



## **TECHNICAL** REPORT

# Seasonal influenza vaccination in Europe

Vaccination recommendations and coverage  
rates in the EU Member States for eight  
influenza seasons

2007–2008 to 2014–2015

**ECDC TECHNICAL REPORT**

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This report was commissioned by the European Centre for Disease Prevention and Control (ECDC), coordinated by Suzanne Cotter (Health Protection Surveillance Centre, Ireland), Svetla Tsoлова and Kari Johansen (both ECDC); and produced by Jolita Mereckiene

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## Abbreviations

CINECA	Consortium at the University of Bologna, Italy
GP	General practitioner
HCWs	Healthcare workers
ILI	Influenza-like illness
NITAG	National Immunization Technical Advisory Group
SAGE	Strategic Advisory Group of Experts on Immunisation
VCR	Vaccination coverage rates
VENICE	Vaccine European New Integrated Collaboration Effort
WHO	World Health Organization

## Summary

In Europe, influenza occurs in regular annual epidemics in the winter season. Annual influenza epidemics are associated with high morbidity and mortality. Severe illness and complications are more common in certain risk groups, which include those with chronic medical conditions (e.g. cardiovascular, respiratory, renal and hepatic diseases; diabetes mellitus; immunosuppression due to disease or treatment; obesity; children and teenagers on long-term aspirin therapy) and individuals 65 years of age and above. The main public health intervention to prevent influenza is vaccination. To protect vulnerable individuals and reduce transmission, vaccination is also recommended for healthcare workers.

The aim of this report was to summarise the information on seasonal influenza immunisation recommendations and vaccination coverage rates in the European Union (EU) and the European Economic Area (EEA) between 2007–08 and 2014–15, a total of eight influenza seasons.

A standardised questionnaire was developed for the first survey and made available online in January 2008. For each subsequent survey the questionnaire was amended reflecting changes in European Commission/WHO recommendations for seasonal influenza. Questionnaires were completed by experts in the EU/EEA Member States. Overall, six surveys were conducted, with eight influenza seasons covered. The participation rate was high for each survey, with only one or two countries not responding to any given survey. The United Kingdom has provided data separately for England, Northern Ireland, Scotland and Wales since 2012 (influenza season 2011–12).

All Member States recommended seasonal influenza vaccination to older age groups, with the age ranging from  $\geq 50$  to  $\geq 65$  years of age, depending on the country. Over time, a growing number of countries lowered the recommended age for adult influenza vaccination. All in all, 30 countries have lowered the recommended vaccination age at some point in time during the eight seasons covered in this report.

Six countries (Hungary, Germany, Greece, Iceland, the Netherlands and Portugal) recommended that people aged 60 years or older get vaccinated (2014–15), while for the 2007–08 season, only three (Iceland, Greece and Germany) of 27 countries made such a recommendation. Recommendations to vaccinate those 65 years or older were made by 18 countries in 2014–15, and by 19 countries in 2007–08. Two countries (Poland and Malta) recommended adult influenza vaccination for those aged 55 years and above in 2007–08 and 2014–15; Slovakia recommended vaccination for people 59 years of age or above for the 2014–15 and the 2007–08 seasons. In 2014–15, Austria, Belgium and Ireland recommended vaccination for those 50 years or older. In 2007–08, Austria and Ireland also recommended that this age group should be vaccinated.

An increase in the number of countries recommending vaccination for children was noted. Nine countries (Austria, Estonia, Finland, Malta, Latvia, Slovenia, Slovakia, Poland and United Kingdom) recommended vaccination of different age groups of children and adolescents under 18 years of age in the 2014–15 influenza season; for the 2007–08 season, only six countries did so.

Similarly, an increase in the number of countries recommending influenza vaccine for healthcare workers (HCWs) was observed. Of 30 responding Member States, 29 recommended influenza vaccinations for HCWs in 2014–15; 24 of these had recommendations in place to vaccinate all HCWs; four recommended vaccination only for certain HCWs. In Northern Ireland and Scotland, vaccine was offered to all HCWs, while England and Wales recommended that only HCWs in direct contact with patients should be vaccinated. Of the 27 responding countries, 22 recommended that HCWs should be vaccinated for the 2007–08 influenza season.

All Member States recommended seasonal influenza vaccine for people with immunosuppression due to disease or treatment, metabolic disorders, chronic pulmonary diseases, cardiovascular diseases and renal diseases for six of the eight influenza seasons covered in this report. The number of countries that recommended influenza vaccination for people with morbid obesity increased (nine Member States in 2010–11, 19 in 2014–15). Also on the increase are vaccination recommendations for hepatic diseases (15 Member States in 2007–08, 27 in 2014–15). Twenty-six Member States recommended vaccination for people with neurological diseases in 2014–15 (2010–11: 19 Member States). Ten Member States recommended the vaccination of pregnant women in 2010–11; in 2014–15, 27 Member States recommended influenza vaccination for pregnant women.

A decrease in the number of Member States recommending influenza vaccination for children under 18 years of age on long-term aspirin treatment was noted: the number dropped from 18 countries in 2007–08 to 15 countries in 2014–15.

Between 2007–08 and 2014–15, 26 Member States reported vaccination coverage rates for older populations for at least one season; coverage rates for this demographic ranged from 1.0% to 76.3% (median 47.6%). Seventeen Member States provided coverage data (reported for at least one influenza season) for HCWs: coverage ranged from 5.7% to 54.4% (median 26.9%). Coverage for those with chronic medical conditions was provided by nine Member States and ranged from 28.7% to 78.7% (median 44.4%). Seven Member States submitted coverage data for pregnant women: coverage ranged between 0.3% and 58.2% (median 22.6%). Four Member States were able

to report vaccination coverage rates for residents of long-term care facilities: coverage was 68.7% in Belgium (2008–09), 72.2% in Ireland (2014–15), 96.6% in Slovakia (2014–15), and 77% in Portugal (2014–15).

The predominant payment mechanism for influenza vaccinations<sup>i</sup>, as reported by Member States, was through national health services (or equivalent) for those population groups for whom seasonal influenza vaccine was recommended (children, adolescents, adults, those with chronic medical conditions, pregnant women, HCWs and members of closed communities).

In conclusion, the results of the VENICE surveys indicate that most of the Member States have clear recommendations as to which population groups should receive seasonal influenza vaccine, i.e. those with chronic medical conditions, pregnant women, older age groups, and HCWs. There has been an increase in the proportion of Member States which now recommend vaccine for high risk groups as identified by WHO and ECDC. However, there was a notable discrepancy between issuing recommendations and the ability to monitor and report vaccination coverage among those with chronic medical conditions and pregnant women: less than a quarter of EU/EEA Member States have the capability to do so.

Just under half of the Member States were able to report on vaccination coverage for HCWs. It is notable that more Member States were able to report on coverage in this and other risk groups. Another noticeable trend is the lowering of the recommended age for the influenza vaccine in older populations; there were no major changes in recommendations for children.

Although there has been a widespread consensus for many years that the older age groups should be vaccinated, the EU target of 75% vaccination coverage was reached in only two Member States (the Netherlands and the United Kingdom (only Northern Ireland and Scotland) in some of the influenza seasons covered in this overview. As the ability to monitor vaccination coverage is a key component of any vaccination programme, all Member States may need to reconsider their approach in order to collect more comprehensive and accurate information on vaccination coverage for all targeted population groups. Member States that do not monitor vaccination coverage among older age groups are encouraged to implement monitoring systems that are age-group-specific, in accordance with national recommendations, to enable them to track their progress or identify obstacles that keep them from achieving national and EU targets.

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<sup>i</sup> By 'vaccination' we refer to both cost factors: the vaccine itself *and* the administration of the vaccine.



# Introduction

Vaccination remains the most effective public health intervention to mitigate and prevent seasonal influenza [1]. The policies of the EU/EEA Member States for influenza vaccination are based on the principle of protection of people at higher risk of severe illness and complications, either directly through vaccination, or indirectly by vaccinating subgroups (e.g. healthcare workers) that are likely to infect those at higher risk for influenza.

