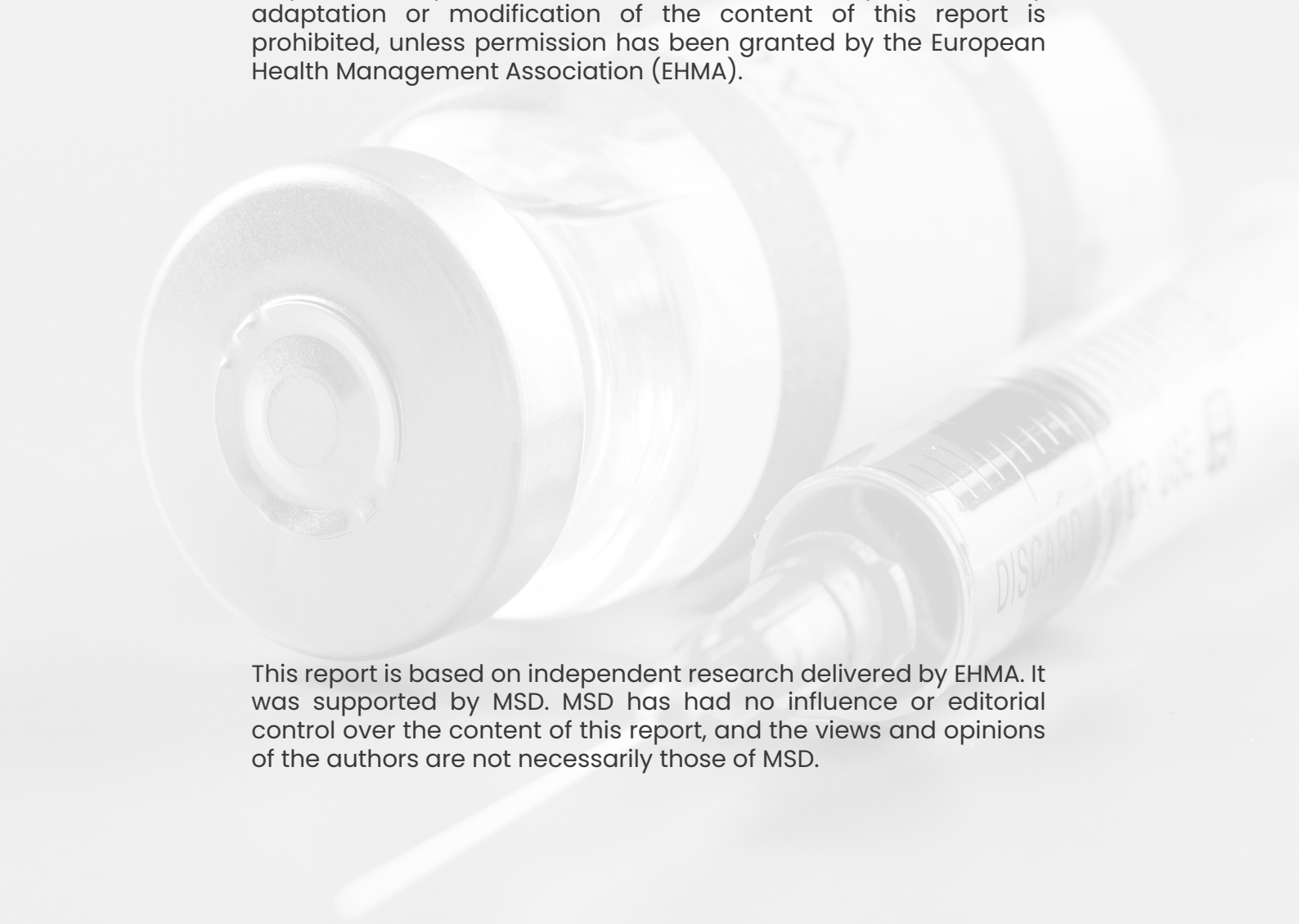
EHMA
European Health Management Association

Give our health systems some room to breathe:

The impact of invasive pneumococcal disease and pneumococcal pneumonia

Published by the European Health Management Association (EHMA) in October 2024.



This report is based on independent research delivered by EHMA. It was supported by MSD. MSD has had no influence or editorial control over the content of this report, and the views and opinions of the authors are not necessarily those of MSD.

TABLE OF CONTENTS

EHMA
European Health Management Association

EXECUTIVE SUMMARY

Globally, pneumococcal disease (PD) is a major cause of morbidity and mortality resulting. The most burdensome clinical syndromes of PD are known as invasive pneumococcal disease (including bacteremia and meningitis) and pneumococcal pneumonia. Annually, 1.07-1.2 in 1000 adults are estimated to be infected with pneumococcal pneumonia in Europe, increasing to 14 per 1000 in adults aged 65 years and older. Disease severity also increases with age: **75% of adults over 65 years of age with pneumonia infection end up in the hospital, and 12.7% die within 30 days of infection.**

PD creates a significant burden on health, but there are effective vaccines to combat the spread of *Streptococcus pneumoniae* bacteria, which is the primary cause of pneumococcal infections. Unfortunately, advances in pneumococcal vaccine technology have not always been matched by an evolution of National Immunization Plans to ensure adequate coverage for older and at-risk adult populations in Europe. Europe also lacks a centralized system of surveillance for PD in adults, leaving policymakers and health managers largely without evidence on which to build effective vaccination programmes. As it stands, a lack of cohesive and well-implemented life-course vaccination programmes for pneumococcal disease remains a missed opportunity in Europe.

Given the negative impacts of pneumococcal disease, its role in exacerbating seasonal respiratory illness outbreaks and the known effectiveness of vaccines, it is evident that there are still political, logistical and administrative barriers preventing comprehensive pneumococcal vaccination programmes from being implemented for adults across Europe. This EHMA report addresses these barriers by presenting an additional lens through which policymakers and health authorities can comprehend the threat of pneumococcal disease. Specifically, in this report EHMA sheds light on the specific pressures that invasive pneumococcal disease and pneumococcal pneumonia place on Europe's health workforce and health managers.

Following an in-depth survey of over 200 healthcare professionals and health managers working in hospitals and primary care settings in Austria, Belgium, France, Italy and Portugal, coupled with in-depth interviews with infectious disease experts, it is clear that invasive pneumococcal disease and pneumococcal pneumonia have a significant negative impact on health system functioning.

Pneumococcal disease increases the quantity and severity of respiratory illness cases, particularly during the peak seasons of influenza, RSV and COVID-19, and adds an additional burden of co-morbidity to patients with non-communicable diseases such as heart failure and cancer. This increased disease burden directly contributes to reduced capacity and efficiency in our health systems as resources are directed towards cases of illness caused or exacerbated by a pathogen that is largely vaccine preventable. All of these impacts naturally also increase the burden on our health workforce, which is already stretched to its limits.

Through this study, health managers and care providers offer a clear message: invasive pneumococcal disease and pneumococcal pneumonia represent a serious concern for the sustainability of our health systems and are ultimately a threat to optimal health outcomes for Europeans.

Faced with an aging population, stretched health system resources, an increasing health burden from non- communicable diseases, it is imperative that we take every available and reasonable action to improve the resilience of our health systems.

Strengthening pneumococcal vaccine programmes for adults across Europe is an opportunity to take an obvious, cost-effective win for health managers, our health workforce, our citizens and our health systems.

