



## The Coalition for Life-course Immunisation:

### Powering protection for all by a collaborative approach to enhancing vaccine coverage

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#### Introduction

##### **Immunisation has proven cost-effectiveness yet remains undervalued.**

Immunisation is one of the most successful global public health interventions to date, and its potential is well documented.(1, 2) Smallpox was eradicated in 1980, 14 years after the World Health Organisation (WHO) launched the Intensified Eradication Programme in 1966.(3) Today, more than 100 million children worldwide are vaccinated annually against diseases such as diphtheria, tetanus, pertussis, tuberculosis, polio, measles and hepatitis B.(4)

Eradication of some infectious diseases is now viable. For example, a global public-private partnership has reduced the number of polio cases by 99%. The disease now only survives in pockets in Afghanistan, Nigeria and Pakistan.(5) As the WHO states, the elimination of certain infectious diseases such as measles and rubella is feasible, beneficial and cost-effective.(6)

##### **In Europe poor vaccine coverage has led to large outbreaks of infectious diseases with, mainly, adolescent and adult fatalities in countries that had previously eliminated or interrupted endemic transmission.**

Recent years have seen immunization programmes poorly prioritized in healthcare systems in the WHO European region resulting in discontinued or diminished resourcing.(1) The European region has growing doubt about the safety and efficacy of immunisation (the “vaccine hesitancy movement”) and, overall, the most negative sentiment to vaccine safety in the world.(7) This has resulted in some people refusing vaccines or not completing their vaccination schedule. The insufficient coverage that has resulted exposes large populations of unprotected people to infectious diseases and outbreaks of vaccine-preventable diseases.

Despite previous progress, Europe has moved further away from the 2020 measles eradication deadline as in 2019 four countries lost their measles elimination status: Albania, Czech Republic, Greece and the United Kingdom.(8) The surge in measles cases that began in 2018 has continued into 2019.(8) Traditionally seen as a childhood disease, recent outbreaks of measles are centralised in adolescent and adult population: In 2019, 1 433 measles cases were reported in 24 European Union (EU) countries in June alone, almost half occurring in people aged 20 or over.(9) This situation is not unique to measles, Europe is also seeing a resurgence of other vaccine-preventable diseases. In 2017, 42 242 cases of pertussis were reported in EU countries, with the majority of cases found in people aged 15 or over.(10) The situation is further exacerbated by a more mobile population,(11) for example, in 2017 50% of the 39 cases of diphtheria reported to the European Centre for Disease Control (ECDC) were imported.(12)

**National vaccination goals are not shared across countries and are not being delivered effectively; they are falling short of their potential. This is a growing concern as the European population becomes older and more mobile between countries of variable immunity profile.**

The proportion of older adults in the EU-28 is projected to increase from 19% at the start of 2016 to 29% by 2080, reflecting an additional 53.3 million elderly persons by 2080.(13) Ageing is associated with a decline in immune function and older adults are typically more susceptible to vaccine-preventable diseases such as influenza, pneumococcal disease and herpes zoster (shingles), usually resulting in a greater impact on health than in younger populations.(14) Migration and population mobility are also predicted to increase.(13) Our global networks mean that any individual or pathogen can travel across the globe within hours, as was reported recently with H5N1, H1N1 strains of the influenza virus and other emerging pathogens outbreaks.(15) Together these factors will contribute to a shift in the pattern of common and emerging infectious diseases.(16)

Improving vaccination coverage across the continuum of life is of critical public health and political importance.(17) This requires focused efforts to improve leadership, data collection methods, collaborative working within the population and resourcing.(17) This is achievable through communication tailored to different groups, evidence-based information and collaboration across all levels of society so that the relevant stakeholders cover those receiving vaccines, those administering vaccines and those responsible for policymaking. The Coalition for Life-course Immunisation is in a unique position to deliver this and propel a life-course approach to immunisation forward which will increase vaccination coverage at each stage on the continuum of life. CLCI will call for programmes focussing on different age groups, for example HPV vaccination for adolescents, or focussing on vulnerable segments of the population, such as herpes zoster for older adults or those with chronic conditions.

## Coalition for Life-course Immunisation

The Coalition for Life-course Immunisation (CLCI) is a European network of expert individuals and associations representing public health, academics and health professionals and the public via civil society groups such as patients', parents', and older persons' organisations.

These experts are committed to preventing infectious disease over the life-course by pro-actively highlighting the benefits of wide-scale immunisation to peers and to policymakers.

CLCI believes that vaccines are not just for children but are an important part of health management and well-being at all ages and stages of life.

The natural place for the Coalition is at the interface between policymakers, healthcare professionals and the public via patient organisations – listening to and interpreting that which is being said on all sides in order to transfer relevant information in a multi-stakeholder conversation and helping to promote the national vaccination programmes.

