthcare, combining conventional medical practices with complementary therapies and modalities. It focuses not only on physical health but also considers mental, emotional and spiritual wellbeing. TCIM includes self-care approaches and lifestyle modifications, such as hydrotherapy, sleep hygiene and stress reduction, as well as physical activity, fasting and traditional methods like massage and manual therapies, which are not discussed in detail in this manuscript but contribute to overall health and well-being.

Step 3: patient education

Pharmacists also play an essential role in preventing medication-related issues by educating patients about the safe use of OTC medications, particularly high-risk analgesics such as non-steroidal anti-inflammatory drugs and paracetamol, which are commonly used to treat MURTIs. Through counselling, they raise awareness of potential risks, side-effects and interactions, and promote responsible self-medication.[112]

Improving health literacy requires a supportive environment where patients feel comfortable asking questions.[113] Pharmacists play a key role in enhancing the understanding of prevention and treatment of MURTIs, encouraging self-care and reducing unnecessary referrals to GPs. Supported by clear communication, visual aids and patient-centred materials such as the respiratory tract infection leaflet (TARGET TYI-RTI),[114] they can ultimately empower patients in their health and recovery, reinforcing the foundational principle of a holistic approach by prioritizing the patient and tailoring strategies that best support individual needs.

Step 4: patient follow-up

Pharmacist follow-up can enhance patient adherence, symptom relief and overall patient satisfaction.[115] The patient is recommended to self-monitor their recovery and any changes in their condition, and to consult a GP if symptoms worsen or persist for more than 3 weeks.[1] Potential methods to ensure follow-up include scheduled check-ins, structured documentation of interventions and collaboration with GPs to prevent complications.[115]

In summary, by conducting a detailed patient assessment, providing symptom-targeted treatment, integrating education and offering structured follow-ups, the 360° holistic care model strengthens self-care strategies, ensuring patients receive timely and appropriate support.

Discussion

A holistic, multidisciplinary approach offers considerable advantages by combining the expertise of physicians, pharmacists and specialists. It can streamline workflows and improve patient experiences by reducing fragmentation.[116] The 360° holistic care model also incorporates lifestyle modifications and mental health support, all tailored to each patient's unique needs. This integrated strategy could enhance care efficiency, patient empowerment and healthcare quality.

The treatment of MURTIs is associated with several challenges. Whilst iota-carrageenan shows potential as a non-specific antiviral agent for treating the common cold, it has not yet been established as a standard approach.[77,79] In contrast, antibiotics remain overprescribed despite their ineffectiveness against viral infections. Alternatively, selected phytopharmaceuticals have been shown to significantly reduce antibiotic consumption and duration of sick leave, as shown in a registry analysis of over 230,000 patients.[38]

A thorough understanding of pathogenesis and symptom development is essential for effective symptom management. Promoting prophylaxis and optimizing immune system strength throughout the year can potentially reduce MURTI incidence and prevalence at individual and societal levels. Although research has provided molecular insights into pharmacologically active substances, the understanding of MURTI symptoms is still incomplete, which limits the effectiveness of treatment. As such, behavioural malaise, characterized by reduced alertness and slowed psychomotor performance, can significantly impair everyday activities such as driving and workplace safety.[3] Whilst caffeine may temporarily increase alertness, further research is needed to develop effective treatments for the psychological and performance effects of caffeine in respiratory infections.

G20 leaders and the WHO acknowledge TCIM as an 'important and often underestimated health resource with many applications'[117] and, recently, the new 2025–2034 WHO strategy envisaging universal access to safe, effective and people-centred TCIM was adopted.[118] Interest in TCIM has grown, particularly during the COVID-19 pandemic, for its potential in managing MURTI symptoms and supporting mental health.[119]

Despite its benefits, several challenges can impede the implementation of the 360° holistic care model, for example, financial viability of pharmacist follow-up services, such as scheduled check-ins, structured documentation of interventions and collaboration with GPs.[115] Time constraints, insufficient funding and the absence of standardized protocols pose significant barriers to implement integrated care effectively.[120] Inadequate interdisciplinary training and divergent clinical perspectives amongst physicians, pharmacists and specialists further impede progress. These challenges limit opportunities for patient education leading to inconsistent guidance and fragmented care. Consequently, patients may experience confusion, diminished trust in their treatment plans and lower adherence, ultimately compromising clinical outcomes. Furthermore, disseminating unverified information, particularly on social media, can erode public confidence in medical advice and complicate patient education.[121]

To address these challenges, healthcare systems can adopt several targeted strategies. One promising solution is enhancing interdisciplinary education, for example, by incorporating standardized training programmes in primary care processes for pharmacists focusing on:

- Triage and referral skills: Teaching pharmacists to recognize when patients need more advanced care and how to direct them effectively.
- Clear symptom management guidelines: Equipping pharmacists with standardized approaches for treating common conditions like MURTIs within their scope of practice.
- Improving collaboration across healthcare professionals: Ensuring pharmacists and physicians work together more effectively for the patient's benefit.

Addressing this gap and expanding pharmacists' roles within the health system through training, prescribing rights and formal pathways for managing minor ailments, such as MURTIs, they can play an even more substantial role in relieving pressure on overburdened resources.