Policy Recommendations

1. **Promote European data-sharing and harmonized surveillance systems to monitor pneumococcal disease trends in adult populations, which will improve disease management and inform policy decisions at national and local levels.**

2. **Update national immunization plans to ensure that pneumococcal vaccination is made available to all at-risk and older adults.**

3. **Develop and disseminate awareness campaigns for older adults and the health workforce about the risks of pneumococcal pneumonia and invasive pneumococcal disease and the benefits of vaccination.**

4. **Widen the scope of existing vaccination services to remove barriers to vaccination for under-served populations.**

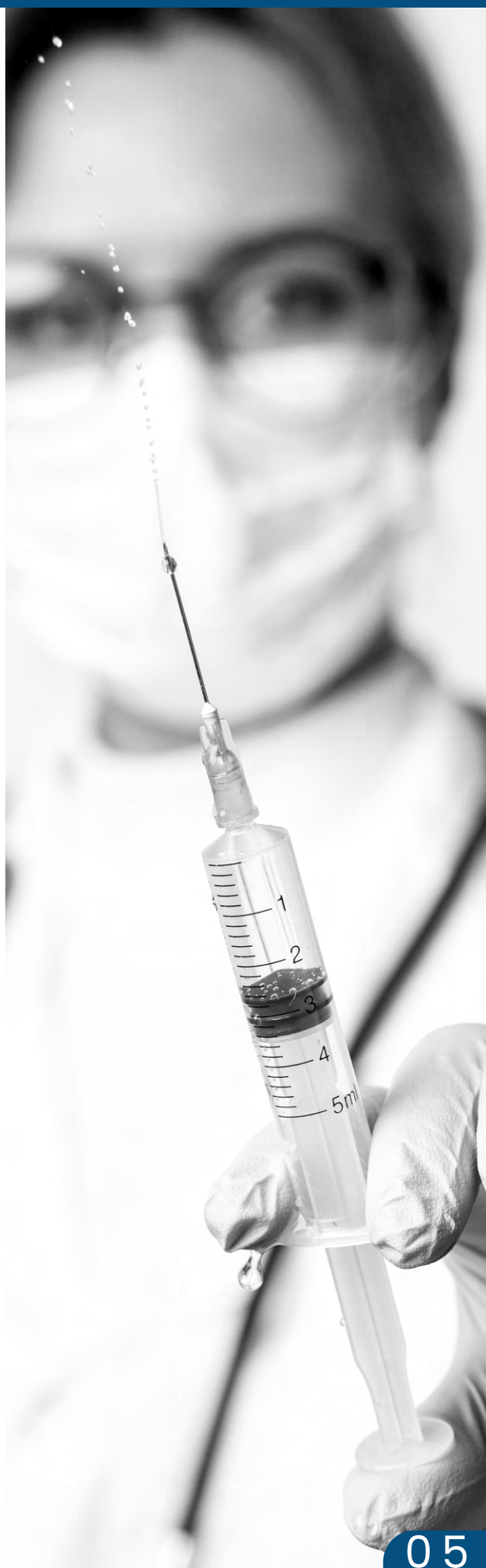
5. **Implement integrated seasonal preparedness plans that address concurrent outbreaks of pneumococcal disease, RSV, influenza, and COVID-19 to manage peaks in respiratory illnesses more effectively.**

6. **Implement integrated decision-making frameworks aimed at reducing the burden of respiratory illnesses on health systems by engaging primary care and hospital clinicians and health managers at all levels.**

Pneumococcal Disease

Pneumococcal disease (PD) includes a set of symptomatic infections caused most frequently by the bacteria *Streptococcus pneumoniae* (pneumococcus) and is a major cause of morbidity and mortality. The most severe manifestations of PD are collectively known as invasive pneumococcal disease (including pneumococcal meningitis and bacteremia), with the most frequent variation being pneumococcal pneumonia.(1) In adults, community-acquired pneumococcal pneumonia is the most common expression of pneumococcal disease and it is the leading cause of mortality from infectious disease for adults around the world. (2)

Though anyone can contract PD, adults with underlying health conditions (e.g. chronic cardiovascular, respiratory, kidney and liver diseases, cancer) and older populations are at the greatest risk, with increasing mortality linked to increasing age.(3,4) Annually, 1.07-1.2 in 1000 adults are estimated to be infected with pneumococcal pneumonia in Europe, increasing to 14 per 1000 in adults aged 65 years and older and 30.9 per 1000 for immunocompromised older adults.(5,6) This trend also translates directly to disease severity; 75% of adults over 65 years of age with pneumonia infection end up in the hospital, with an average length of stay of 10.4 days. 12.7% of older adults with pneumonia will also die within 30 days of infection.(6) Beyond its serious human health costs, community -acquired pneumonia also costs the European economy approximately €13 billion per year, with €4.75 billion of that related to productivity loss.(5)



Pneumococcal Vaccines

Despite the high social and economic burden created by pneumococcal disease, health systems have yet to maximize the value of vaccines to combat the spread of the *Streptococcus pneumoniae* bacteria. Pneumococcal conjugate vaccines (PCVs) and pneumococcal polysaccharide vaccines (PPVs) have successfully targeted many of the bacterium's most invasive serotypes, providing effective protection against pneumococcal pneumonia and invasive pneumococcal disease.(7) Most pneumococcal vaccination programmes in Europe began by targeting paediatric

populations, which not only reduced the incidence of pneumococcal disease in children but also reduced the circulation of pneumococcus at large, creating a residual reduction in infections among adults and older adults.(8) However, there remains a significant disparity between vaccination coverage rates between children and adults, with adult vaccination being neglected as a policy priority to the point that any data on coverage for adults exists in only 26% of European countries.(9)

Since the introduction of the first pneumococcal vaccine, the vaccine technology has continued to improve to cover additional relevant serotypes of the bacteria. Unfortunately, these advances have not always been matched by an evolution of National Immunization Programs to ensure adequate coverage for older and at-risk adult populations in Europe.(10) Among EU countries (plus Norway, Iceland, Switzerland and the United Kingdom), only 12 have recommendations from health or scientific authorities for vaccination of adults, and even fewer have seen these recommendations put into action alongside cost reimbursement schemes.(10) As it stands, a lack of cohesive and well-implemented life-course vaccination programmes for pneumococcal disease remains a missed opportunity for Europe, not least because it has been estimated that for every €1 invested in adult immunization programmes there is a 19-fold return through health system savings.(11) Vaccines have also been proven to be an effective tool in the fight against antimicrobial resistance (AMR), as they reduce the number of people accessing healthcare services with symptoms that may otherwise lead to the prescription of antibiotics.(12)

Looking across the Atlantic to the United States, studies show that only 5-15% of pneumonia cases were caused by pneumococcus,(13) and that this decline has been largely attributed to the introduction of widely accessible pneumococcal vaccination.(14) By contrast, pneumococcus remains the most frequent cause of community-acquired pneumonia in Europe, accounting for an estimated 49% of cases in adults aged 65 years and older.(6,15)