### Vision

The vision of CLCI is that all people of whatever age or stage of life should have the opportunity to be protected against vaccine-preventable diseases by vaccination with every vaccine they need.

'[CLCI is] a centre for reliable, evidence-based information, bridging the divide between the public, healthcare professionals and policy-makers through education and communication which penetrates all areas of society.'

Catherine Weil-Olivier, Professor of Paediatrics

## Our methods for action

The CLCI advocates 7 steps to achieve a European-wide life-course approach to vaccination:

1. Develop strong leadership
2. Make vaccination a societal good
3. Mobilise health workers
4. Innovative access
5. Data-driven decisions
6. A broad coalition

More on the CLCI vision and structure are available at [www.cl-ci.org](http://www.cl-ci.org)

The CLCI will deliver this strategy through three core methods for action.

### Evidence-based information

**CLCI will use its expert network to source high-quality evidence and communicate it to the public, healthcare professionals and policymakers.**

'Vaccination is one of the most powerful prevention services at any stage of life. That is why vaccine hesitancy is a major health threat. The best way to counteract hesitancy is to improve knowledge on vaccination among the public, as well as among healthcare workers and policy makers. This can be achieved by effective communication and education programs.'

Pier-Luigi Lopalco, Professor of Hygiene and Preventive Medicine

Lack of confidence in vaccine safety and effectiveness has been repeatedly cited as one of the main barriers to vaccination and a key factor in hesitancy. (18) (7) Evidence on the large-scale benefits of vaccinations, such as herd protection, is either not known or poorly understood(18) despite the wealth of trusted evidence available from organisations such as the WHO and ECDC.

### Tailored communication

**CLCI will use its independent position to address the current anti-vaccination and 'fake-news' movement through accessible information and use of modern technologies.**

Modern technologies such as social media and recommendation algorithms have amplified false information on vaccination, which has been cited as the main enabler of vaccine hesitancy.(19) Currently, there is an imbalance between scientific evidence and popular belief in favour of the latter, which has resulted in vaccine hesitancy reported in 90% of countries in the world.(19) The amplification of 'fake news' is a new challenge for evidence-based medicine and public health. The inverse relationship between vaccine hesitancy and socioeconomic status, (7) where vaccine-hesitant parents are often more active in searching for information online compared to vaccine-confident parents, opposes traditional information provision theory. (19) Modern technologies mean parents looking for vaccine information can access unverified reports of adverse effects and other unevidenced claims;(19) even without active searching, around 40% of parents are exposed to negative messages about vaccines on social media.(18)

## Collaboration

**As an independent network of experts, the CLCI is in a prime position to collaborate across public, private and academic institutions in order to support immunisation across the continuum of life.**

The Global Polio Eradication Initiative is the largest private-public partnership for health and has successfully reduced the rate of polio infection by 99%.<sup>(5)</sup> It will take a similar structure to change vaccination policies and healthcare practices to make vaccination accessible at every stage of life. For example, a recent partnership between the American Academy of Paediatrics and Facebook saw groups and pages that share anti-vaccine misinformation removed from its recommendation algorithm.<sup>(19)</sup>

Convenience in accessing vaccination is a key factor in vaccine hesitancy, and collaboration across a variety of stakeholders is essential to widen the access opportunities. Traditionally vaccines were only delivered by general practitioners, however increasingly vaccination programmes are delivered outside healthcare settings. One of the most effective examples is school-based vaccinations, commonplace in the UK, where HPV, tetanus, diphtheria, polio and meningitis vaccines are delivered to secondary school children aged 11-18.<sup>(20)</sup> School-based vaccination programmes are also implemented in Sweden, Spain and Ireland.<sup>(21)</sup> Some countries, such as Portugal, Ireland, the UK, Switzerland and France have started to use the pharmacist to bring vaccinations closer to the community. Introducing pharmacist-led vaccination programmes has the potential to increase vaccination coverage in countries where traditionally vaccination programmes were only delivered in clinical settings. For example, the French government piloted pharmacist-led influenza vaccination programmes in order to improve vaccine accessibility, which led to 155 000 more influenza vaccinations delivered across six months. <sup>(22)</sup>

## A Life-course Approach

**The life-course approach to health emphasises the continuum of life and the solidarity among generations, supporting health promotion and disease prevention at any age or stage of life.<sup>(23)</sup> Vaccination plays a vital part in this approach.**

There are a number of key concepts which need to be considered when discussing this approach, including intrinsic capacity and immune function, herd immunity, changes in the immune system and cost-effectiveness.