The primary indicators of successful vaccination programmes are high vaccination coverage rates, i.e. the proportion of targeted populations who were vaccinated. In December 2009, the European Council unanimously recommended that influenza vaccination coverage in all at-risk groups should reach 75% in all EU countries for the 2014–15 influenza season [2]. Risk groups were defined in accordance with guidance from ECDC and the World Health Organization: 'older' individuals (often defined as aged  $\geq 65$  years) and people of all ages  $\geq 6$  months of age with chronic medical conditions [3,4]. In November 2012, the WHO Strategic Advisory Group of Experts on Immunisation (SAGE) recommended the prioritisation of influenza vaccination for pregnant women (who have an increased risk of severe disease and death from influenza). SAGE also said that the expansion of programmes for children under five years of age should be considered, particularly for children under two years of age, who have a high burden of influenza [5].

The European Council Recommendation [2] encouraged Member States to adopt and implement national, regional or local action plans or policies to improve seasonal influenza vaccination coverage (including among HCWs) and to measure coverage in all risk groups. Countries were also encouraged to report on a voluntary basis to the European Commission on the implementation of the recommendation. ECDC-supported VENICE surveys have been identified as being an effective way of doing this. These surveys offer an established mechanism to monitor implementation, with several surveys conducted before and immediately following the Council Recommendation [6]. A total of eight surveys was conducted by VENICE between 2008 and 2015: one pandemic influenza survey and seven seasonal influenza surveys (Table 1).

**Table 1. Influenza surveys conducted in EU/EEA countries by VENICE, 2008–2015**

Survey conducted	Jan 2008	Jul 2009	Aug-2010 <sup>§</sup>	Apr 2011	Nov 2011	Nov 2012	Mar 2014	Dec 2015
Influenza season covered to obtain vaccination coverage rates	2006–07 <sup>†</sup>	2007–08	2009–10	2008–09, 2009–10	2010–11	2011–12	2012–13	2013–14, 2014–15
Influenza season covered to collect recommendations	2006–07	2007–08	2009–10	2009–10	2010–11	2011–12	2012–13	2014–15

*§ Survey conducted to collect data for A(H1N1)pdm; the remaining surveys covered seasonal influenza.*

*† Some countries provided data for seasons 2003–04 and 2005–06; most countries provided data for influenza season 2006–07.*

## Aim and objectives

The aim of the first survey conducted by VENICE in January 2008 was to collect baseline information on country-specific vaccination recommendations for seasonal influenza for risk groups and other target groups in order to obtain vaccination coverage rates for all EU/EEA Member States.

The aim of the subsequent surveys was to update the data on seasonal influenza immunisation recommendations and to obtain EU/EEA vaccination coverage rates for the latest influenza season in order to see whether the EU target of 75% was met in all at-risk groups and other target groups.

## Specific objectives of surveys conducted between 2008 and 2015

- Identify recommendations for every influenza season with regard to seasonal influenza vaccination for different target groups. Target groups can be based on age, medical risk, and profession.
- Obtain influenza vaccination coverage rates for the above groups for every influenza season.
- Obtain information for every influenza season on national payment mechanisms for seasonal influenza vaccinations.

The objective of this report is to summarise information which was collected by the VENICE survey project in EU/EEA countries between July 2009 and the end of the influenza season in 2015. Vaccination coverage data are available for eight influenza seasons, and data on vaccination recommendations were collected during six influenza seasons.

## Methodology

### Study design

All surveys were carried out through a web-based platform with protected access restricted to appointed experts from all EU/EEA Member States. These surveys were collaborative studies between ECDC, the Vaccine European New Integrated Collaboration Effort (VENICE) Project and the EU/EEA Member States. In December 2015, 28 EU and three EEA Member States (Iceland, Norway, and Liechtenstein) participated in VENICE.

### Data collection

A standardised questionnaire, using predominantly close-ended questions, was developed for the first survey in January 2008. For each subsequent survey, the questionnaire was amended in accordance with the changes in EC/WHO recommendations for seasonal influenza. However, the core questionnaire contained the same set of questions for all surveys, which ensured that information gathered in previous surveys was comparable between influenza seasons and countries. The questionnaire was grouped into thematic sections to facilitate completion. Each section could be completed separately. Information was sought on population groups recommended for influenza vaccination (based on age, occupation, chronic medical conditions or social situation, in accordance with national guidelines), methods used to monitor vaccination coverage, vaccination coverage rates in specific population groups, and payment mechanisms relating to vaccination (both procurement and administration of vaccine).

### Data analysis

A descriptive analysis was carried out, summarising data by calculating frequencies or proportions of responses by Member States and population groups targeted for seasonal influenza vaccination. Vaccination coverage rates were calculated as proportions – the number of vaccinated individuals (numerator) divided by the number of population groups targeted for vaccination (denominator) – for each participating Member State. The results of these calculations were provided to VENICE as proportions.

This report summarises and presents data collected from the six most recent seasonal influenza surveys, which were conducted between July 2009 and December 2015. Vaccination coverage rates for the different targeted population groups were calculated for a maximum of eight influenza seasons (2007–08, 2008–09, 2009–10, 2010–11, 2011–12, 2012–13, 2013–14 and 2014–15). For older people, for example, data for all eight seasons covered in this report are available. For some of the target groups, vaccination coverage rates are only available for five seasons because data collection did not start until the 2010–11 influenza season (e.g. vaccination coverage rates for pregnant women, which were first collected after the A(H1N1)pdm09 pandemic).

Data from first survey are not included in this report because vaccination coverage rates were not always provided for the same seasons, e.g. for seasons 2003–04 to 2006–07 (Table 1).

The April 2011 survey collected vaccination coverage rates data for two influenza seasons (2008–09 and 2009–10), while the December 2015 surveys collected data for the 2013–14/2014–15 influenza seasons. For both surveys, data on recommendations were collected for the most recent influenza season (2009–10 and 2014–15, respectively), which means that data on recommendations cover only six influenza seasons. In order to better illustrate the changes after the A(H1N1)pdm09 pandemic, this report focusses on the recommendations from the July 2009 survey, which is based on the 2007–08 season (Table 1). Data provided in this report may differ from previous publications covering the same time period because Member States could retroactively update reported numbers.

The vaccination coverage rates for the 2007–08 and 2014–15 influenza seasons were compared. The median vaccination coverage rates were calculated by country and for the entire EU/EEA region according to the data provided by the participating countries, e.g. if a Member State provided data for only one season, the median vaccination coverage rate was identical with the reported vaccination coverage rate; if a Member State provided data for five seasons, the median was calculated across those five seasons.

The analysis of Member State information relating to payment mechanisms for different targeted population groups was difficult because the majority of countries reported multiple options (vaccine or administration payment mechanisms varied substantially, even within countries). The data presented in this report reflect this diversity of payment options.

In order to compare data between Member States, the estimated number of seasonal influenza vaccine doses purchased by public procurement in each country was expressed as a rate (per 10 000 of those aged  $\geq 65$  and over) as a very crude indicator to assess supply against need. The number of purchased, distributed and used vaccines was provided by the Member States. For the data analysis, the number of purchased doses was chosen because this information was collected in all surveys. The collection of distributed or used doses was introduced later; these data are not available for all eight seasons. The denominator (number of those aged 65 or older) for

this calculation was taken from the Eurostat website [7]. The cut-off for age was  $\geq 65$ ; no adjustment was made to the countries' recommendations as age recommendations varied between influenza seasons. At the time of writing, the latest data available were for the year 2011. Population data were not available for more recent years, which is why the same denominator was used to calculate the coverage rates for all influenza seasons.

Data for the United Kingdom were provided separately for England, Northern Ireland, Scotland and Wales. The UK was considered as one Member State when responses were the same for a given question (e.g. on policies or mechanisms across the UK, such as recommendations and payment mechanisms); if responses were different on a given question, a footnote indicates and explains the differences. Data on vaccination coverage rates are presented and interpreted separately for each country in the UK.

## Results

### Response rate

Of the 29 EU/EEA countries participating in the VENICE project, 27 provided data for the 2007–08 influenza season (Bulgaria and Luxembourg did not respond to the survey); 28 countries reported data for the 2008–09 and 2009–10 seasons (the UK did not respond to the survey, but provided vaccination coverage data at a later date; data were included in this report); data for the 2010–11 influenza season were reported by 28 countries (Finland did not respond to the survey). For the survey on the 2011–12 season, 28 countries responded (Austria did not respond). Croatia joined the EU in 2013, which resulted in a total of 31 EU/EEA countries invited to participate in the survey for the 2012–13 season; of these, 29 responded; 30 countries responded to the survey for the influenza seasons 2013–14 and 2014–15 (Luxembourg did not provide data for either season).