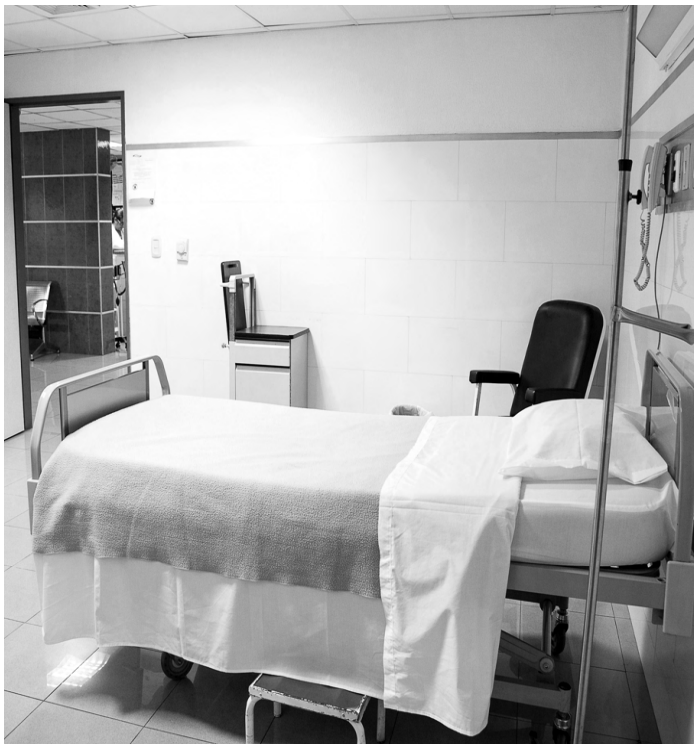
Seasonality

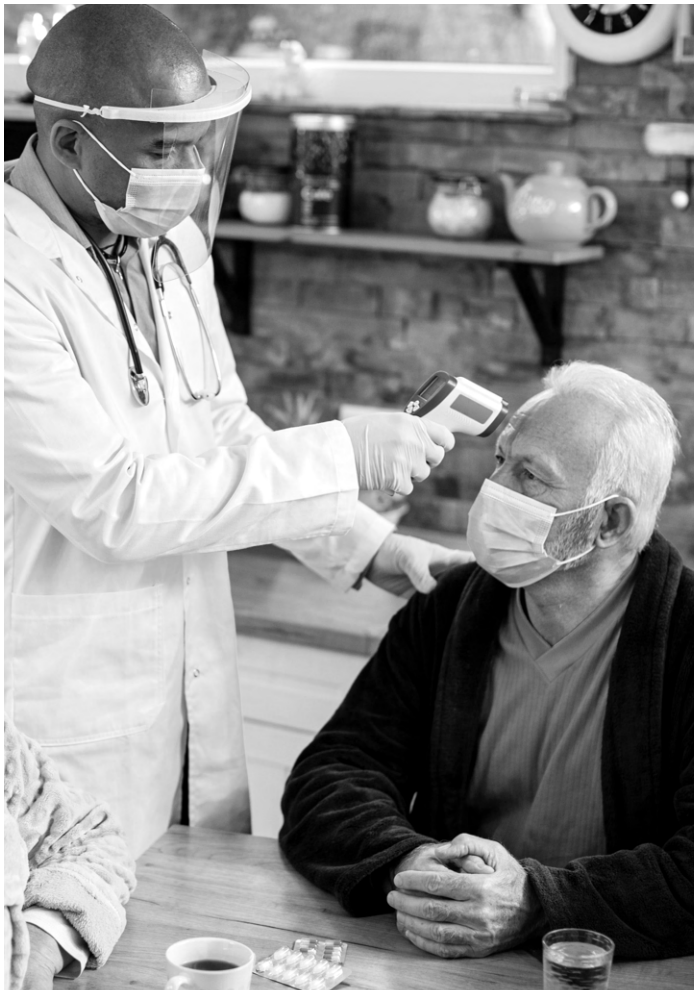
Pneumococcal disease can occur at any time, but it exhibits a seasonal pattern like many other infectious respiratory illnesses, with global case incidence increasing sharply each year during the winter season.(16) This seasonal pattern also often coincides with the seasonal peaks of influenza and RSV, increasing the number and complexity of respiratory illness cases presenting to health facilities and in many cases also leading to higher mortality due to concomitant infection.(17) The emergence of SARS -CoV-2 has added further urgency to the need to more rapidly advance our vaccination programmes to reduce the seasonal impact of pneumococcal disease.

Evidence indicates that coinfection with COVID and *Streptococcus pneumoniae* results in substantially increased lethality, but combined vaccination against COVID and pneumococcus results in 100% protection against coinfection.(18) Given that pneumococcal vaccines can be effectively administered year-round, vaccination programmes can also efficiently deliver these vaccines without placing additional burden on vaccinators during peak periods of demand.

TIME TO TAKE ACTION AGAINST PNEUMOCOCCAL DISEASE

Given the well-documented negative impacts of pneumococcal disease, its role in exacerbating seasonal respiratory illness outbreaks and the known effectiveness of vaccines, it is evident that there are still political, logistical and administrative barriers preventing comprehensive pneumococcal vaccination programmes from being implemented across Europe.(19) This report by the European Health Management Association (EHMA) takes steps to address these barriers by presenting an additional lens through which policymakers and health authorities can comprehend the threat of pneumococcal disease. This report comes at a critical time for Europe's health systems, with major trends creating an imperative for health managers to act now to strengthen pneumococcal vaccination programmes, safeguard health system readiness, and protect the health of our citizens.





Europe's Aging Population

Older adults are particularly vulnerable to infections, especially pneumococcal disease. Moreover, the ongoing demographic shift towards an aging European population indicates that the burden of pneumococcal disease will continue to increase unless effective vaccination measures are implemented. In the WHO European Region, the population aged 60 and older is expanding very quickly, and is estimated to increase from 215 million in 2021 to 247 million by 2030 and over 300 million by 2050.(20)As a result, healthcare systems are seeing rising demand for hospital admissions, intensive care, and long-term management of complications related to respiratory illnesses.

Stronger pneumococcal vaccination programs targeted at this growing population group are essential to mitigating this demand and keeping our health systems sustainable. As Europe's population continues to age, robust vaccination strategies will become increasingly vital in preserving the capacity and efficiency of healthcare delivery.

The Fight Against Non-Communicable Diseases

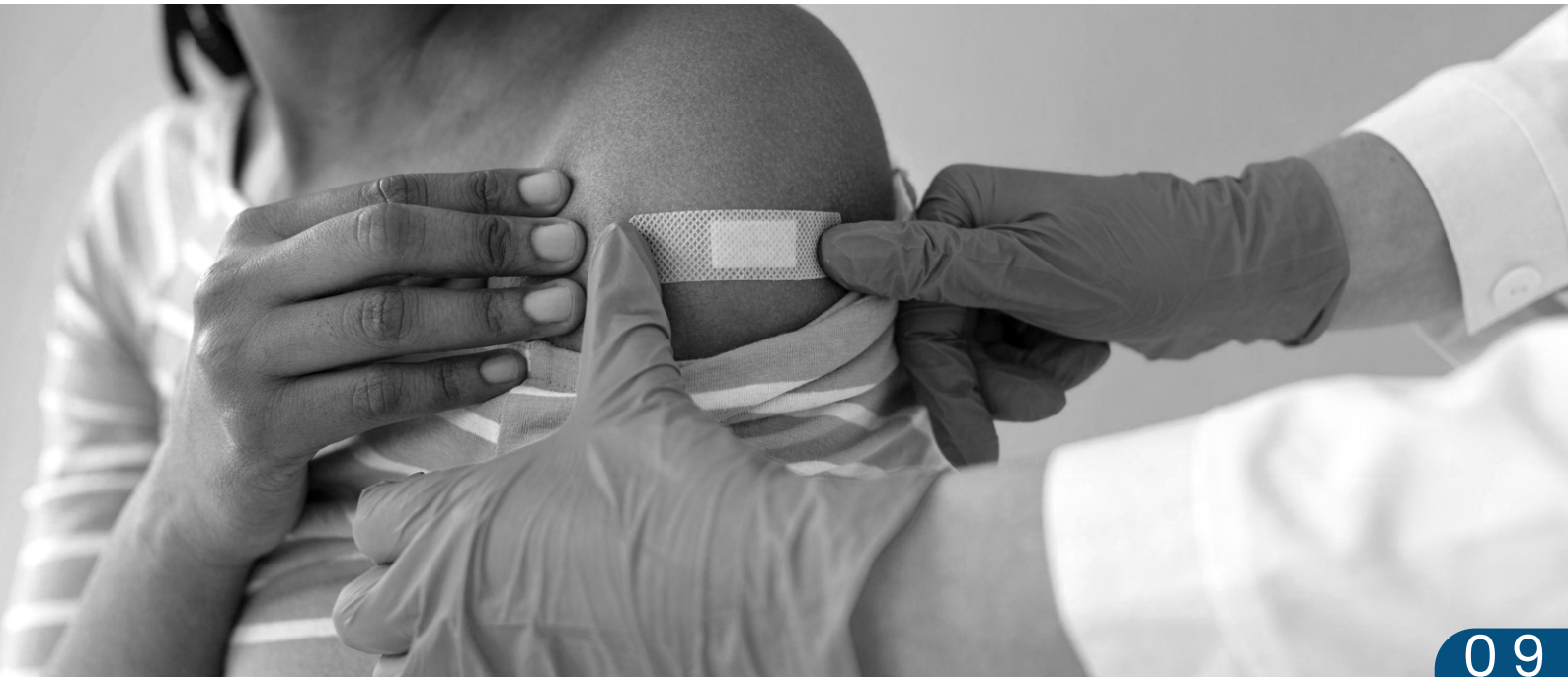
Strengthening pneumococcal vaccination programs is crucial not only for reducing the burden of infectious disease, but also for reducing the growing burden of non-communicable diseases (NCDs) such as cardiovascular disease and cancer. The circulation of pneumococcus exacerbates the strain these conditions place on health by adding co-morbidity and clinical complications which can lead to worsened health outcomes and longer hospitalizations.(21)

Ongoing European initiatives, such as Europe's Beating Cancer Plan and other action plans for tackling NCDs focus heavily on prevention, early detection, and improved patient outcomes. However, to truly succeed, these programs must integrate robust immunization strategies including coverage rate targets to ensure adequate protection of the population, as a critical preventive measure.
By reducing vaccine-preventable infections, healthcare systems can alleviate the exacerbating effect that pneumococcal disease has on the existing burden of NCDs, supporting the implementation of these EU-level initiatives and reducing healthcare costs associated with managing complex multi-morbidities.