### Intrinsic Capacity and Immune Function

**Intrinsic capacity is the innate ability of the body to maintain good health. Vaccination against infectious diseases at appropriate stages across the life span supports this innate capacity.**

Intrinsic capacity is the composite of all the physical and mental capacities of an individual and is a key factor in maintaining the functional ability to be and do what we value as we grow older.<sup>(24)</sup> Immune function plays an important role in maintaining intrinsic capacity in older adults.<sup>(24)</sup>

Various factors which contribute to intrinsic capacity, including immune function, generally decline as people age.<sup>(24)</sup> On top of these underlying changes, exposure to a range of environmental influences across the life-course impact the individual's innate ability to achieve and maintain good health – their intrinsic capacity.<sup>(24)</sup> Preventative risk factor reduction, such as vaccination, nutrition or hypertension management will reduce the impact of disease on one's intrinsic capacity.<sup>(15, 24)</sup> Taking measures that strengthen and maintain intrinsic

capacity, including vaccination, throughout life will allow people to live healthier, more independent lives for longer.(24, 25)

### Immune function decline

**Vaccination is a cost-effective intervention which can support the ability of older adults to achieve and maintain good health.**

The gradual decline of immune function, called immunosenescence, means that older adults may be more vulnerable to infectious diseases [10-13] as their immune response is reduced. The WHO recommends influenza vaccination for all aged over 65(14) and work is underway to improve vaccine efficacy in this group.(14)

Vaccination is one method by which healthcare systems can support good health in older adults and should be included in health strategies designed to maximise individuals' ability to achieve and maintain good health throughout life. (25)

### Herd immunity

**High vaccination coverage in the targeted population often protects both vaccinated and unvaccinated vulnerable populations, thus it is an act of solidarity and support for the whole community.**

Herd immunity arises from high vaccination coverage, where unvaccinated or vulnerable individuals are protected because the majority of the population are vaccinated and therefore are no more carriers of disease.(26) The effects of herd immunity can also be seen by the multiplicative effect catch-up vaccination programmes can have across the whole population. For example, a catch-up meningococcal serogroup C conjugate vaccination programme in England reduced the attack rate in the unvaccinated population by 67%.(27)

### Changes in the immune system

**Increasing the number of opportunities to vaccinate across the life-course helps develop a standardised, baseline of immunity.**

A combination of environmental influences(24) may stimulate or suppress the immune system across the life-course resulting in a dynamic immune response.(28) More opportunities for vaccination throughout life means a baseline of protection can be ensured for all.

The following four groups are used to describe how a life-course approach to vaccination can support an individual's ability to achieve and maintain good health at any age or stage of life.

### Pregnancy

**Vaccination in pregnancy is an opportunity to develop baseline immunity.**

Despite the vulnerability of pregnant women and neonates to infectious diseases due, respectively, to altered and underdeveloped immune function, global vaccination coverage rates in pregnant women remain low, even in countries where national immunization programs are in place.(29) Delivering vaccinations to pregnant women has been evaluated since the 1940s and found to be effective and safe. The WHO recommends pertussis, influenza and tetanus vaccinations for pregnant women.(30) However, many still see vaccination in pregnancy as potentially unsafe(30), thus there is an opportunity for CLCI to develop and deliver messages targeted at this vulnerable group.

Some licensed vaccines that are recommended for adults are now recommended for pregnant women and these recommendations have been based on need and risk-benefit assessments.(30) For example, in 2012, the United Kingdom recommended pertussis

vaccination for pregnant women in response to a pertussis epidemic which caused many infant deaths.(31) Seasonal influenza vaccination is recommended for pregnant women in 25 countries(32) but only 9 EU member states report their coverage rates, which range from 0.5% in Lithuania, Slovenia, Italy and Hungary to 57% in the UK and Ireland.(33) For the CLCI, supporting healthcare systems to improve reporting rates is a key strategic objective.

### Adolescence

**Adolescence is a critical time for physical and mental development, a time when vaccination has a strong positive effect on immune response and future vaccination behaviours can be influenced.**

Adolescence is increasingly recognized as a critical period in the life-course, a time when the brain, body, and behaviours are rapidly changing.(34) It offers a critical window where intrinsic capacity can be strengthened by vaccination, both directly through boosting immune function and indirectly through teaching vaccination habits for the years ahead.

Adolescents are often disproportionately affected by seasonal influenza epidemics,(34) yet vaccination of healthy adolescents within seasonal influenza vaccination programmes remains far less widespread than for the elderly or people with chronic conditions.(34)

### Adulthood

**Many adults are unvaccinated because they haven't completed their vaccination schedule or received the necessary booster vaccination. This is a critical time to vaccinate as the immune function begins to decline in older adults.**

Adulthood represents a large section of life, a time where people work, travel more, experience more stress and potentially the onset of chronic disease. During adulthood, there is a progressive decline in immune function, which accelerates in older adulthood making this group more vulnerable to disease and less responsive to vaccination.(35) With a growing ageing population it is crucial to strengthen the defences of the individuals before this decline in immune function.