### Seasonal influenza vaccination recommendations

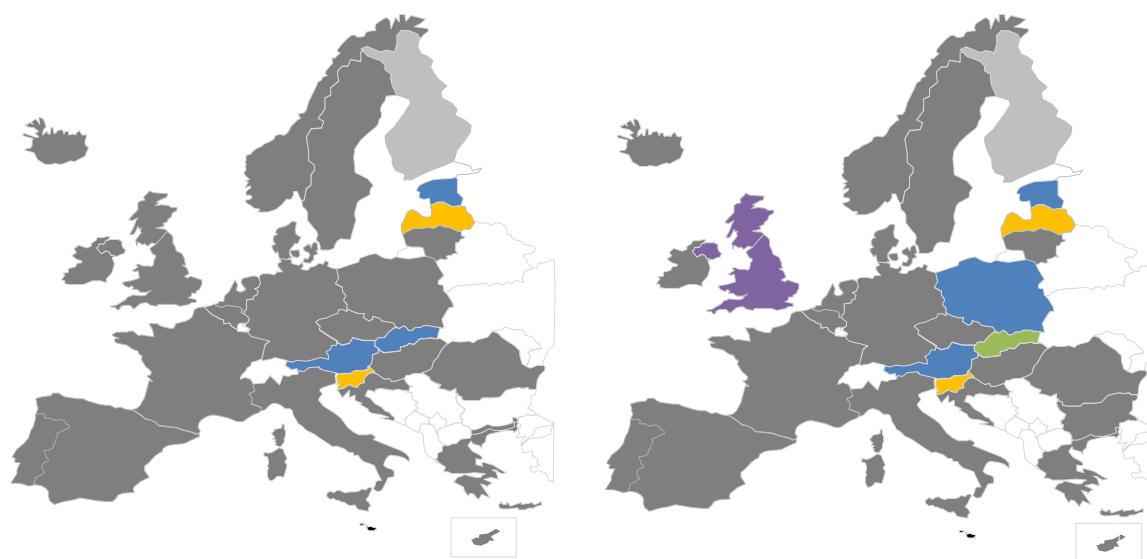
#### Age groups recommended for influenza vaccination

In the 2014–15 influenza season, nine of the 30 responding countries (Austria, Estonia, Finland, Latvia, Malta, Poland, Slovakia, Slovenia and the United Kingdom) reported recommending seasonal influenza vaccination for various age groups of healthy children and adolescents aged  $< 18$  years. In Latvia and Slovenia, vaccination was recommended for children aged  $\geq 6$  months to 2 years; in Finland, vaccination was recommended for children aged  $\geq 6$  months to 3 years; in Malta, vaccination was recommended for children aged  $\geq 6$  months to 4 years; in Slovakia, vaccination was recommended for children aged  $< 12$  years. Austria, Estonia and Poland recommended vaccination for children aged  $\geq 6$  months to  $< 18$  years. For the 2013–14 influenza season, the UK introduced influenza vaccination for various age groups of children between  $\geq 2$  and 11 years of age. By comparison, in the 2007–08 season, six of the 27 countries gave a recommendation for the vaccination of children and adolescents (Austria, Estonia, Finland, Latvia, Slovakia, Slovenia) (Map 1; Annex 1: Table 2).

All 30 countries recommended seasonal influenza vaccination for the older age groups in 2014–15, but the specified age differed between countries. Eighteen countries recommended vaccination for individuals  $\geq 65$  years of age. In six countries (Germany, Greece, Hungary, Iceland, the Netherlands and Portugal), vaccination was recommended for those aged  $\geq 60$  years. Two countries (Malta and Poland) recommended vaccination for individuals aged  $\geq 55$  years. Slovakia recommended vaccination for individuals aged  $\geq 59$  years. The remaining three countries (Austria, Belgium and Ireland) recommended vaccination for those  $\geq 50$  years. In Ireland, however, only people aged  $\geq 65$  years are being offered the seasonal influenza vaccination free of charge, and only for this age group the vaccination coverage is monitored.

For the influenza season 2007–08, 18 of the 27 survey responding countries recommended vaccination for individuals aged  $\geq 65$  years. Three countries (Germany, Greece and Iceland) recommended vaccination for those aged  $\geq 60$  years; two countries (Malta and Poland) recommended vaccination for people aged  $\geq 55$  years. Slovakia recommended the vaccination of all people aged  $\geq 59$  years. Three countries (Austria, Belgium and Ireland) recommended vaccination for those  $\geq 50$  years (Map 2; Annex 1: Table 2).

**Map 1. Member States recommending seasonal influenza vaccine for children and adolescents, 2014–15 and 2007–08 influenza seasons, 2007–08 (left) and 2014–15 (right)**



Source: National seasonal influenza vaccination survey, December 2015, July 2009

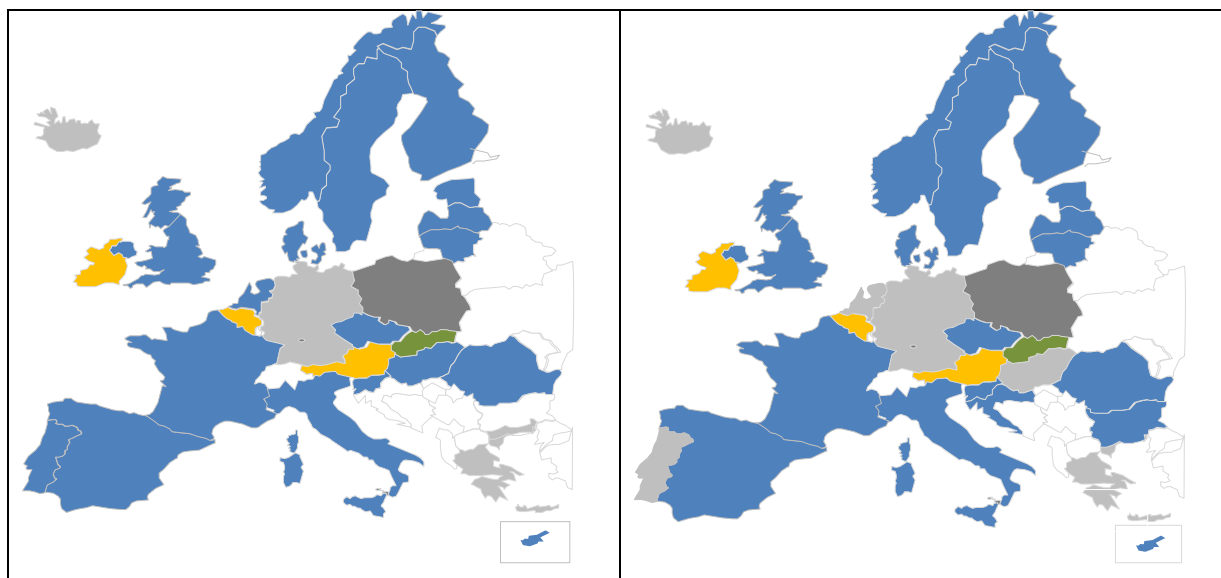
- No recommendations
- ≥6 months – 2 years
- ≥6 months – 3 years
- ≥6 months – 5 years
- ≥6 months – 12 years
- ≥6 months – 18 years
- Various age groups between ≥2 – 11 years

*In Malta, vaccination was recommended for children six months or older and below 5 years of age in 2014–15.*

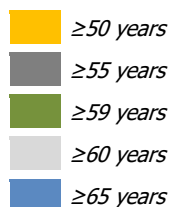
*Liechtenstein did not have a recommendation to vaccinate healthy children or adolescents in 2014–15.*

*UK recommendations for vaccination age: England ≥2–4 years; Northern Ireland and Scotland 2–11 years; Wales 2–4 and 7–11 years (2014–15 season).*

**Map 2. Member States recommending seasonal influenza vaccine for older age groups, 2014–15 and 2007–08 influenza seasons, 2007–08 (left) and 2014–15 (right)**



Source: National seasonal influenza vaccination survey, December 2015 and July 2009



*In Ireland, the National Immunization Technical Advisory Group (NITAG) recommends vaccine for people ≥50 years of age but the programme focuses only on people ≥65 years.*

*In Belgium, during the influenza season 2007–2008, vaccination was recommended for people 50–64 years of age. In 2014–2015, vaccination was still advised for this age group but this group was no longer considered high priority.*