A Complex Surveillance Landscape

The surveillance landscape for pneumococcal disease in Europe is highly fragmented and lacks the cohesion necessary for effective, continent -wide responses to the rising burden PD places on health systems. There are significant differences in disease prevalence and the distribution of pneumococcal serotypes across various populations and geographical regions, and there are currently no harmonized standards for data collection or surveillance.(22) The absence of a standardized, centralized surveillance system through the ECDC makes it difficult for health managers and policymakers to assess the impact of vaccination programs and to monitor the AMR profile for different serotypes.(23) As it stands, existing systems lead to inconsistent reporting, underestimation of disease impact, and limited cross-border comparisons.

This complexity not only hampers efforts to track disease trends but also complicates the development of targeted interventions, such as the development of future vaccines to cover emerging serotypes. Without urgent action to establish more integrated and standardized surveillance systems, the ability to respond effectively to the epidemiological landscape of pneumococcal disease will remain compromised, further straining already overstretched health systems across the EU.



OUR OBJECTIVES

In this report EHMA aims to shed light on the specific pressures that invasive pneumococcal disease and pneumococcal pneumonia place on our health workforce and the health managers that work alongside them. By building a deeper understanding of how pneumococcal disease affects the people working most directly to fight it, we add another layer to our existing knowledge of the health system burden of pneumococcal disease, providing additional insight into the most pressing areas for policy change and additional motivation towards making those changes a reality.

This report has two primary objectives:

1. To gather and present evidence directly from healthcare workers and health managers in Europe on the perceived impact of pneumococcal pneumonia and invasive pneumococcal disease on various aspects of their daily work.

2. To use the insights and evidence gathered through this work to develop relevant, actionable policy recommendations that aim to reduce the negative impacts of pneumococcal disease on the well-being of Europe's citizens and health systems.

METHODOLOGY

The methodology for this study consisted primarily of a targeted survey to specific groups of healthcare professionals and health managers, notably those working in hospital wards, emergency care, and primary care settings.

The survey was conducted across five different European countries: Austria, Belgium, France, Italy and Portugal.

The survey was designed on the foundation of a rapid literature review which established a baseline for gaps in the existing data on the health system impacts of pneumococcal disease and validated through feedback from experts with extensive health system experience in each study country. Survey data was analysed, and final results further validated through additional expert feedback and short interviews with volunteering respondents.

Country Selection

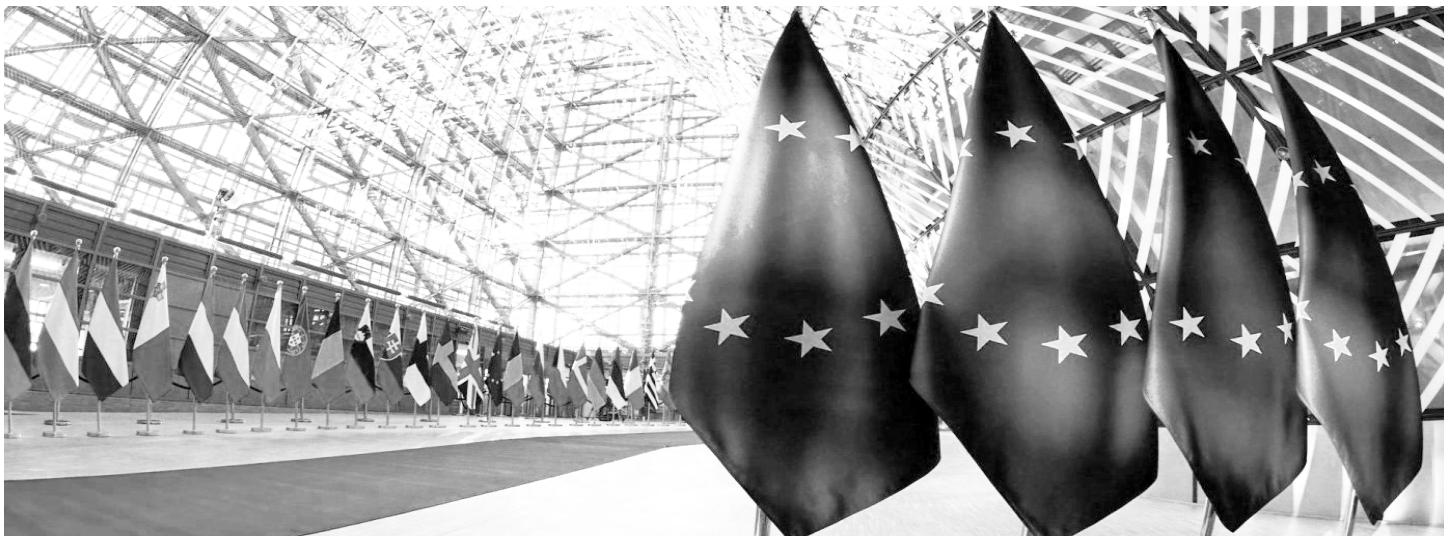
Five countries—Austria, Belgium, France, Italy and Portugal—were chosen for this study to provide a diverse yet comparable representation of healthcare systems within the wider European Union, enabling a comprehensive analysis of the burden of pneumococcal disease across different settings while ensuring that the findings are relevant to policymakers in other countries and at the European level.

All five countries operate advanced, publicly funded healthcare systems that emphasize universal coverage, accessibility, and comprehensive service delivery. They also have well-established vaccination programs and public health infrastructures capable of managing communicable diseases, including pneumococcal disease. These shared characteristics make it possible to draw meaningful comparisons across the countries, as they all strive to achieve high levels of healthcare access and quality, despite varying operational approaches. In addition, all five countries are participants in the European Centre for Disease Prevention and Control (ECDC) network, ensuring that they follow similar surveillance standards for vaccine-preventable diseases such as invasive pneumococcal disease and pneumococcal pneumonia.

Despite these overarching similarities, the countries exhibit sufficient differences to allow for a meaningful comparative analysis, including differences in pneumococcal vaccine recommendations, coverage, and reimbursement.(24)

The established means of access to vaccinations for adults in each country also provide several points of difference, with responsibilities for vaccination being spread across different combinations of general practitioners, pharmacists, nurses, and specialized vaccination centres in each country, alongside varying degrees of health system de-centralization.(25) Existing geographical and cultural differences between the countries may also create different expectations and lived experiences for the health workforce, leading to different perceptions of the impact of pneumococcal disease.

Explore the Pneumococcal Vaccination Atlas for the full picture of pneumococcal vaccine recommendations, coverage and reimbursement in Europe.



Rapid Literature Review

A rapid literature review was conducted to establish a baseline understanding of the current knowledge and gaps in the data regarding the health system burden of pneumococcal pneumonia and invasive pneumococcal disease (IPD). The review focused on relevant scientific articles, white papers, and policy reports covering both global and European contexts. This process identified existing evidence and previously completed research, allowing for a gap in information regarding health provider perceptions to be identified and targeted by this study. Country-specific health system data was collected and analysed to inform the development of survey questions and the relevant professional profiles to be targeted with survey dissemination.

Online Survey

Primary data collection for this report was done through a 35-question survey, which was developed and hosted online through the Qualtrics platform from May to September 2024.

Based on the findings of the literature review, the survey was divided into sections targeted towards specific professional profiles working within three distinct care settings: hospital wards (including ICUs and long-term care facilities), emergency care settings (including emergency departments and urgent care clinics), and primary care settings (including single and multiple -physician community clinics).

All respondents were asked an initial series of demographic questions to establish their professional specialty, years of working experience, their geographic location, and finally the care setting in which they practice. Respondents were then directed to one of three separate sets of context-specific questions based on their stated care setting of practice.