Respiratory infections, even those that are mild at the onset, can disrupt homeostasis in ways that may lead to cardiovascular adverse events.[122] Therefore, preventing or adopting holistic care approaches, which limit the initial infection, might contribute to preventing detrimental cardiovascular impacts. This holistic management may include vaccination, particularly in patients with cardiovascular diseases, when available and not contraindicated.

Vitamin D should also be considered.[123] Vitamin D is recognized as a stimulatory agent of innate immunity with a positive impact on acute respiratory tract infections, of which MURTIs are a subset. High doses were found to be suitable for preventing seasonal respiratory infections, characterized by rapid symptom relief, decreased viral load and faster recovery. This effect is particularly noticeable in the paediatric population. From a holistic approach perspective, it should be noted that, besides vitamin D supplementation, lifestyle recommendations encourage maintaining appropriate levels of vitamin D intake from dietary sources as well as adequate sun exposure.

Chronic pathologies associated with increased or low-grade inflammation are linked to an increased vulnerability to infection and its complications.[124] Management of chronic diseases and the underlying inflammatory status of patients through pharmacotherapy and lifestyle adaptations is an integral part of holistic care in preventing or managing mild infections and potential cardiovascular complications.

Conclusion

The 360° holistic care model is built around the core principle of patient-centred care. It goes beyond addressing acute MURTI symptoms with pharmaceuticals and integrates personalized lifestyle guidance, for example, supporting nutrition, sleep and stress management, to promote overall well-being. There are several advantages of treating the whole symptom complex rather than individual ones. First, this may lead to early and extensive symptom management. This, in turn, may induce faster and more complete recovery. The implications of this are that discomfort will be reduced and the person's quality of life will improve. Additionally, this might contribute to reduced healthcare costs. It should also be noted that any treatment or approach strategies are culturally dependent and heterogeneous.

In conclusion, this approach transforms MURTI treatment into a comprehensive care strategy, aiming to promote immediate symptom alleviation for patients and provide them with the necessary tools and support to sustain their long-term health.

Contributions: All authors provided scientific input, reviewed, and edited the manuscript. AS and PP wrote the manuscript. All named authors meet the International Committee of Medical Journal Editors (ICMJE) criteria for authorship for this article, take responsibility for the integrity of the work as a whole, and have given their approval for this version to be published.

Disclosure and potential conflicts of interest: This work was supported by Procter & Gamble International Operations SA, 47 Route de Saint-Georges, 1213 Petit-Lancy, Geneva, Switzerland. LS has received grants and consulting fees from Procter & Gamble. LS has also received consulting fees from Chiesi and Reckitt. AM has received consulting fees from Procter & Gamble. The International Committee of Medical Journal Editors (ICMJE) Potential Conflicts of Interests form for the authors is available for download at: https://www.drugsincontext.com/wp-content/uploads/2025/11/dic.2025-7-12-COI.pdf

Acknowledgements: Sandra Götsch-Schmidt, Eva Bauer and Andrea Zudrell, DREHM Pharma GmbH, 1120 Vienna, Austria, provided medical writing assistance.

Funding declaration: Preparation of this article and medical writing assistance were funded by Procter & Gamble International Operations SA, 47 Route de Saint-Georges, 1213 Petit-Lancy, Geneva, Switzerland.

Article URL: https://www.drugsincontext.com/holistic-care-in-mild-upper-respiratory-tract-infections-murtis-an-approach-to-individualized-care-management

Correspondence: Andrew Smith, School of Psychology, Cardiff University, 63 Park Place, Cardiff, CF10 3AS, UK. Email: smithap@cardiff.ac.uk

Provenance: Submitted; externally peer reviewed.

Submitted: 31 July 2025; **Accepted:** 7 October 2025; **Published:** 4 December 2025.

Drugs in Context is published by BioExcel Publishing Ltd. Registered office: 6 Green Lane Business Park, 238 Green Lane, New Eltham, London, SE9 3TL, UK.

BioExcel Publishing Limited is registered in England Number 10038393. VAT GB 252 7720 07.

For all manuscript and submissions enquiries, contact the Editorial office editorial@drugsincontext.com

For all permissions, rights, and reprints, contact David Hughes david.hughes@bioexcelpublishing.com

References

1. Smith A, Kardos P, Pfaar O, et al. The treatment of mild upper respiratory tract infections–a position paper with recommendations for best practice. *Drugs Context*. 2023;12:2023-4-2. https://doi.org/10.7573/dic.2023-4-2
2. Eccles R. Understanding the symptoms of the common cold and influenza. *Lancet Infect Dis*. 2005;5(11):718–725. https://doi.org/10.1016/S1473-3099(05)70270-X
3. Smith AP. Twenty-five years of research on the behavioural malaise associated with influenza and the common cold. *Psychoneuroendocrinology*. 2013;38(6):744–751. https://doi.org/10.1016/j.psyneuen.2012.09.002