*In Portugal, vaccination was recommended for people ≥60 years of age in 2014–15; the vaccine is only free of charge for people ≥ 65 years.*

*The recommendation in Spain is for people ≥65 years of age; however, 10 out of 19 regions recommend vaccination for those ≥60 years of age.*

*In Austria, Estonia and Poland, vaccination against seasonal influenza is recommended for all population groups six months or older in 2014–15.*

*In Austria and Estonia vaccination against seasonal influenza is recommended for all population groups six months or older in 2007–08.*

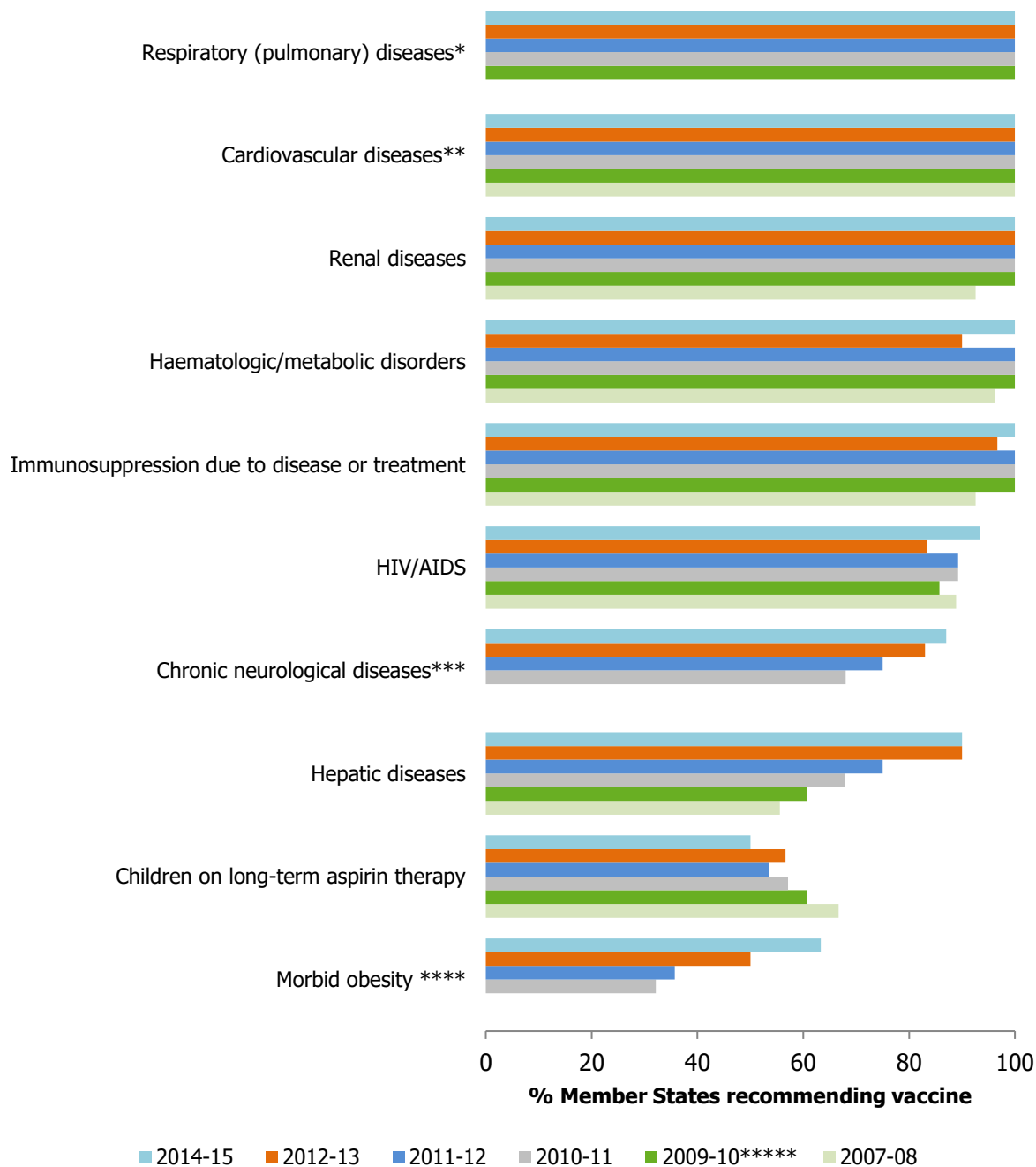
*In Liechtenstein, vaccination is recommended for people ≥65 years in 2014–15.*

*In Malta, vaccination was recommended for people ≥55 years in 2014–15 and 2007–08.*

## Chronic medical conditions

In comparison with earlier VENICE surveys, and notably since the Council Recommendation, a number of countries made changes to their seasonal influenza vaccination recommendations and policies, usually with regard to certain risk groups. Between 2007–08 and 2014–15, all Member States participating in the surveys recommended seasonal influenza vaccination for patients with treatment-induced immunosuppression, disease-induced immunosuppression, and metabolic disorders. In addition, influenza vaccine was recommended to those with chronic pulmonary, cardiovascular and renal diseases. The number of Member States that recommended seasonal influenza vaccine for individuals with hepatic disease increased each year (15 in 2007–08, 27 in 2014–15); 28 Member States recommended vaccination for people living with HIV/AIDS in 2007–08 vs. 24 in 2014–15. In addition, more countries recommended vaccine for those with morbid obesity in 2014–15 than in 2010–11 (19 Member States vs. 9, respectively) (Figure 1; Annex 2: Table 3).

**Figure 1. Proportion of Member States recommending seasonal influenza vaccine by chronic medical condition, 2007–08 to 2014–15 influenza seasons**



Source: National seasonal influenza vaccination surveys, July 2009–December 2015

\* Respiratory (pulmonary) diseases, e.g. chronic obstructive pulmonary disease, cystic fibrosis, asthma

\*\* Cardiovascular diseases, e.g. congenital heart disease, congestive heart failure and coronary artery disease, except hypertension

\*\*\* Chronic neurological diseases or neuromuscular conditions, e.g. disorders of the brain, the spinal cord, the peripheral nerves and muscles such as cerebral palsy, epilepsy (seizure disorders), stroke, intellectual disability (mental retardation), moderate to severe developmental delay, muscular dystrophy, or spinal cord injury.

\*\*\*\* Morbid obesity is defined as having a body mass index of  $\geq 40\text{kg/m}^2$ . This information was not collected before/during A(H1N1)pdm09

\*\*\*\*\* Data refer to seasonal influenza vaccine recommendations during the 2009–10 pandemic influenza season

## Vaccination and pregnancy

The number of Member States that recommended vaccination for pregnant women increased over time, from 10 Member States (Austria, Belgium, Cyprus, Denmark, Estonia, Ireland, Italy, Slovakia, Spain and Portugal) in 2007–08 to 27 Member States in 2014–15. Of the 27 countries that participated in the survey in 2014–15, 25 recommended vaccination for all pregnant women while two recommended vaccination for pregnant women with an additional clinical risk condition (Croatia and the Netherlands) (Figure 2; Annex 2: Table 3). Three Member States (Bulgaria, Malta and Slovakia) did not issue any recommendations for the vaccination of pregnant women. Malta does not officially recommend the vaccination of pregnant women but pregnant women who are interested in taking the vaccine are encouraged to do so; the vaccine, however, is not provided free of charge. Slovakia recommends the vaccine only to experts working in the field of immunisation but has no official written recommendation backed by legislation.