These sets of context-specific questions presented examples of potential contributory factors and impacts of healthcare system disruption related to invasive pneumococcal disease and pneumococcal pneumonia. For each example, respondents were asked to indicate their level of agreement with each listed example as a cause of healthcare system disruption, as it relates to their care setting and experience over the past three years (2022, 2023, 2024). Respondents answered using a sliding scale, which collected a score between 1 and 6 associated with the phrase 'Pneumococcal pneumonia and invasive pneumococcal disease causes health system disruption in X fashion' with X representing each different potential contributory factor (1 = Disagree completely, 2 = Strongly disagree, 3 = Somewhat disagree, 4 = Somewhat agree, 5 = Strongly agree, 6 = Agree completely).

Interviews and Iterative Expert Validation

To enhance the accuracy and relevance of the survey results, the final dataset was validated through consultations with infectious disease experts with extensive health system experience from each study country. These same experts gave input on the survey design and provided input on country-specific health system dynamics to create a process of iterative co-creation.
Their expertise helped ensure that the survey design adequately addressed the complexities of managing pneumococcal disease within diverse European healthcare contexts, and that the resulting data were robust enough to support meaningful policy recommendations.

This process was further supported by 11 in-depth unstructured interviews with survey respondents who volunteered to provide additional thoughts and context to support their initial survey responses. The data collected through these interviews, combined with the interventions of the designated country experts, gives additional legitimacy to the final results through triangulation.

RESULTS

With the exception of the data outlining the sample demographics, the results of this research are presented below in tables showing the original questions, with a score for each country representing the average level of response.

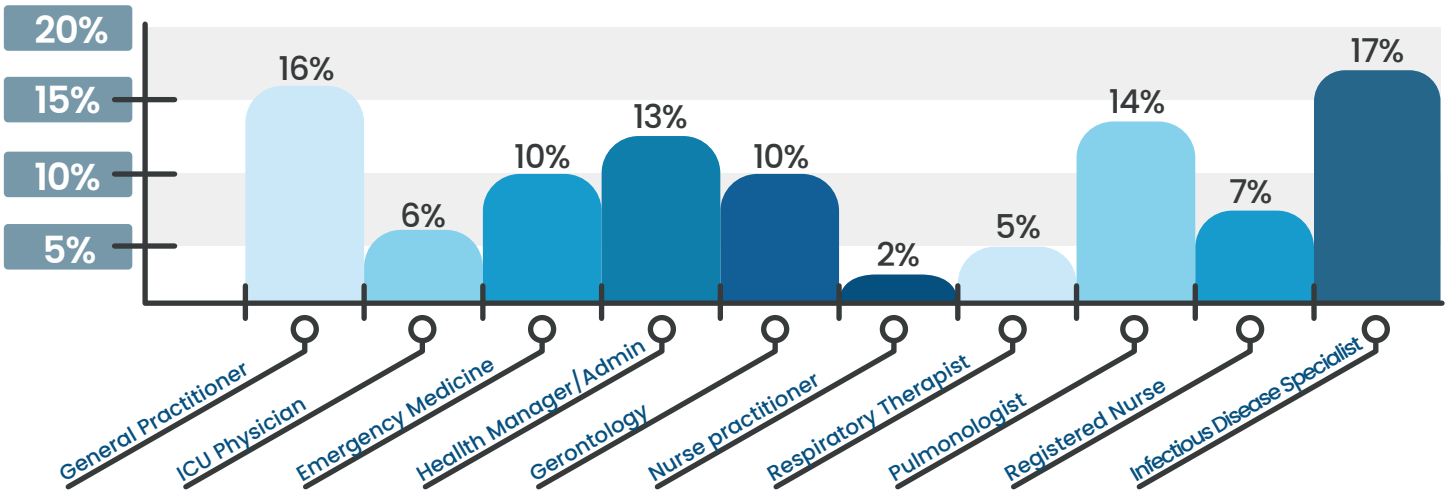
All reported scores should be considered based on the answer scale (>3.5 means more respondents agree than disagree, <3.5 means more respondents disagree than agree):

1 = Disagree completely
2 = Strongly disagree
3 = Somewhat disagree
4 = Somewhat agree
5 = Strongly agree
6 = Agree completely.

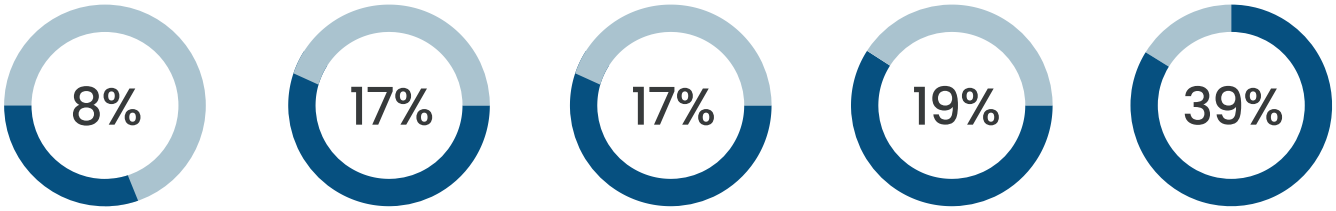
SAMPLE

Number of Respondents = 210

Respondents' Professional Specialty

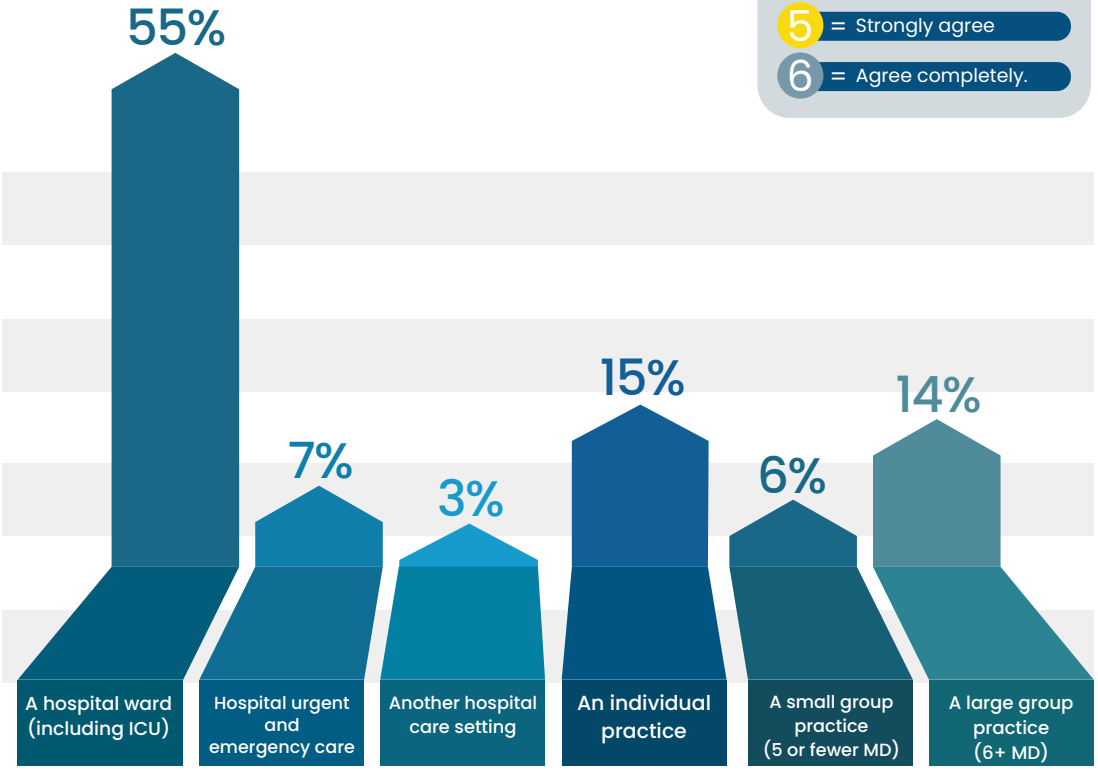


Respondents' Practicing Experience (post-internship)