4. Tobin EH, Thomas M, Bomar PA. Upper respiratory tract infection with a focus on the common cold. In: *StatPearls*. StatPearls Publishing; 2025. http://www.ncbi.nlm.nih.gov/books/NBK532961/. Accessed January 21, 2025.
5. Grief SN. Upper respiratory infections. *Prim Care Clin Off Pract*. 2013;40(3):757–770. https://doi.org/10.1016/j.pop.2013.06.004
6. Eccles R. Common cold. *Front Allergy*. 2023;4:1224988. https://doi.org/10.3389/falgy.2023.1224988
7. Jaume F, Alobid I, Mullol J, Quintó L. Direct costs of acute rhinosinusitis in spain: a prospective and observational study (PROSINUS). *J Investig Allergy Clin Immunol*. 2021;31(6):481–488. https://doi.org/10.18176/jiaci.0525
8. Heikkinen T, Järvinen A. The common cold. *Lancet*. 2003;361(9351):51–59. https://doi.org/10.1016/S0140-6736(03)12162-9
9. Smith A, Matthews O. Aromatic ointments for the common cold: what does the science say? *Drugs Context*. 2022;11:2022-5-6. https://doi.org/10.7573/dic.2022-5-6
10. Keshvari N, Yousefi N, Peiravian F, Sharif Z. Exploring health seeking behaviors for common cold management. *Explor Res Clin Soc Pharm*. 2023;11:100301. https://doi.org/10.1016/j.rcsop.2023.100301
11. Thielmann A, Gerasimovska-Kitanovska B, Buczkowski K, et al. Self-care for common colds by primary care patients: a European multicenter survey on the prevalence and patterns of practices—the COCO study. *Evid Based Complement Alternat Med*. 2016;2016(1):6949202. https://doi.org/10.1155/2016/6949202
12. Tsutsumi M, Shaku F, Ozone S, Sakamoto N, Maeno T. Reasons for the preference of clinic visits to self-medication by common cold patients in Japan. *J Gen Fam Med*. 2017;18(6):336–340. https://doi.org/10.1002/jgf2.81
13. McIsaac WJ, Levine N, Goel V. Visits by adults to family physicians for the common cold. *J Fam Pract*. 1998;47(5):366–369.
14. World Health Organization. WHO guideline on self-care interventions for health and well-being, 2022 revision. https://www.who.int/publications/i/item/9789240052192
15. Zhao Y, Zhang J. Consumer health information seeking in social media: a literature review. *Health Inf Libr J*. 2017;34(4):268–283. https://doi.org/10.1111/hir.12192
16. Patrick M, Venkatesh RD, Stukus DR. Social media and its impact on health care. *Ann Allergy Asthma Immunol*. 2022;128(2):139–145. https://doi.org/10.1016/j.anai.2021.09.014
17. Aly M, Schneider CR, Sukkar MB, Lucas C. Educational needs of community pharmacy staff in minor ailment service delivery: a systematic scoping review. *Curr Pharm Teach Learn*. 2020;12(10):1269–1287. https://doi.org/10.1016/j.cptl.2020.05.013
18. Lelie-van der Zande R, Koster ES, Teichert M, Bouvy ML. Barriers and facilitators for providing self-care advice in community pharmacies: a qualitative study. *Int J Clin Pharm*. 2023;45(3):758–768. https://doi.org/10.1007/s11096-023-01571-3
19. Eccles R. Cough and common cold. In: Kenakin T, ed. *Comprehensive Pharmacology*. London: Elsevier; 2022:745–761. https://doi.org/10.1016/B978-0-12-820472-6.00094-3
20. McNulty CA, Nichols T, French DP, Joshi P, Butler CC. Expectations for consultations and antibiotics for respiratory tract infection in primary care: the RTI clinical iceberg. *Br J Gen Pract*. 2013;63(612):e429–e436. https://doi.org/10.3399/bjgp13X669149
21. Pietrusiewicz M, Kopa-Stojak PN, Pawliczak R. Pharmacist's recommendations of over-the-counter treatments for the common cold–analysis of prospective cases in Poland. *BMC Fam Pract*. 2021;22(1):216. https://doi.org/10.1186/s12875-021-01561-2
22. Rojas EI, Dupotey NM, De Loof H. Comprehensive medication management services with a holistic point of view, a scoping review. *Pharmacy*. 2023;11(1):37. https://doi.org/10.3390/pharmacy11010037
23. Govers C, Calder PC, Savelkoul HFJ, Albers R, van Neerven RJJ. Ingestion, immunity, and infection: nutrition and viral respiratory tract infections. *Front Immunol*. 2022;13:841532. https://doi.org/10.3389/fimmu.2022.841532
24. Ventegodt S, Kandel I, Ervin DA, Merrick J. Concepts of holistic care. In: Rubin IL, Merrick J, Greydanus DE, Patel DR, eds. *Health Care for People with Intellectual and Developmental Disabilities across the Lifespan*. Cham: Springer International Publishing; 2016:1935–1941. https://doi.org/10.1007/978-3-319-18096-0_148
25. Smith AP. Upper respiratory tract infections and academic attainment: a case study. *J Clin Transl Res*. 2022;8(2):156–159.
26. Alsubaie SS, Bukhamseen ZFA, Alyami FSA, et al. Multidisciplinary approaches in general medical practice: enhancing collaboration for better patient care. *J Ecohumanism*. 2024;3(7):2659–2669. https://doi.org/10.62754/joe.v3i7.4665
27. Reeves S, Pelone F, Harrison R, Goldman J, Zwarenstein M. Interprofessional collaboration to improve professional practice and healthcare outcomes. *Cochrane Database Syst Rev*. 2017;6:CD000072. https://doi.org/10.1002/14651858.CD000072.pub3