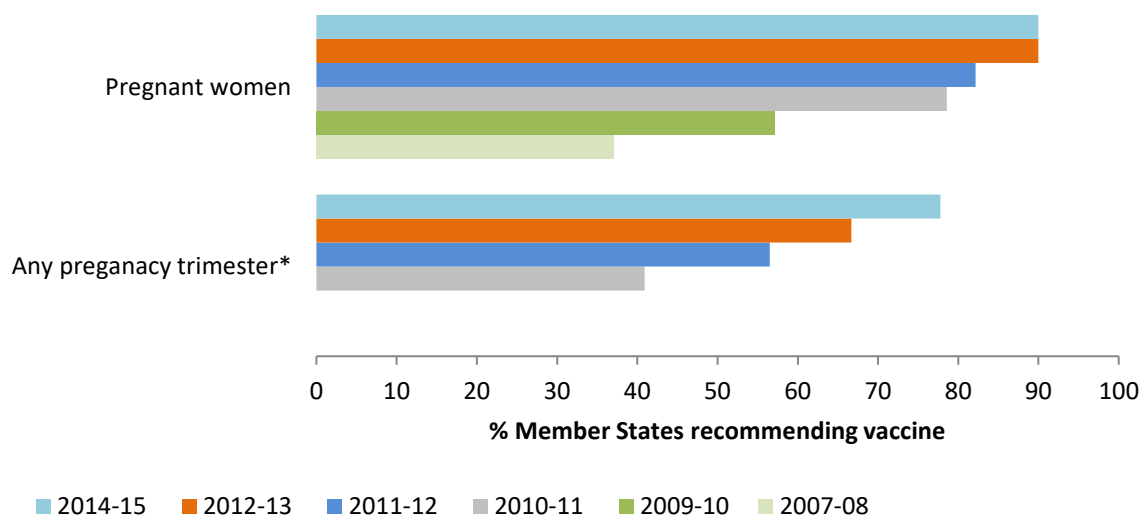
Compared with 2010–11, more Member States introduced recommendations to vaccinate pregnant women in any trimester of pregnancy (21 Member States in 2014–15 vs. 9 in 2010–11). Twenty-one Member States recommended vaccination at any stage of pregnancy (the Czech Republic, Croatia, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Latvia, Liechtenstein, Lithuania, Malta, the Netherlands, Poland, Romania, Slovenia, Spain, Portugal, the United Kingdom) and seven Member States (Austria, Belgium, Cyprus, Germany, Italy, Norway, Sweden) recommended vaccination only for the second and third trimesters in 2014–15. In Denmark, healthy pregnant women were recommended influenza vaccination in the second and third trimesters in 2014–15 (Figure 2; Annex 2: Table 3).

In Germany and Norway (2014–15 season), vaccination was recommended to women with a chronic medical condition in all trimesters; healthy pregnant women were recommended the vaccine in the second and third pregnancy trimesters.

Three countries did not have any recommendations to vaccinate pregnant women (Bulgaria, Malta and Slovakia) in 2014–15. Although Malta does not officially recommend influenza vaccination for pregnant women, it encourages pregnant women to get vaccinated, but without offering to cover the costs. Slovakia has no official written recommendation backed by legislation, but advice to get vaccinated is unofficially given by immunisation experts.

Overall, 17 of 27 countries did not have recommendations to vaccinate pregnant women in 2007–08 (the Czech Republic, Germany, Finland, France, Greece, Hungary, Iceland, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Romania, Slovenia, Sweden, and the United Kingdom).

**Figure 2. Proportion of Member States recommending seasonal influenza vaccine for pregnant women, 2007–08 to 2014–15 influenza seasons**



Source: National seasonal influenza vaccination surveys, July 2009–December 2015

\* Percentage calculated from those countries which recommend vaccine for pregnant women; in 2007–08 and 2009–10, no data were collected on pregnancy trimester recommended for vaccination

## Occupational groups

### Healthcare workers

There were no substantial changes in 2014–15 concerning the vaccination of certain occupational groups, except for healthcare workers (HCWs). More Member States recommended vaccinating HCWs in 2014–15 compared with 2007–08: 29 Member States recommended the vaccine in 2014–15, 22 Member States did so in 2007–08) (Figure 3; Annex 2: Table 3). Of the 30 responding countries, 24 recommended vaccination for all HCWs, and four recommended vaccination for some HCW categories, e.g. staff with close contact with patients, staff with no patient contact but contact with potentially contaminated material, or social care staff directly involved in frontline patient care. In the UK–Northern Ireland and UK–Scotland, vaccination was recommended for all HCWs. In UK–England and UK–Wales, vaccination was recommended only for frontline HCWs or those HCWs with direct patient contact. Although there is no national recommendation to vaccinate HCWs in Denmark, most regions and municipalities offer HCWs free vaccinations to them. In Sweden, vaccination was only recommended for staff caring for severely immunocompromised persons. In Slovakia, vaccination was recommended for HCWs in close contact with patients or foci of infection.

In all responding Member States, the vaccination of HCWs is voluntary, which, for the purposes of this report, is defined as individual free will (choice) when deciding on seasonal influenza vaccination; there is also no penalty for not getting the vaccine.

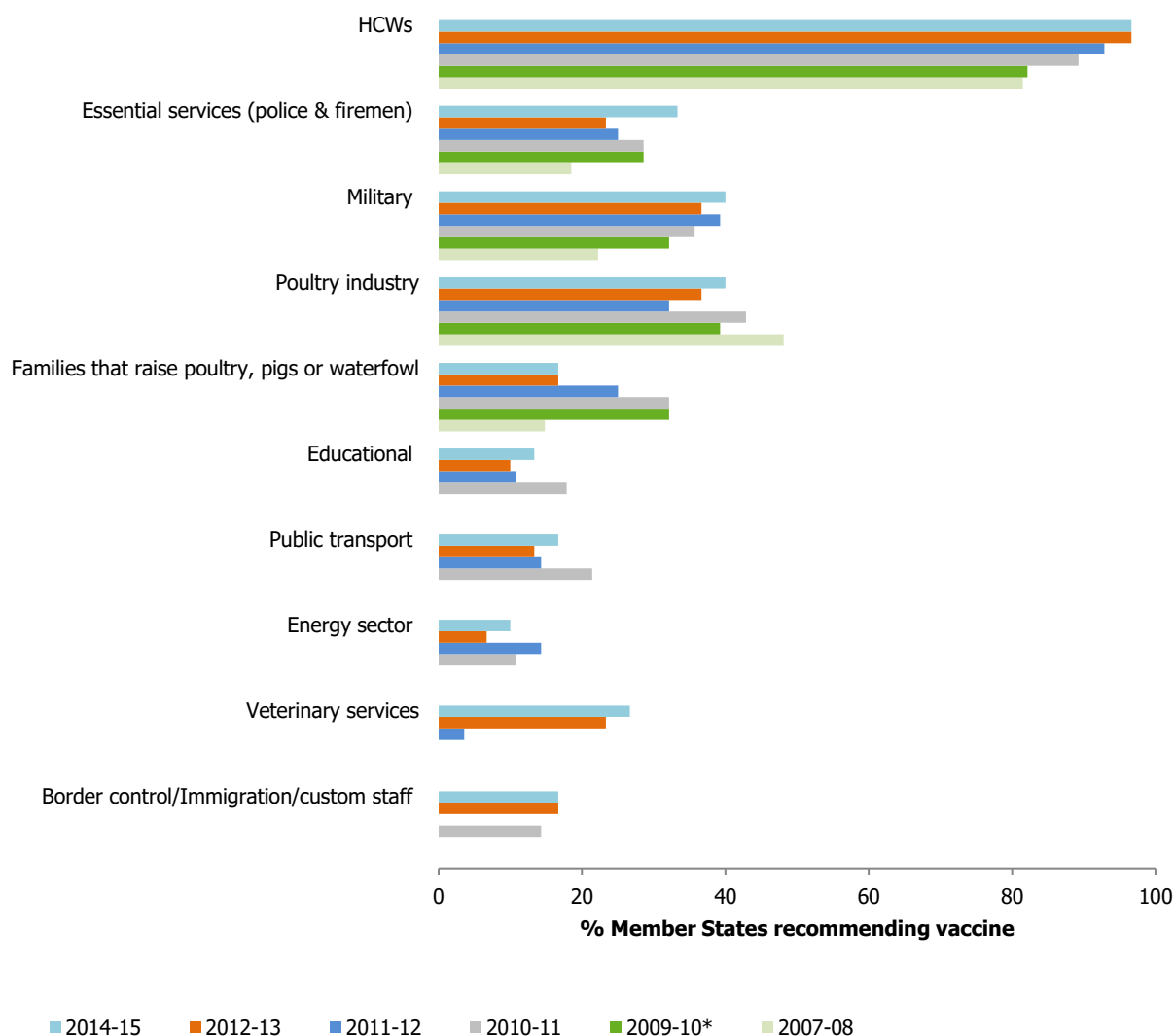
### Other occupations

Between 2007–08 and 2014–15, 27 of the responding Member States recommended seasonal influenza vaccination for at least one other occupational group. Vaccination was not recommended for any occupational groups (except HCWs) in seven Member States (the Czech Republic, Denmark, Latvia, Lithuania, Romania, Portugal, and Sweden).