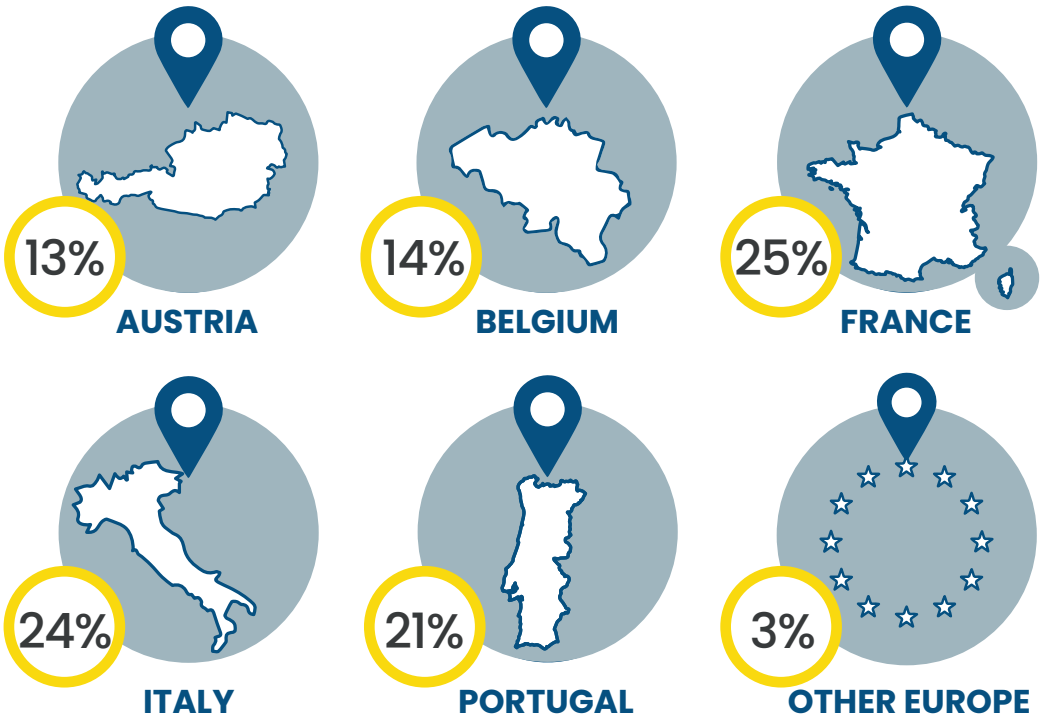


Respondents' Setting of Practice

1 = Disagree completely
2 = Strongly disagree
3 = Somewhat disagree
4 = Somewhat agree
5 = Strongly agree
6 = Agree completely.



Respondents' Country of Practice



1 = Disagree completely
2 = Strongly disagree
3 = Somewhat disagree
4 = Somewhat agree
5 = Strongly agree
6 = Agree completely.

Results from Hospital Wards

Invasive pneumococcal disease and pneumococcal pneumonia causes health system disruption due to:

	AT	BE	FR	IT	PT
An increase in general admissions for respiratory illness	4.1	4.5	4.6	4.4	4.3
Equipment shortages	2	3.1	2.8	3.2	3.2
An increase in ICU admissions for severe respiratory illness	4.2	4.6	4.9	4.3	4.5
An increase in the acuity and complexity of patients requiring ICU care	4.1	4.6	5	4.5	4.7
Inadequate number of bedside nurses to cover patient care workload	3.3	3.5	3.5	3.7	3.4
Burden on laboratory testing facilities	2.9	3.4	3.5	3.8	3.8

Invasive pneumococcal disease and pneumococcal pneumonia causes health system disruption because it:

	AT	BE	FR	IT	PT
Reduces bed capacity in the general ward	5.1	5.6	5.4	5.6	5.5
Reduces critical care bed capacity	4.9	5.1	5.3	5.3	5
Delays discharges	4.2	4.1	4.3	4.6	4.5
Disrupts patient flow	4.1	4.2	4.5	4.2	4.6
Contributes to excessive and inefficient use of resources in the health care system	5.2	5.4	5.6	5.4	5.7

1 = Disagree completely
2 = Strongly disagree
3 = Somewhat disagree
4 = Somewhat agree
5 = Strongly agree
6 = Agree completely.

Results from Emergency Medicine

Invasive pneumococcal disease and pneumococcal pneumonia causes health system disruption due to:

	AT	BE	FR	IT	PT
Higher emergency attendances for respiratory illness from urgent GP referrals	4.4	4.2	4.5	4.1	4.1
Higher emergency attendances for respiratory illness from self-referrals	5.1	5.5	5.6	5.4	5.5
Increased emergency admissions for respiratory illness	3.6	4.1	4	3.9	3.8

Invasive pneumococcal disease and pneumococcal pneumonia causes health system disruption because it:

	AT	BE	FR	IT	PT
Delays patient handovers from ambulance to hospital	3.6	3.9	4.1	3.8	3.9
Increases waiting time in the urgent and emergency care department	4.8	5.2	5.4	5.1	5.2
Delays first clinical assessment of patients	4.6	5.1	5.4	5	5.1
Delays referrals between urgent/emergency care and specialty teams	4.5	4.9	5.1	4.8	4.9
Compels the use of unsafe physical space (corridors) for care and treatment	2.4	2.9	3.1	3.2	2.9

1 = Disagree completely
2 = Strongly disagree
3 = Somewhat disagree
4 = Somewhat agree
5 = Strongly agree
6 = Agree completely.

Results from Primary Care Settings

Invasive pneumococcal disease and pneumococcal pneumonia causes health system disruption due to:

	AT	BE	FR	IT	PT
An overall increase in office visits	4.7	5.1	5.5	5.3	5.6
A seasonal increase in consultations for resp. infection	5.1	5.5	5.7	5.6	5.5
An increase in referrals to urgent and emergency care departments	4.9	5.1	5.3	5.2	5.1

Invasive pneumococcal disease and pneumococcal pneumonia causes health system disruption because it:

	AT	BE	FR	IT	PT
Increases waits in outpatient clinics	4.9	5.2	5.4	5.5	5.4
Increases work hours for physicians	4.2	4.6	4.7	4.4	4.5
Increases waiting time for specialist treatments and referrals	3.9	4.1	4.3	4	4.1
Delays non-urgent treatment	3.8	4.2	4.4	4.6	4.8

1 = Disagree completely
2 = Strongly disagree
3 = Somewhat disagree
4 = Somewhat agree
5 = Strongly agree
6 = Agree completely.

Results on Health System Performance: All care settings

Staff Performance – Invasive pneumococcal disease and pneumococcal pneumonia causes health system disruption because it:

	AT	BE	FR	IT	PT
Negatively impacts workplace environment	3.9	4.6	4.5	4.8	4.6
Increases staff sickness absences	3.1	3.4	3.3	3.6	3.6
Increases workload for health providers	4.7	5.2	5.3	5.5	5.1
Increases levels of stress and exhaustion in health providers	4.5	5.1	5.3	5.3	5

Patient Safety – Invasive pneumococcal disease and pneumococcal pneumonia causes health system disruption because it:

	AT	BE	FR	IT	PT
Puts patients at higher risk of hospital-acquired infection	4.1	4.5	4.6	4.8	4.9
Diminishes patient experience	3.8	4.1	4.3	4.1	4.5

THE CHALLENGES ARE CLEAR

These findings provide clarity on several levels about the significant impact that pneumococcal pneumonia and invasive pneumococcal disease (IPD) have on European healthcare systems, with implications for patient care, system efficiency, and workforce wellbeing.

Three key themes highlighted by the data underscore the need for targeted interventions and investment in improved surveillance to allow health systems to manage PD more effectively and sustainably:

- An increase in the quantity and severity of respiratory illness cases
- A reduction in the capacity and efficiency of healthcare systems
- An increased burden on healthcare workers

Pneumococcal Disease Increases the Quantity and Severity of Respiratory Illness Cases

The experiences reported by respondents show that pneumococcal pneumonia and IPD contribute to a substantial rise in both the number and severity of respiratory illness cases presenting to hospitals and primary care settings. Care providers in hospitals perceive pneumococcus to cause a noticeable rise in emergency department self-referrals, general and ICU admissions, and an increase in the acuity and complexity of patients requiring ICU care. Patients with pneumococcal disease frequently present with severe symptoms, including shortness of breath requiring mechanical ventilation in the most extreme cases, and case severity is much likely to be higher among older and at-risk populations who could otherwise be protected by vaccination. The increases in demand and case complexity caused by pneumococcus negatively impact patient outcomes, lead to longer hospital stays and higher mortality rates, and create additional strain on healthcare systems.

The additional strain pneumococcal disease places on health systems is further exacerbated by the simultaneous circulation of other respiratory pathogens such as RSV, influenza, and SARS-CoV-2, and by existing chronic NCDs contributing to multiple co-morbidities within the population.