28. Czarniak P, Chalmers L, Hughes J, et al. Point-of-care C-reactive protein testing service for respiratory tract infections in community pharmacy: a qualitative study of service uptake and experience of pharmacists. *Int J Clin Pharm*. 2022;44(2):466–479. https://doi.org/10.1007/s11096-021-01368-2
29. Mesbahi Z, Piquer-Martinez C, Benrimoj SI, et al. Pharmacists as independent prescribers in community pharmacy: a scoping review. *Res Social Adm Pharm*. 2025;21(3):142–153. https://doi.org/10.1016/j.sapharm.2024.12.008
30. Piogé A, Zorek J, Eickhoff J, et al. Interprofessional collaborative clinical practice in medicine and pharmacy: measure of student perceptions using the SPICE-R2F instrument to bridge health-care policy and education in France. *Healthcare*. 2022;10(8):1531. https://doi.org/10.3390/healthcare10081531
31. Witek TJ, Ramsey DL, Carr AN, Riker DK. The natural history of community-acquired common colds symptoms assessed over 4-years. *Rhinology*. 2015;53(1):81–88. https://doi.org/10.4193/Rhino14.149
32. Nusair MB, Guirguis LM. Thoroughness of community pharmacists' assessment and communication using the patient care process. *Res Social Adm Pharm*. 2018;14(6):564–571. https://doi.org/10.1016/j.sapharm.2017.07.002
33. Mahmoud SH, ed. *Patient Assessment in Clinical Pharmacy: A Comprehensive Guide*. Cham: Springer International Publishing; 2019. https://doi.org/10.1007/978-3-030-11775-7
34. Watson MC, Bond CM, Grimshaw J, Johnston M. Factors predicting the guideline compliant supply (or non-supply) of non-prescription medicines in the community pharmacy setting. *Qual Saf Health Care*. 2006;15(1):53–57. https://doi.org/10.1136/qshc.2005.014720
35. Langlois L, Carnovale V, Stefan T, et al. 139 Pharmacists' involvement in shared decision making: a scoping review. *BMJ Evid-Based Med*. 2024;29(Suppl. 1):A63. https://doi.org/10.1136/bmjebm-2024-SDC.138
36. Eccles R, Martensson K, Chen SC. Effects of intranasal xylometazoline, alone or in combination with ipratropium, in patients with common cold. *Curr Med Res Opin*. 2010;26(4):889–899. https://doi.org/10.1185/03007991003648015
37. Zwolińska D. Rational phytotherapy as an alternative treatment for acute respiratory tract infections. *Pediatr Med Rodz*. 2022;18(2):139–145. https://doi.org/10.15557/PiMR.2022.0020
38. Martin D, Konrad M, Adarkwah CC, Kostev K. Reduced antibiotic use after initial treatment of acute respiratory infections with phytopharmaceuticals – a retrospective cohort study. *Postgrad Med*. 2020;132(5):412–418. https://doi.org/10.1080/00325481.2020.1751497
39. Valussi M, Antonelli M, Donelli D, Firenzuoli F. Appropriate use of essential oils and their components in the management of upper respiratory tract symptoms in patients with COVID-19. *J Herb Med*. 2021;28:100451. https://doi.org/10.1016/j.hermed.2021.100451
40. Stathis C, Victoria N, Loomis K, et al. Review of the use of nasal and oral antiseptics during a global pandemic. *Future Microbiol*. 2021;16(2):119–130. https://doi.org/10.2217/fmb-2020-0286
41. Juergens LJ, Worth H, Juergens UR. New perspectives for mucolytic, anti-inflammatory and adjunctive therapy with 1,8-cineole in COPD and Asthma: review on the new therapeutic approach. *Adv Ther*. 2020;37(5):1737–1753. https://doi.org/10.1007/s12325-020-01279-0
42. Sudhoff H, Klenke C, Greiner JF, et al. 1,8-cineol reduces mucus-production in a novel human ex vivo model of late rhinosinusitis. *PLoS One*. 2015;10(7):e0133040. https://doi.org/10.1371/journal.pone.0133040
43. Michalsen A, Goldenstein K, Kardos P, et al. The impact of cineole treatment timing on common cold duration and symptoms: non-randomized exploratory clinical trial. *PLoS One*. 2024;19(1):e0296482. https://doi.org/10.1371/journal.pone.0296482
44. Kehrl W, Sonnemann U, Dethlefsen U. Therapy for acute nonpurulent rhinosinusitis with cineole: results of a double-blind, randomized, placebo-controlled trial. *Laryngoscope*. 2004;114(4):738–742. https://doi.org/10.1097/00005537-200404000-00027
45. Fischer J, Dethlefsen U. Efficacy of cineole in patients suffering from acute bronchitis: a placebo-controlled double-blind trial. *Cough*. 2013;9(1):25. https://doi.org/10.1186/1745-9974-9-25
46. Kardos P, Bittner CB, Seibel J, Abramov-Sommariva D, Birring SS. Effectiveness and tolerability of the thyme/ivy herbal fluid extract BNO 1200 for the treatment of acute cough: an observational pharmacy-based study. *Curr Med Res Opin*. 2021;37(10):1837–1844. https://doi.org/10.1080/03007995.2021.1960493
47. Kemmerich B, Eberhardt R, Stammer H. Efficacy and tolerability of a fluid extract combination of thyme herb and ivy leaves and matched placebo in adults suffering from acute bronchitis with productive cough. A prospective, double-blind, placebo-controlled clinical trial. *Arzneimittelforschung*. 2006;56(9):652–660. https://doi.org/10.1055/s-0031-1296767
48. Wagner L, Cramer H, Klose P, et al. Herbal medicine for cough: a systematic review and meta-analysis. *Forsch Komplementmed*. 2015;22(6):359–368. https://doi.org/10.1159/000442111