Around one third of the Member States recommended vaccination for those working in essential services, in the military, and in the poultry industry. Influenza vaccination was also recommended for families that raise poultry, waterfowl or pigs. Influenza vaccination was recommended for military service personnel (12 Member States in 2014–15 vs. six in 2007–08), poultry industry workers (12 Member States in 2014–15 vs. 13 in 2007–08); and police and firefighters (10 Member States in 2014–15 vs. five in 2007–08). Four Member States recommended the vaccination of teachers and other educational staff in 2014–15 (five in 2010–11) (Figure 3; Annex 2: Table 3).



**Figure 3. Proportion of Member States recommending seasonal influenza vaccine for occupational groups, 2007–08 to 2014–15 influenza seasons**



Source: National seasonal influenza vaccination surveys, July 2009–December 2015

\* Data refer to seasonal influenza vaccine recommendations during the 2009–10 pandemic influenza season

## Population groups in closed communities

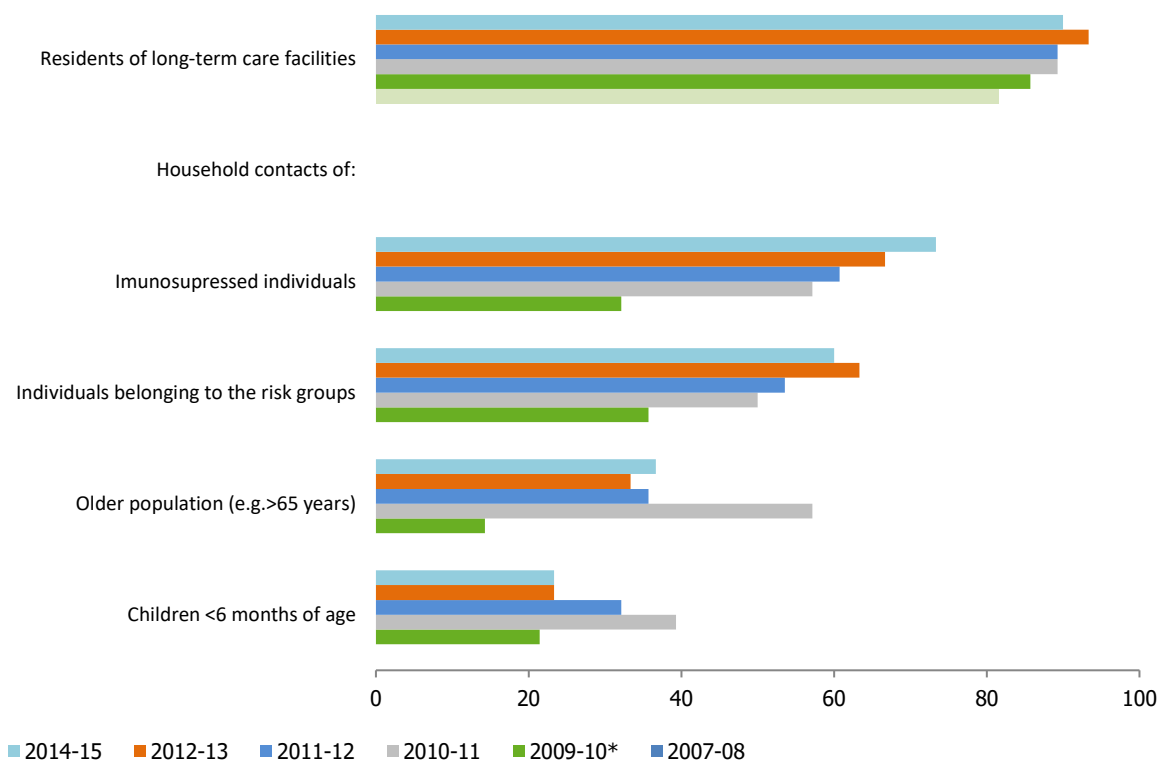
In the 2014–15 influenza season, 27 of 30 participating Member States (all but Denmark, Latvia and Sweden) recommended vaccination for residents of long-term care facilities; in 2007–08, only 22 of 27 Member States issued such a recommendation. More Member States introduced recommendations to vaccinate household contacts or carers of individuals belonging to risk groups (18 Member States in 2014–15 vs. 10 Member States in 2010–11). Also, household contacts or carers of immunosuppressed individuals were given the recommendation to get vaccinated (22 Member States in 2014–15 vs. 9 Member States in 2007–08) (Figure 4; Annex 2: Table 3).

## Household contacts or caretakers

Data were collected on vaccination recommendations for household contacts of at-risk individuals since 2009–10. Between 2009–10 and 2014–15, an increasing number of countries recommended that household contacts of people in clinical risk groups, older individuals or children less than six months of age should be vaccinated. For example, household contacts of individuals belonging to clinical risk groups were given a vaccination recommendation in 18 countries in 2014–15 as opposed to 10 countries in 2009–10. Similarly, 22 countries in 2014–15 recommended the vaccine for household contacts of immunosuppressed individuals – in 2009–10, only nine countries recommended the vaccine for this group). There was some year-to-year variation in the number of countries that recommended the vaccine for household contacts: some Member States which in 2010–11 issued

recommendations for the household contacts of elderly people and very young children no longer did so in 2012–11 (Figure 4; Annex 2: Table 3).

**Figure 4. Proportion of Member States recommending seasonal influenza vaccine for household contacts/caretakers of those at risk for influenza, 2007–08 to 2014–15 influenza seasons**



Source: National seasonal influenza vaccination surveys, July 2009–December 2015

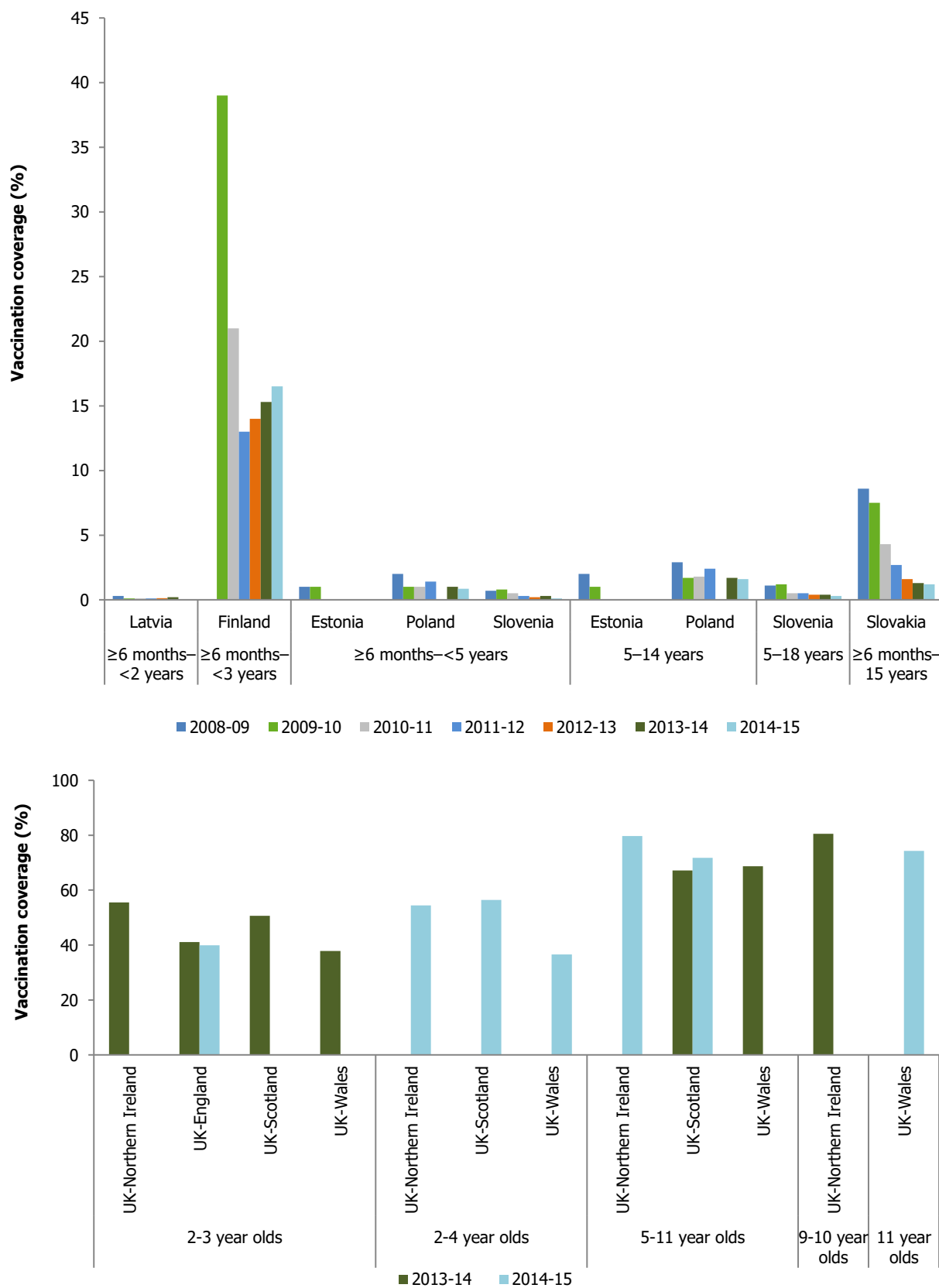
\* Data refer to seasonal influenza vaccine recommendations during the 2009–10 pandemic influenza season