As a result, care providers in primary care settings also noted a marked increase in overall office visits and an increase in referrals to urgent and emergency care departments as a direct result of pneumococcal disease.

This type of widespread increase in primary care attendance, especially during busier seasonal periods, is not only a major barrier to efficient health service delivery but also poses a major risk for an overprescription of antibiotics that contributes to the eventual growth of AMR pathogens.

Pneumococcal Disease Reduces the Capacity, Efficiency and Sustainability of Health Systems

Across primary and hospital care settings, pneumococcal disease creates significant challenges to the effective and efficient delivery of healthcare services. Respondents reported how pneumococcal disease significantly reduces bed capacity in hospitals, as patients with pneumococcal pneumonia and invasive pneumococcal disease often require extended hospital stays, causing beds to be occupied for longer periods and limiting the availability of space for other patients in need of acute care.

This strain is particularly evident in ICUs, where the demand for specialized respiratory support rises during peak seasons of respiratory illness. The reduction in available beds not only hampers the system's ability to handle regular patient inflow but also leaves healthcare services vulnerable to being overwhelmed during periods of heightened disease transmission. As a secondary consequence, this lack of capacity leads to delays in admissions and treatment, increasing wait times for patients and forcing health managers and clinical leaders to make difficult decisions about prioritizing care.

In addition to bed shortages in hospitals, pneumococcal disease contributes to an excessive and inefficient use of resources across entire health systems. Increased demand for services, especially during peak periods, forces delays to initial clinical assessments and prolonging waiting times in all settings, creating a cascade of inefficiency that extends to primary care referral systems, where delays in transferring patients between different levels of care slows down the overall treatment process and negatively impacts patient outcomes.

The widespread inefficiencies caused by pneumococcal disease drain health system resources such as staff time, diagnostic tools, treatment options—that could be used more effectively elsewhere in the healthcare system. Over time, these cumulative pressures increase the costs of delivering care and reduce the sustainability of health systems.
Investment in effective and cost-efficient pneumococcal vaccination programmes is a clear solution to mitigating these challenges and allowing vital resources to be directed towards other critical areas of care.

Pneumococcal Disease Increases the Burden on the Health Workforce

At a time where our health workforce is already under a significant and growing burden of demand for healthcare services, this report shows that vaccine-preventable pneumococcal disease is contributing to even more stress and exhaustion for care workers. As the prevalence of pneumococcal cases rises, particularly during the winter months when other respiratory illnesses are prevalent, healthcare workers are required to perform more tasks within the same time constraints, from conducting initial assessments to managing complex, multi-comorbid cases. This often leaves them to feel the need to work extended hours so that they can address the critical needs of all their patients. This increase in work hours intensifies levels of stress and exhaustion, contributing to negative workplace environments where staff feel overwhelmed and unsupported.

The human cost of this overwork is significant for individual providers as well, as it contributes to both physical and mental health challenges. Over time, these conditions contribute to decreased job satisfaction and increase the likelihood of burnout, making it more difficult for health systems to retain experienced professionals. Moreover, as stress levels rise, the likelihood of clinical errors and reduced quality of care increases, further endangering patient safety and outcomes. From a health management perspective, pneumococcal disease contributes to a vicious cycle: staff turnover increases as more workers leave the profession due to burnout, placing even more pressure on the remaining workforce and destabilizing the system's long-term sustainability.

Every reasonable step needs to be taken to strengthen our prevention systems and address avoidable challenges like pneumococcal disease, which erodes workforce resilience and threatens the ability of health systems to provide high-quality care.

TAKING ACTION: POLICY RECOMMENDATIONS

These findings have critical implications for health managers and policymakers at both the national and EU levels. The rising quantity and severity of pneumococcal-related illnesses place a spotlight on the need for enhanced vaccination efforts, better resource allocation, and integrated health system responses to manage surges in respiratory illnesses effectively. Additionally, the strain on healthcare capacity and efficiency calls for investments in infrastructure and emergency preparedness, ensuring that hospitals can adapt quickly to changing demands without compromising other essential services.

Finally, addressing the increased burden on healthcare workers is paramount. Investing in workforce support through staffing adjustments, training, and mental health services can mitigate the negative effects of high patient acuity and improve the overall resilience of healthcare systems. Ultimately, ensuring the well-being of healthcare workers will translate into better patient outcomes, as a well-supported workforce is better equipped to provide high-quality, responsive care.

1) Promote European data-sharing and harmonized surveillance systems to monitor pneumococcal disease trends in adult populations, which will improve disease management and inform policy decisions at national and local levels.

Surveillance systems are critical for monitoring the coverage, impact and effectiveness of vaccination, as well as understanding pneumococcal disease epidemiology to guide future vaccination policies and programmes. These data may also help to inform national decision making for local vaccination policy in countries without established programmes. At present, surveillance for IPD is very heterogeneous and many countries lack surveillance systems to determine accurate, up-to-date national estimates of pneumococcal disease burden and have limited data on serotype distribution. Strengthening and harmonizing EU-wide surveillance systems for pneumococcal disease in adults through the ECDC is key to enabling better coordination between member states, allowing them to evaluate epidemiological trends and allocate resources accordingly. A centrally standardized system would also provide guidance for national and regional health authorities on how to improve their monitoring and data collection systems. Improved access to reliable, quality information on pneumococcal disease will help policymakers and health managers identify regions with lower vaccination coverage or higher disease burdens, enabling targeted interventions to improve vaccination uptake and reduce the overall impact on health systems.

2) Update national immunization plans to ensure that pneumococcal vaccination is made available to all at-risk and older adults.

Vaccination is the most effective way to prevent pneumococcal disease, yet vaccination coverage remains suboptimal in many countries in Europe and there is a broad diversity of recommendations that do not always reflect good public health practice. By strengthening national immunization programs to reflect the latest evidence on vaccine effectiveness and expanding reimbursement eligibility to include more age groups or populations at risk, healthcare systems can improve prevention outcomes based on population-specific needs.

Ultimately, a more inclusive pneumococcal vaccination strategy that treats vaccines as the cost-effective investment that they are will lead to fewer cases of severe disease, alleviating the pressure on healthcare systems, improving patient outcomes, and reducing long-term healthcare costs.

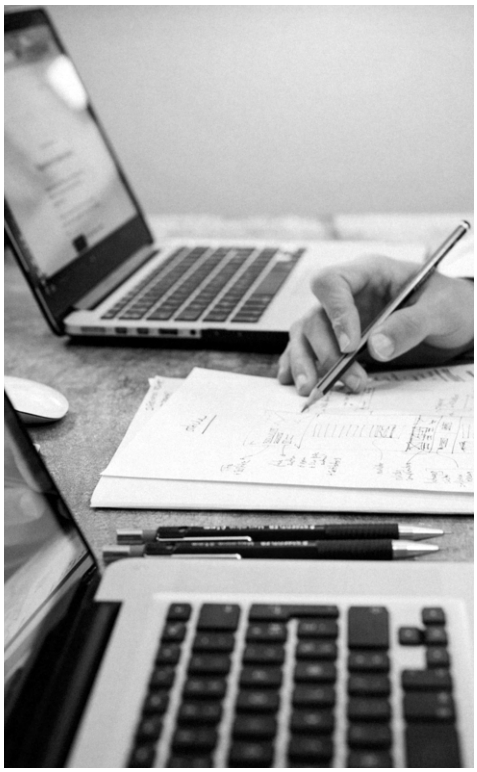
3) Develop and disseminate awareness campaigns for older adults and the health workforce about the risks of pneumococcal pneumonia and invasive pneumococcal disease and the benefits of vaccination.

Public awareness about pneumococcal disease remains low compared to other vaccine-preventable illnesses like influenza and COVID-19.

Developing and disseminating educational campaigns that highlight the risks associated with pneumococcal infections, especially for vulnerable groups, can drive higher vaccine uptake and reduce the overall burden of disease. Driven by targeted informational materials for older adults and specific training programmes for the healthcare providers delivering vaccinations, these campaigns should be standardized across both the EU and national levels to ensure consistent messaging, while also being adaptable enough to address the specific needs and concerns of local populations.

4) Widen the scope of existing vaccination services to remove barriers to vaccination for under-served populations.