49. Miraldi E, Cappellucci G, Baini G, et al. Chemical markers in italian propolis: chrysin, galangin and CAPE as indicators of geographic origin. *Plants*. 2024;13(19):2734. https://doi.org/10.3390/plants13192734
50. Esposito C, Garzarella EU, Bocchino B, et al. A standardized polyphenol mixture extracted from poplar-type propolis for remission of symptoms of uncomplicated upper respiratory tract infection (URTI): a monocentric, randomized, double-blind, placebo-controlled clinical trial. *Phytomedicine*. 2021;80:153368. https://doi.org/10.1016/j.phymed.2020.153368
51. Governa P, Cusi MG, Borgonetti V, et al. Beyond the biological effect of a chemically characterized poplar propolis: antibacterial and antiviral activity and comparison with flurbiprofen in cytokines release by LPS-stimulated human mononuclear cells. *Biomedicines*. 2019;7(4):73. https://doi.org/10.3390/biomedicines7040073
52. Sberna G, Biagi M, Marafini G, et al. *In vitro* evaluation of antiviral efficacy of a standardized hydroalcoholic extract of poplar type propolis against SARS-CoV-2. *Front Microbiol*. 2022;13:799546. https://doi.org/10.3389/fmicb.2022.799546
53. Brugnerotto P, Seraglio SKT, Schulz M, Gonzaga LV, Fett R, Costa ACO. Pyrrolizidine alkaloids and beehive products: a review. *Food Chem*. 2021;342:128384. https://doi.org/10.1016/j.foodchem.2020.128384
54. Bisht D, Rashid M, Arya RKK, et al. Revisiting liquorice (*Glycyrrhiza glabra* L.) as anti-inflammatory, antivirals and immunomodulators: potential pharmacological applications with mechanistic insight. *Phytomed Plus*. 2022;2(1):100206. https://doi.org/10.1016/j.phyplu.2021.100206
55. Feng Yeh C, Wang KC, Chiang LC, Shieh DE, Yen MH, San Chang J. Water extract of licorice had anti-viral activity against human respiratory syncytial virus in human respiratory tract cell lines. *J Ethnopharmacol*. 2013;148(2):466–473. https://doi.org/10.1016/j.jep.2013.04.040
56. Roth M, Fang L, Stolz D, Tamm M. Pelargonium sidoides radix extract EPs 7630 reduces rhinovirus infection through modulation of viral binding proteins on human bronchial epithelial cells. *PLoS One*. 2019;14(2):e0210702. https://doi.org/10.1371/journal.pone.0210702
57. Willcox M, Simpson C, Wilding S, et al. Pelargonium sidoides root extract for the treatment of acute cough due to lower respiratory tract infection in adults: a feasibility double-blind, placebo-controlled randomised trial. *BMC Complement Med Ther*. 2021;21(1):48. https://doi.org/10.1186/s12906-021-03206-4
58. Jund R, Mondigler M, Steindl H, Stammer H, Stierna P, Bachert C. Klinische Wirksamkeit eines pflanzlichen Kombinationspräparates in der Behandlung der akuten viralen Rhinosinusitis [Clinical efficacy of a herbal drug combination in acute viral rhinosinusitis]. *MMW Fortschr Med*. 2015;157(Suppl. 4):6–11. https://doi.org/10.1007/s15006-015-2934-4
59. Jund R, Mondigler M, Stammer H, Stierna P, Bachert C. Herbal drug BNO 1016 is safe and effective in the treatment of acute viral rhinosinusitis. *Acta Otolaryngol*. 2015;135(1):42–50. https://doi.org/10.3109/00016489.2014.952047
60. Droebner K, Ehrhardt C, Poetter A, Ludwig S, Planz O. CYSTUS052, a polyphenol-rich plant extract, exerts anti-influenza virus activity in mice. *Antiviral Res*. 2007;76(1):1–10. https://doi.org/10.1016/j.antiviral.2007.04.001
61. Kalus U, Grigorov A, Kadecki O, Jansen JP, Kiesewetter H, Radtke H. Cistus incanus (CYSTUS052) for treating patients with infection of the upper respiratory tract. A prospective, randomised, placebo-controlled clinical study. *Antiviral Res*. 2009;84(3):267–271. https://doi.org/10.1016/j.antiviral.2009.10.001
62. Harnett J, Oakes K, Carè J, et al. The effects of *Sambucus nigra* berry on acute respiratory viral infections: a rapid review of clinical studies. *Adv Integr Med*. 2020;7(4):240–246. https://doi.org/10.1016/j.aimed.2020.08.001
63. David S, Cunningham R. Echinacea for the prevention and treatment of upper respiratory tract infections: a systematic review and meta-analysis. *Complement Ther Med*. 2019;44:18–26. https://doi.org/10.1016/j.ctim.2019.03.011
64. Karsch-Völk M, Barrett B, Kiefer D, et al. Echinacea for preventing and treating the common cold. *Cochrane Database Syst Rev*. 2014;(2):CD000530. https://doi.org/10.1002/14651858.CD000530.pub3
65. Tóth-Mészáros A, Garmaa G, Hegyi P, et al. The effect of adaptogenic plants on stress: a systematic review and meta-analysis. *J Funct Foods*. 2023;108:105695. https://doi.org/10.1016/j.jff.2023.105695
66. Li Z, Wang Y, Xu Q, et al. Ginseng and health outcomes: an umbrella review. *Front Pharmacol*. 2023;14:1069268. https://doi.org/10.3389/fphar.2023.1069268
67. Arumugam V, Vijayakumar V, Balakrishnan A, et al. Effects of Ashwagandha (Withania Somnifera) on stress and anxiety: a systematic review and meta-analysis. *Explore*. 2024;20(6):103062. https://doi.org/10.1016/j.explore.2024.103062
68. Ayustaningwarno F, Anjani G, Ayu AM, Fogliano V. A critical review of Ginger's (*Zingiber officinale*) antioxidant, anti-inflammatory, and immunomodulatory activities. *Front Nutr*. 2024;11:1364836. https://doi.org/10.3389/fnut.2024.1364836
69. Committee on Herbal Medicinal Products (HMPC). European Union herbal monograph on *Zingiber officinale* Roscoe, rhizome. EMA/HMPC/885789/2022; 2025. https://www.ema.europa.eu/en/documents/herbal-monograph/final-european-union-herbal-monograph-zingiber-officinale-roscoe-rhizoma-revision-1_en.pdf. Accessed December 1, 2025.