## Vaccination coverage rates

### Children and adolescents

Seven of nine Member States recommending seasonal influenza vaccine for children and/or adolescents in 2014–15 reported vaccination coverage rates for various age groups calculated by administrative methods; in the UK, vaccine for children was introduced in 2013–14; soon thereafter the country began providing coverage data. (Figure 5; Annex 3: Table 4). Two of the Member States that recommended influenza vaccination for children did not provide vaccination coverage data (Austria and Malta).

**Figure 5. Seasonal influenza vaccination coverage rates among children and/or adolescents in seven EU/EEA Member States, 2008–09 to 2014–15 influenza seasons**

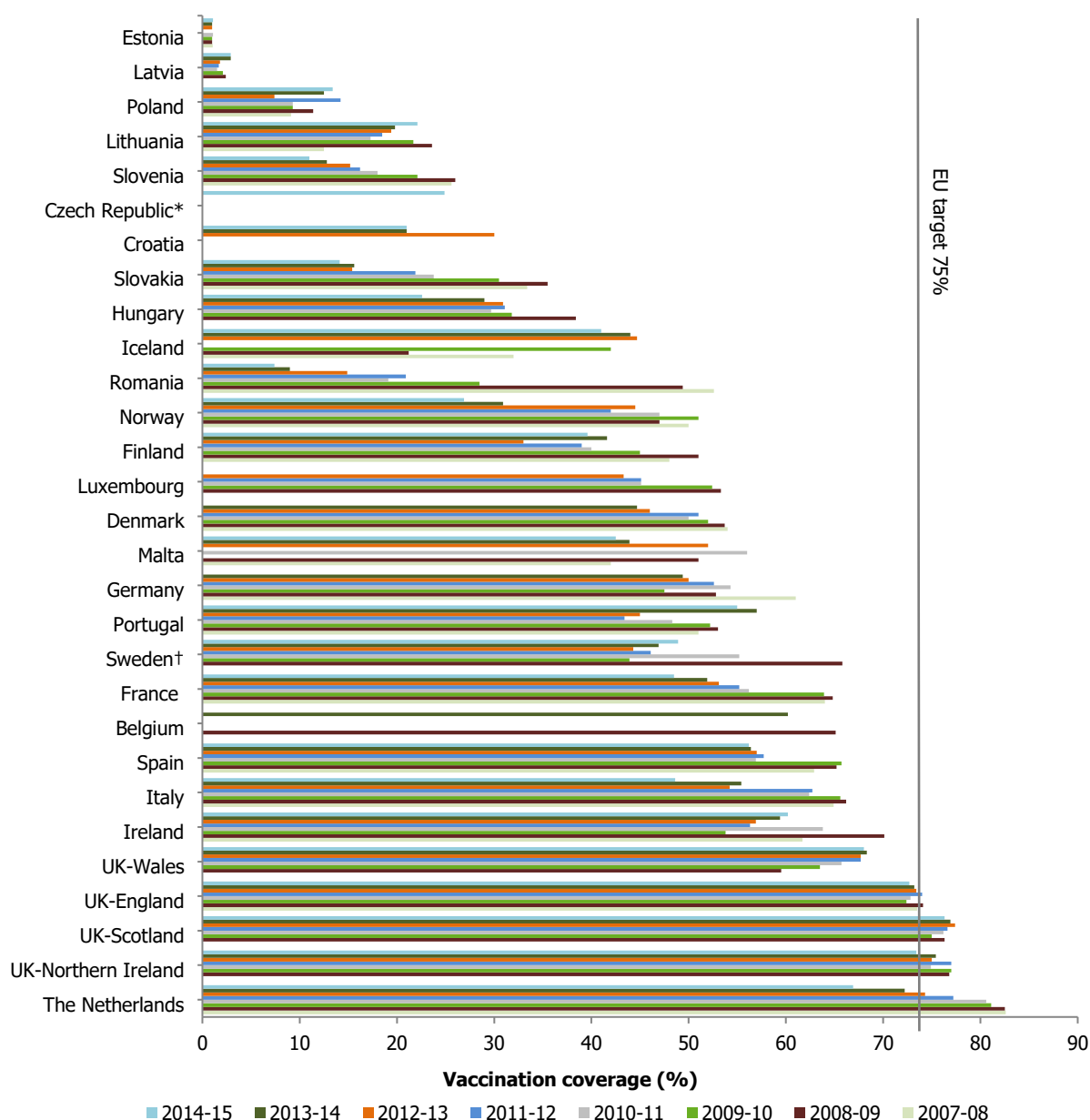


Source: National seasonal influenza vaccination surveys, July 2009–December 2015

## Older age groups

Influenza vaccination coverage rates among 'older age groups' (as defined in accordance with Member State recommendations, e.g.  $\geq 55$ ,  $\geq 59$ ,  $\geq 60$  or  $\geq 65$  years of age) from 2007–08 to 2014–15 influenza seasons were reported by 26 Member States (Figure 6, Annex 3: Table 5). Vaccination coverage rates varied from 1.1% to 76.3% in 2014–15; the median vaccination coverage rate for the same season was 41.8%. The median vaccination coverage rate for the latest survey was nearly 10% lower than when reporting first began. For the 2007–08 season, vaccination coverage rates ranged from 1% to 82.5%, with a median vaccination coverage rate of 51.0%. In the most recent survey, the highest vaccination coverage rates were reported by the United Kingdom, which achieved (United Kingdom–Scotland) or almost achieved (United Kingdom–England, United Kingdom–Northern Ireland) the EU target of 75%. Although vaccination is recommended for older age groups in all surveyed Member States, five Member States were not able to provide vaccination coverage rates for older age groups (Austria, Bulgaria, Cyprus, Greece, and Liechtenstein).

**Figure 6. Seasonal influenza vaccination coverage rates in older age groups, 29 EU/EEA Member States, 2007–08 to 2014–15 influenza seasons**