Immunizing certain populations, including older adults living in community settings and younger individuals with high-risk comorbidities, can be difficult due to barriers like limited interaction with formal health systems, mobility issues, and vaccine hesitancy. To overcome these challenges, local health authorities should implement solutions such as mobile vaccination units, home-based immunization services, and partnerships with community organizations to increase vaccine availability and uptake. Efforts should also be made to expand vaccination capacity to trusted care providers in the community, such as pharmacists. These cost-effective modifications to existing services can improve access to vaccination for older and at-risk adults and also allow wider vaccination programs to remain flexible to help improve vaccination rates for all disease groups among those who are often underserved by traditional healthcare settings.



5) Implement integrated seasonal preparedness plans that address concurrent outbreaks of pneumococcal disease, RSV, influenza, and COVID-19 to manage peaks in respiratory illnesses more effectively.

Seasonal peaks in respiratory infections place tremendous strain on healthcare systems, particularly in winter months when resources are already stretched. Coordinating responses to multiple respiratory illnesses through integrated preparedness strategies—including resource allocation, bed management, and preventive care such as vaccination—can help systems handle surges in demand more efficiently.

Pneumococcal vaccination can be administered year-round and as such can easily be incorporated into these plans in a way that does not increase the burden on vaccinators during periods of high demand.

6) Implement integrated decision-making frameworks aimed at reducing the burden of respiratory illnesses on health systems by engaging primary care and hospital clinicians and health managers at all levels.

By fostering collaboration between primary care and hospital settings, healthcare systems can ensure more comprehensive coverage and protection for high-risk patients, as well as avoid a duplication of efforts with regards to prevention and vaccine outreach. Professionals working in primary and hospital settings need consistent opportunities to establish clear responsibilities, structured communication channels and increased trust to unlock more efficient methods of care delivery, such as coordinated care pathways between primary care settings (including public health outpatient clinics) and hospitals to ensure timely referrals and smoother transitions for patients with pneumococcal disease and other respiratory illnesses.

Given their central role in delivering vaccination, it is especially important that primary care providers are given a mechanism for providing input into strategic health system decisions on disease prevention.

REFERENCES

1. Drijkoningen JJC, Rohde GGU. Pneumococcal infection in adults: burden of disease. Clin Microbiol Infect Off Publ Eur Soc Clin Microbiol Infect Dis. 2014 May;20 Suppl 5:45–51.

2. CDC. Pneumococcal Disease. 2024 [cited 2024 Sep 19]. About Pneumococcal Disease. Available from: https://www.cdc.gov/pneumococcal/about/index.html

3. Chalmers JD, Campling J, Dicker A, Woodhead M, Madhava H. A systematic review of the burden of vaccine preventable pneumococcal disease in UK adults. BMC Pulm Med. 2016 May 11;16(1):77.

4. Torres A, Cillóniz C, Blasi F, Chalmers JD, Gaillat J, Dartois N, et al. Burden of pneumococcal community-acquired pneumonia in adults across Europe: A literature review. Respir Med. 2018 Apr 1;137:6–13.

5. Welte T, Torres A, Nathwani D. Clinical and economic burden of community-acquired pneumonia among adults in Europe. Thorax. 2012 Jan;67(1):71–9.

6. Vila-Corcoles A, Ochoa-Gondar O, Rodriguez-Blanco T, Raga-Luria X, Gomez-Bertomeu F. Epidemiology of community-acquired pneumonia in older adults: A population-based study. Respir Med. 2009 Feb 1;103(2):309–16.

7. Ceyhan M, Dagan R, Sayiner A, Chernyshova L, Dinleyici EÇ, Hryniewicz W, et al. Surveillance of pneumococcal diseases in Central and Eastern Europe. Hum Vaccines Immunother. 2016 Apr 20;12(8):2124–34.

8. Izurieta P, Bahety P, Adegbola R, Clarke C, Hoet B. Public health impact of pneumococcal conjugate vaccine infant immunization programs: assessment of invasive pneumococcal disease burden and serotype distribution. Expert Rev Vaccines. 2018 Jun;17(6):479–93.

9. European Pneumococcal Vaccination Atlas: A Progress Report [Internet]. International Longevity Centre UK; 2023. Available from: https://ilcuk.org.uk/european-pneumococcal-vaccination-a-progress-report/

10. Arya S, Norton N, Kaushik P, Brandtmüller A, Tsoumani E. Recent changes to adult national immunization programs for pneumococcal vaccination in Europe and how they impact coverage: A systematic review of published and grey literature. Hum Vaccines Immunother. 19(3):2279394.

11. OHE - Leading intellectual authority on global health economics [Internet]. 2024 [cited 2024 Oct 7]. Socio-Economic Value of Adult Immunisation Programmes - OHE. Available from: https://www.ohe.org/publications/the-socio-economic-value-of-adult-immunisation-programmes/

12. Hasso-Agopsowicz M, Sparrow E, Cameron AM, Sati H, Srikantiah P, Gottlieb S, et al. The role of vaccines in reducing antimicrobial resistance: A review of potential impact of vaccines on AMR and insights across 16 vaccines and pathogens. Vaccine. 2024 Jul 25;42(19, Supplement 1):S1–8.

13. Jain S, Self WH, Wunderink RG, Fakhran S, Balk R, Bramley AM, et al. Community-Acquired Pneumonia Requiring Hospitalization among U.S. Adults. N Engl J Med. 2015 Jul 30;373(5):415–27.

14. Moberley SA, Holden J, Tatham DP, Andrews RM. Vaccines for preventing pneumococcal infection in adults. Cochrane Database Syst Rev. 2008 Jan 23;(1):CD000422.

15. Rozenbaum MH, Pechlivanoglou P, van der Werf TS, Lo-Ten-Foe JR, Postma MJ, Hak E. The role of Streptococcus pneumoniae in community-acquired pneumonia among adults in Europe: a meta-analysis. Eur J Clin Microbiol Infect Dis Off Publ Eur Soc Clin Microbiol. 2013 Mar;32(3):305–16.

16. Dowell SF, Whitney CG, Wright C, Rose CE, Schuchat A. Seasonal Patterns of Invasive Pneumococcal Disease. Emerg Infect Dis. 2003 May;9(5):574–9.

17. Weinberger DM, Harboe ZB, Viboud C, Krause TG, Miller M, Mølbak K, et al. Pneumococcal disease seasonality: incidence, severity and the role of influenza activity. Eur Respir J. 2014 Mar 1;43(3):833–41.

18. Barman TK, Singh AK, Bonin JL, Nafiz TN, Salmon SL, Metzger DW. Lethal synergy between SARS-CoV-2 and Streptococcus pneumoniae in hACE2 mice and protective efficacy of vaccination. JCI Insight. 2022 Jun 8;7(11):e159422.

19. Pattyn J, Bonanni P, Group on behalf of the AIB working. Assessing the health burden of vaccine-preventable infections in European adults: challenges and opportunities translated into action. Eurosurveillance. 2023 Nov 30;28(48):2300791.

20. World Health Organization [Internet]. 2024 [cited 2024 Oct 7]. Ageing EURO. Available from: https://www.who.int/europe/health-topics/ageing

21. Fukuda H, Onizuka H, Nishimura N, Kiyohara K. Risk factors for pneumococcal disease in persons with chronic medical conditions: Results from the LIFE Study. Int J Infect Dis. 2022 Mar 1;116:216–22.

22. Hanquet G, Perrocheau A, Kissling E, Bruhl DL, Tarragó D, Stuart J, et al. Surveillance of invasive pneumococcal disease in 30 EU countries: Towards a European system? Vaccine. 2010;28(23):3920–8.

23. European Centre for Disease Control and Prevention [Internet]. 2024 [cited 2024 Oct 7]. Surveillance and updates for pneumococcal disease. Available from: https://www.ecdc.europa.eu/en/pneumococcal-disease/surveillance-and-disease-data

24. Pneumococcal Vaccination Atlas - Homepage [Internet]. [cited 2024 Sep 20]. Available from: https://pneumoniaatlas.org/

25. Gaillat J. Where are the keys to improve vaccine uptake in adults and elders in European countries? Aging Clin Exp Res. 2021 Apr 1;33(4):1123–31

EHMA
European Health Management Association

THANK YOU

WWW.EHMA.ORG