70. Wardani RS, Schellack N, Govender T, et al. Treatment of the common cold with herbs used in Ayurveda and Jamu: monograph review and the science of ginger, liquorice, turmeric and peppermint. *Drugs Context*. 2023;12:2023-2-12. https://doi.org/10.7573/dic.2023-2-12
71. Stinson RJ, Morice AH, Sadofsky LR. Modulation of transient receptor potential (TRP) channels by plant derived substances used in over-the-counter cough and cold remedies. *Respir Res*. 2023;24(1):45. https://doi.org/10.1186/s12931-023-02347-z
72. Stinson RJ, Morice AH, Ahmad B, Sadofsky LR. Ingredients of Vicks VapoRub inhibit rhinovirus-induced ATP release. *Drugs Context*. 2023;12:2023-3-2. https://doi.org/10.7573/dic.2023-3-2
73. Liu R, Caram-Salas NL, Li W, Wang L, Arnason JT, Harris CS. Interactions of *Echinacea* spp. root extracts and alkylamides with the endocannabinoid system and peripheral inflammatory pain. *Front Pharmacol*. 2021;12:651292. https://doi.org/10.3389/fphar.2021.651292
74. Benzie IFF, Wachtel-Galor S, eds. *Herbal Medicine: Biomolecular and Clinical Aspects*. 2nd ed. Boca Raton, FL: CRC Press/Taylor & Francis; 2011.
75. Brinckmann J, Sigwart H, van Houten Taylor L. Safety and efficacy of a traditional herbal medicine (Throat Coat) in symptomatic temporary relief of pain in patients with acute pharyngitis: a multicenter, prospective, randomized, double-blinded, placebo-controlled study. *J Altern Complement Med*. 2003;9(2):285–298. https://doi.org/10.1089/10755530360623400
76. Ziment I. Herbal antitussives. *Pulm Pharmacol Ther*. 2002;15(3):327–333. https://doi.org/10.1006/pupt.2002.0343
77. Eccles R. Iota-carrageenan as an antiviral treatment for the common cold. *Open Virol J*. 2020;14(1):9–15. https://doi.org/10.2174/1874357902014010009
78. Figueroa JM, Lombardo ME, Dogliotti A, et al. Efficacy of a nasal spray containing iota-carrageenan in the postexposure prophylaxis of COVID-19 in hospital personnel dedicated to patients care with COVID-19 disease. *Int J Gen Med*. 2021;14:6277–6286. https://doi.org/10.2147/IJGM.S328486
79. Bichiri D, Rente AR, Jesus Â. Safety and efficacy of a iota-carrageenan nasal spray in treatment and prevention of the common cold. *Med Pharm Rep*. 2021;94(1):28–34. https://doi.org/10.15386/mpr-1817
80. Ramalingam S, Cai B, Wong J, et al. Antiviral innate immune response in non-myeloid cells is augmented by chloride ions via an increase in intracellular hypochlorous acid levels. *Sci Rep*. 2018;8(1):13630. https://doi.org/10.1038/s41598-018-31936-y
81. Huijghebaert S, Hoste L, Vanham G. Essentials in saline pharmacology for nasal or respiratory hygiene in times of COVID-19. *Eur J Clin Pharmacol*. 2021;77(9):1275–1293. https://doi.org/10.1007/s00228-021-03102-3
82. Vertigan AE, Theodoros DG, Gibson PG, Winkworth AL. Efficacy of speech pathology management for chronic cough: a randomised placebo controlled trial of treatment efficacy. *Thorax*. 2006;61(12):1065–1069. https://doi.org/10.1136/thx.2006.064337
83. Spinato G, Fabbris C, Costantini G, et al. The effect of isotonic saline nasal lavages in improving symptoms in SARS-CoV-2 infection: a case-control study. *Front Neurol*. 2021;12:794471. https://doi.org/10.3389/fneur.2021.794471
84. Fashner J, Ericson K, Werner S. Treatment of the common cold in children and adults. *Am Fam Physician*. 2012;86(2):153–159.
85. Oduwole O, Udoh EE, Oyo-Ita A, Meremikwu MM. Honey for acute cough in children. *Cochrane Database Syst Rev*. 2018;(4):CD007094. https://doi.org/10.1002/14651858.CD007094.pub5
86. Abuelgasim H, Albury C, Lee J. Effectiveness of honey for symptomatic relief in upper respiratory tract infections: a systematic review and meta-analysis. *BMJ Evid Based Med*. 2021;26(2):57–64. https://doi.org/10.1136/bmjebm-2020-111336
87. Eccles R, Mallefet P. Observational study of the effects of upper respiratory tract infection on hydration status. *Multidiscip Respir Med*. 2019;14:36. https://doi.org/10.1186/s40248-019-0200-9
88. Kox M, van Eijk LT, Zwaag J, et al. Voluntary activation of the sympathetic nervous system and attenuation of the innate immune response in humans. *Proc Natl Acad Sci USA*. 2014;111(20):7379–7384. https://doi.org/10.1073/pnas.1322174111
89. Zwaag J, Naaktgeboren R, van Herwaarden AE, Pickkers P, Kox M. The effects of cold exposure training and a breathing exercise on the inflammatory response in humans: a pilot study. *Psychosom Med*. 2022;84(4):457–467. https://doi.org/10.1097/PSY.0000000000001065
90. Larson EL. Warned, but not well armed: preventing viral upper respiratory infections in households. *Public Health Nurs*. 2007;24(1):48–59. https://doi.org/10.1111/j.1525-1446.2006.00607.x
91. Nunes-Silva C, Vilares AT, Schweitzer V, et al. Non-COVID-19 respiratory viral infection. *Breathe*. 2022;18(1):210151. https://doi.org/10.1183/20734735.0151-2021