Adult vaccination recommendations vary across Europe, some countries like Hungary, Lithuania and Iceland recommend just four vaccines, others like the UK, Denmark and France recommend 15 and Estonia is the only country that recommends 16 vaccinations. Some countries' recommendations are defined by risk group, which can vary by country,(11) consequently, coverage is variable across countries. This poses significant challenges in controlling the burden and pattern of disease as people move across borders.

### Chronic disease patients

**Individuals living with chronic disease have an altered immune function which must be supported to avoid multi-morbidities and further losses to quality of life.**

It is particularly important for patients with chronic diseases to be vaccinated because their immune system is weaker.(36) They are also more likely to develop complications of their condition which may lead to long-term illness, hospitalisation, and even death, from certain vaccine-preventable diseases.(36) Despite this, there are few reliable data on vaccination coverage in patients with chronic conditions. Data suggest that no EU or European Economic Area (EEA) country reports 75% influenza vaccination coverage in chronic disease populations, which is recommended by the WHO and ECDC.(32) Between 2015 and 2016 influenza vaccination rates for people with chronic disease was reported by 7 countries in the EU/EEA, coverage ranged from 16% in Norway to 57% in the UK and Ireland, with the median European uptake rate of 50%.(33)

## Cost-effectiveness

**Supporting the immune function of individuals through effective vaccination programmes can result in improved quality of life for individuals and their family, and thus significant savings for healthcare systems and society at large.**

In Europe, it would only cost €443 to €3,395 (dependent on health status) to deliver vaccination programmes for 10-17 pathogens over an individual's lifetime.(37)

Vaccine-preventable disease outbreaks cause significant disruption to the socio-economic function of a country. An economic evaluation of a measles outbreak of 1 749 cases in Germany in 2006 found that each measles case cost healthcare services and public health €520, and of the 1 749 cases, 95 patients were hospitalized for a total of 775 days.(1) The societal cost was greater as children and adolescents missed 3 000 school days and adults missed about 300 workdays.(1) The total cost to the state of this outbreak was nearly a million euros,(1) but the cost to the individual and family is likely to be much greater, in terms of stress caused to the family, missed opportunities and potential long-term effects on physical and mental health. Clearly vaccination is being underutilised in this population as 80% of the patients in this outbreak were unvaccinated.(1) In an economy where healthcare systems must work within a finite budget, an outbreak like this results in cuts and restrictions in other healthcare services. This is not an efficient use of a healthcare budget as measles is preventable, at a comparatively low cost compared to outbreak management, whereas other diseases that healthcare services must address are not.

The cost-effectiveness of vaccination against the devastating impact of disease is clear. A cost-effectiveness study on the introduction of a rotavirus vaccination programme in Armenia showed that over five years the total cost of vaccinating the cohort was \$257,000, this saved healthcare services \$182 000(1) and resulted in direct societal savings of \$13 800. The impact on indirect societal costs was significant, \$459 000(1) was saved in this model, which describes fewer work and school days missed and more productivity at work and outside of work for patients and carers.

The societal cost of infectious diseases is significant, illness often results in missed opportunities for the individual to be or do what they value,(24) which is at the core of quality of life.(38) It is of ethical importance for governments to allow equal access to modern technologies which improve health and wellbeing.(39) The ethical and economic argument are unquestionably in favour of large-scale, sustainable vaccination programmes.

## Call to action

**A life-course approach to vaccination provides a framework within which the value of vaccinations can be communicated, and access expanded, for everyone - at every age or stage of life.**

The value of vaccination across the life-course is not yet being given its due recognition. Low vaccination coverage across most of Europe, variable recommendations between countries, incomplete data collection and reporting are indicative of low political will.

Current approaches are not unified and are not communicating the value of life-course vaccination effectively. A concerted European-wide effort is vital in order to change policy and practice and level up variable national vaccination coverage rates to the highest possible level.

A life-course approach to vaccination has the potential to transform the current state-of-play. This holistic approach emphasises the uniqueness of one's innate ability to achieve and maintain health throughout life by focusing on strategies that aim to maximise that ability. It

also promotes the expansion of vaccination delivery from the healthcare setting into the wider community setting, supporting people to access vaccination when and where is convenient for them. Subsequent higher vaccination coverage holds significant cost savings for healthcare systems and society at large.

Currently, national vaccination schedules vary significantly, making it difficult to achieve a base-line immunity profile across Europe. In order to improve confidence in national schedules, the CLCI will help the public, healthcare professionals and policymakers understand this variability by actively communicating and explaining the differences between national vaccination policies, fostering convergence towards a more harmonised vaccination schedule.

Widening vaccination opportunity, communicating value and standardising policy is of vital importance to the health and stability of the European region. The CLCI calls on all healthcare professionals, policymakers and communicators to come together to eliminate vaccine-preventable diseases by considering the entire population in vaccination scheduling and information provision.

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