92. Black CL, Kriss JL, Razzaghi H, et al. Influenza, updated COVID-19, and respiratory syncytial virus vaccination coverage among adults—United States, Fall 2023. *MMWR Morb Mortal Wkly Rep*. 2023;72(51):1377–1382. https://doi.org/10.15585/mmwr.mm7251a4
93. Schmitz NCM, Van Der Werf YD, Lammers-van Der Holst HM. The importance of sleep and circadian rhythms for vaccination success and susceptibility to viral infections. *Clocks Sleep*. 2022;4(1):66–79. https://doi.org/10.3390/clockssleep4010008
94. Madison AA, Shrout MR, Renna ME, Kiecolt-Glaser JK. Psychological and behavioral predictors of vaccine efficacy: considerations for COVID-19. *Perspect Psychol Sci*. 2021;16(2):191–203. https://doi.org/10.1177/1745691621989243
95. Miller GE, Cohen S, Pressman S, Barkin A, Rabin BS, Treanor JJ. Psychological stress and antibody response to influenza vaccination: when is the critical period for stress, and how does it get inside the body? *Psychosom Med*. 2004;66(2):215–223. https://doi.org/10.1097/01.psy.0000116718.54414.9e
96. Cohen S, Doyle WJ, Alper CM, Janicki-Deverts D, Turner RB. Sleep habits and susceptibility to the common cold. *Arch Intern Med*. 2009;169(1):62–67. https://doi.org/10.1001/archinternmed.2008.505
97. Prather AA, Janicki-Deverts D, Hall MH, Cohen S. Behaviorally assessed sleep and susceptibility to the common cold. *Sleep*. 2015;38(9):1353–1359. https://doi.org/10.5665/sleep.4968
98. Robinson CH, Albury C, McCartney D, et al. The relationship between duration and quality of sleep and upper respiratory tract infections: a systematic review. *Fam Pract*. 2021;38(6):802–810. https://doi.org/10.1093/fampra/cmab033
99. Evans SS, Repasky EA, Fisher DT. Fever and the thermal regulation of immunity: the immune system feels the heat. *Nat Rev Immunol*. 2015;15(6):335–349. https://doi.org/10.1038/nri3843
100. Stick C, Rischewski C, Eggert P, Scheewe S. Circulatory changes in the nasal mucosa of infection-susceptible children following climatotherapy by the sea [Änderungen der Nasenschleimhautdurchblutung bei infektanfälligen Kindern nach einer Klimakur an der See.] *Physikalische Medizin, Rehabilitationsmedizin, Kurortmedizin*. 2000;10(1):6–10. https://doi.org/10.1055/s-2008-1057750
101. Conradi E, Brenke R, Philipp S. Frequency of acute respiratory disease and secretory Immunoglobulin A in the saliva of children under the influence of regular sauna bathing. *Physikalische Medizin, Rehabilitationsmedizin, Kurortmedizin*. 1992;02(1):19–21. https://doi.org/10.1055/s-2008-1062095
102. Schulte K, Blakeslee SB, Stritter W, et al. The effect of Kneipp treatment hydrotherapy on secretory IgA in young children: a controlled, non-randomized clinical pilot study. *Complement Ther Med*. 2021;57:102637. https://doi.org/10.1016/j.ctim.2020.102637
103. Cohen S, Doyle WJ, Alper CM, Janicki-Deverts D, Turner RB. Sleep habits and susceptibility to the common cold. *Arch Intern Med*. 2009;169(1):62–67. https://doi.org/10.1001/archinternmed.2008.505
104. Takkouche B, Regueira C, Gestal-Otero JJ. A cohort study of stress and the common cold. *Epidemiology*. 2001;12(3):345–349. https://doi.org/10.1097/00001648-200105000-00015
105. Cohen S. Keynote presentation at the eight international congress of behavioral medicine: the Pittsburgh common cold studies: psychosocial predictors of susceptibility to respiratory infectious illness. *Int J Behav Med*. 2005;12(3):123–131. https://doi.org/10.1207/s15327558ijbm1203_1
106. Pedersen A, Zachariae R, Bovbjerg DH. Influence of psychological stress on upper respiratory infection–a meta-analysis of prospective studies. *Psychosom Med*. 2010;72(8):823–832. https://doi.org/10.1097/PSY.0b013e3181f1d003
107. Erlich JR, To EE, Liong S, et al. Targeting evolutionary conserved oxidative stress and immunometabolic pathways for the treatment of respiratory infectious diseases. *Antioxid Redox Signal*. 2020;32(13):993–1013. https://doi.org/10.1089/ars.2020.8028
108. Nieman DC, Henson DA, Austin MD, Sha W. Upper respiratory tract infection is reduced in physically fit and active adults. *Br J Sports Med*. 2011;45(12):987–992. https://doi.org/10.1136/bjsm.2010.077875
109. Ballarini S, Rossi GA, Principi N, Esposito S. Dysbiosis in pediatrics is associated with respiratory infections: is there a place for bacterial-derived products? *Microorganisms*. 2021;9(2):448. https://doi.org/10.3390/microorganisms9020448
110. Gasmi A, Shanaida M, Oleshchuk O, et al. Natural ingredients to improve immunity. *Pharmaceuticals*. 2023;16(4):528. https://doi.org/10.3390/ph16040528
111. Rondanelli M, Miccono A, Lamburghini S, et al. Self-care for common colds: the pivotal role of vitamin D, vitamin C, zinc, and *Echinacea* in three main immune interactive clusters (physical barriers, innate and adaptive immunity) involved during an episode of common colds-practical advice on dosages and on the time to take these nutrients/botanicals in order to prevent or treat common colds. *Evid Based Complement Alternat Med*. 2018;2018:5813095. https://doi.org/10.1155/2018/5813095

112. Ylä-Rautio H, Siissalo S, Leikola S. Drug-related problems and pharmacy interventions in non-prescription medication, with a focus on high-risk over-the-counter medications. *Int J Clin Pharm*. 2020;42(2):786–795. https://doi.org/10.1007/s11096-020-00984-8
113. Poe M. *Empowering Self-Care: A Handbook for Pharmacists.* The Hague: International Pharmaceutical Federation; 2022.
114. Ashiru-Oredope D, Doble A, Thornley T, et al. Improving management of respiratory tract infections in community pharmacies and promoting antimicrobial stewardship: a cluster randomised control trial with a self-report behavioural questionnaire and process evaluation. *Pharmacy*. 2020;8(1):44. https://doi.org/10.3390/pharmacy8010044
115. Bosse N, Machado M, Mistry A. Efficacy of an over-the-counter intervention follow-up program in community pharmacies. *J Am Pharm Assoc (2003)*. 2012;52(4):535–540. https://doi.org/10.1331/JAPhA.2012.10093
116. World Health Organization. WHO consolidated guideline on self-care interventions for health: sexual and reproductive health and rights 2019. https://iris.who.int/handle/10665/325480. Accessed March 8, 2025.
117. World Health Organization. WHO global report on traditional and complementary medicine 2019. https://iris.who.int/handle/10665/312342. Accessed February 11, 2025.
118. Burki T. WHA adopts new strategy on traditional medicine. *Lancet*. 2025;405(10493):1897–1898. https://doi.org/10.1016/S0140-6736(25)01142-0
119. Portella CFS, Ghelman R, Abdala CVM, Schveitzer MC. Evidence map on the contributions of traditional, complementary and integrative medicines for health care in times of COVID-19. *Integr Med Res*. 2020;9(3):100473. https://doi.org/10.1016/j.imr.2020.100473
120. National Institute for Health and Care Excellence. Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes. NICE guideline NG 5; 2015. https://www.nice.org.uk/guidance/ng5. Accessed January 8, 2025.
121. Islam MS, Sarkar T, Khan SH, et al. COVID-19-related infodemic and its impact on public health: a global social media analysis. *Am J Trop Med Hyg*. 2020;103(4):1621–1629. https://doi.org/10.4269/ajtmh.20-0812
122. Rademacher J, Therre M, Hinze CA, Buder F, Böhm M, Welte T. Association of respiratory infections and the impact of vaccinations on cardiovascular diseases. *Eur J Prev Cardiol*. 2024;31(7):877–888. https://doi.org/10.1093/eurjpc/zwae016
123. Nicolae M, Mihai CM, Chisnoiu T, et al. Immunomodulatory effects of Vitamin D in respiratory tract infections and COVID-19 in children. *Nutrients*. 2023;15(15):3430. https://doi.org/10.3390/nu15153430
124. Spinetti G, Mutoli M, Greco S, et al. Cardiovascular complications of diabetes: role of non-coding RNAs in the crosstalk between immune and cardiovascular systems. *Cardiovasc Diabetol*. 2023;22(1):122. https://doi.org/10.1186/s12933-023-01842-3