Source: National seasonal influenza vaccination surveys, July 2009–December 2015

\* Age groups of over 65 years of age and clinical risk groups combined

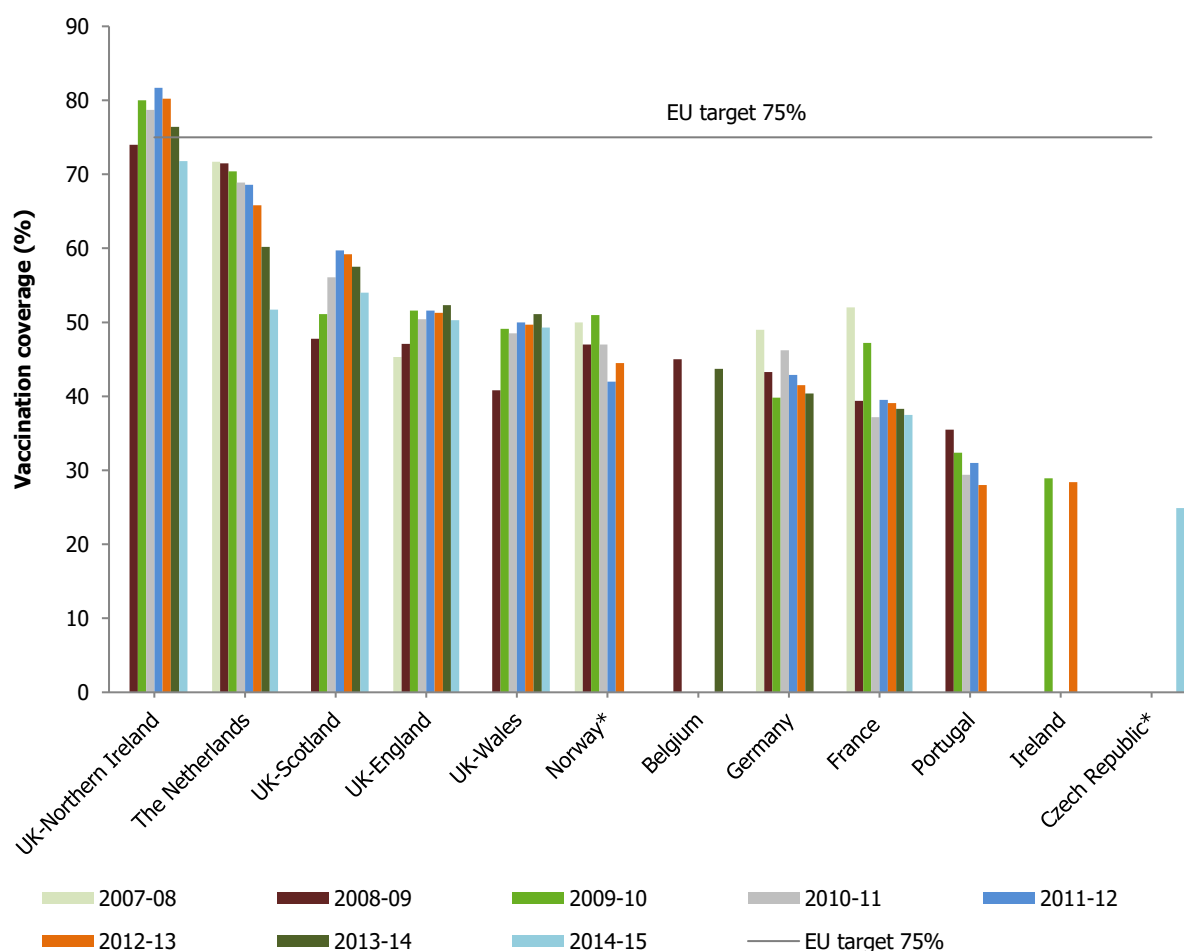
† Sweden: For the 2009–10 influenza season, reports were received for around 60% of the population.

## Individuals with chronic medical conditions

Influenza vaccination coverage rates among individuals with chronic medical conditions from 2007–08 to 2014–15 were reported by nine Member States and ranged from 24.9% to 71.8% (2014–15); the median vaccination coverage rate for the same season was 50.3% (Figure 7, Annex 3: Table 5). In 2007–08, the vaccination coverage rates ranged from 45.3% to 71.7%, with a median vaccination coverage rate of 50%. Some Member States reported an increase in vaccination coverage rates in this population, while other Member States reported a decrease.

The highest vaccination coverage rates for people with chronic medical conditions were reported by the United Kingdom–Northern Ireland. Northern Ireland reached the EU target of 75% in the seasons 2009–10 to 2013–14, but missed it, by a low margin, in 2014–15. The remaining 23 Member States were not able to report vaccination coverage rates for individuals with chronic medical conditions.

**Figure 7. Seasonal influenza vaccination coverage rates among individuals with chronic medical conditions, nine EU/EEA Member States, influenza seasons 2007–08 to 2014–15**



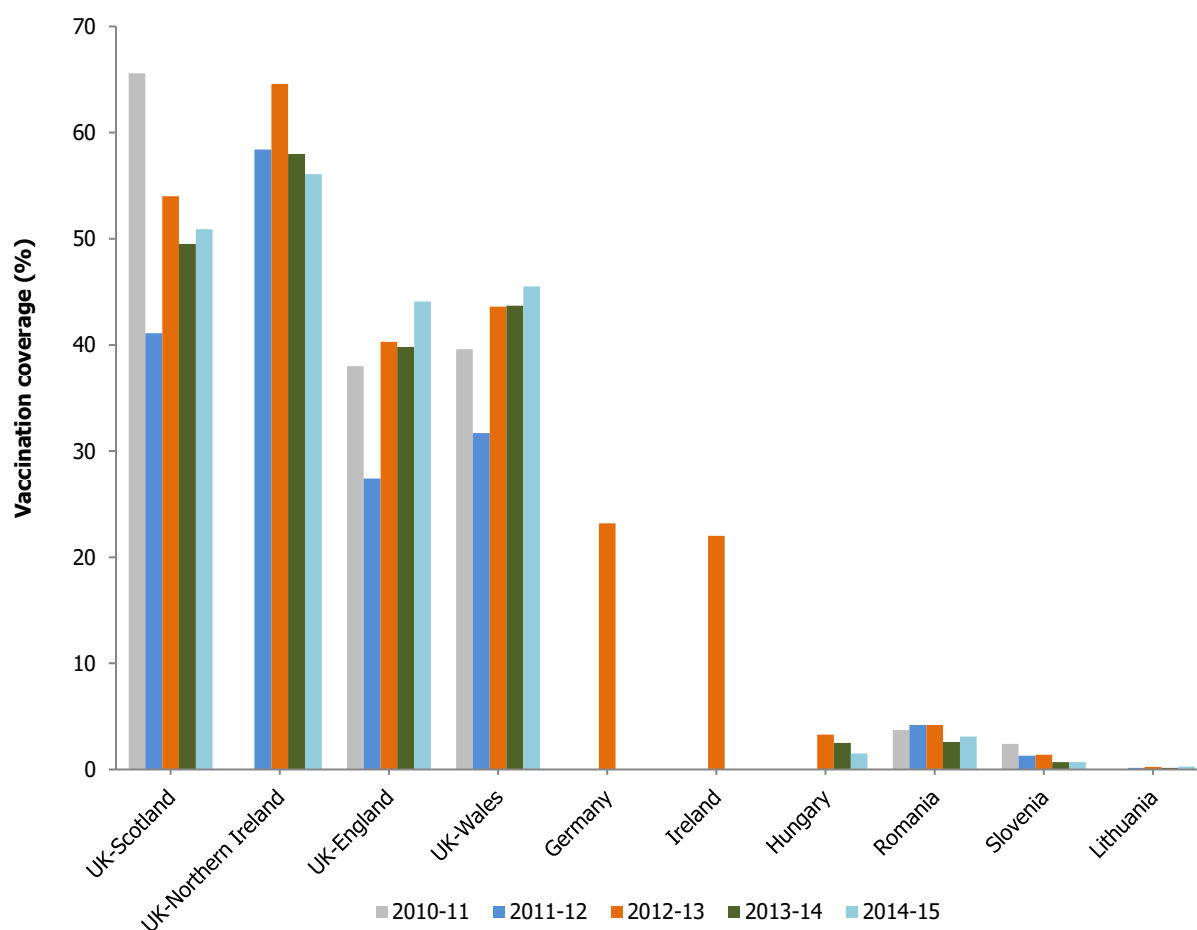
Source: National seasonal influenza vaccination surveys, July 2009–December 2015

\* Norway: Age groups of over 65 years of age and clinical risk groups combined between 2007–08 and 2012–13, measured by administrative method; Czech Republic: Age groups of over 65 years of age and clinical risk groups combined

## Pregnant women

Influenza vaccination coverage rates for pregnant women were reported by seven Member States (Figure 8, Annex 3: Table 4). Two of these Member States could only provide data for one season (Germany and Ireland). The vaccination coverage rates in pregnant women ranged from 0.3% to 56.1% in 2014–15; the median vaccination coverage rate was 23.6%. The remaining 20 of the 27 Member States where vaccine was recommended to pregnant women reported that vaccination coverage in this group was not monitored. The highest vaccination coverage rates were in the United Kingdom and varied from 44.1% in England to 56.1% in Northern Ireland in 2014–15. The vaccination coverage rates ranged from 2.4% to 65.6% in the 2010–11 influenza season, with a median vaccination coverage of 38.0%.

**Figure 8. Seasonal influenza vaccination coverage rates in pregnant women, seven EU/EEA Member States, influenza seasons 2010–11 to 2014–15**

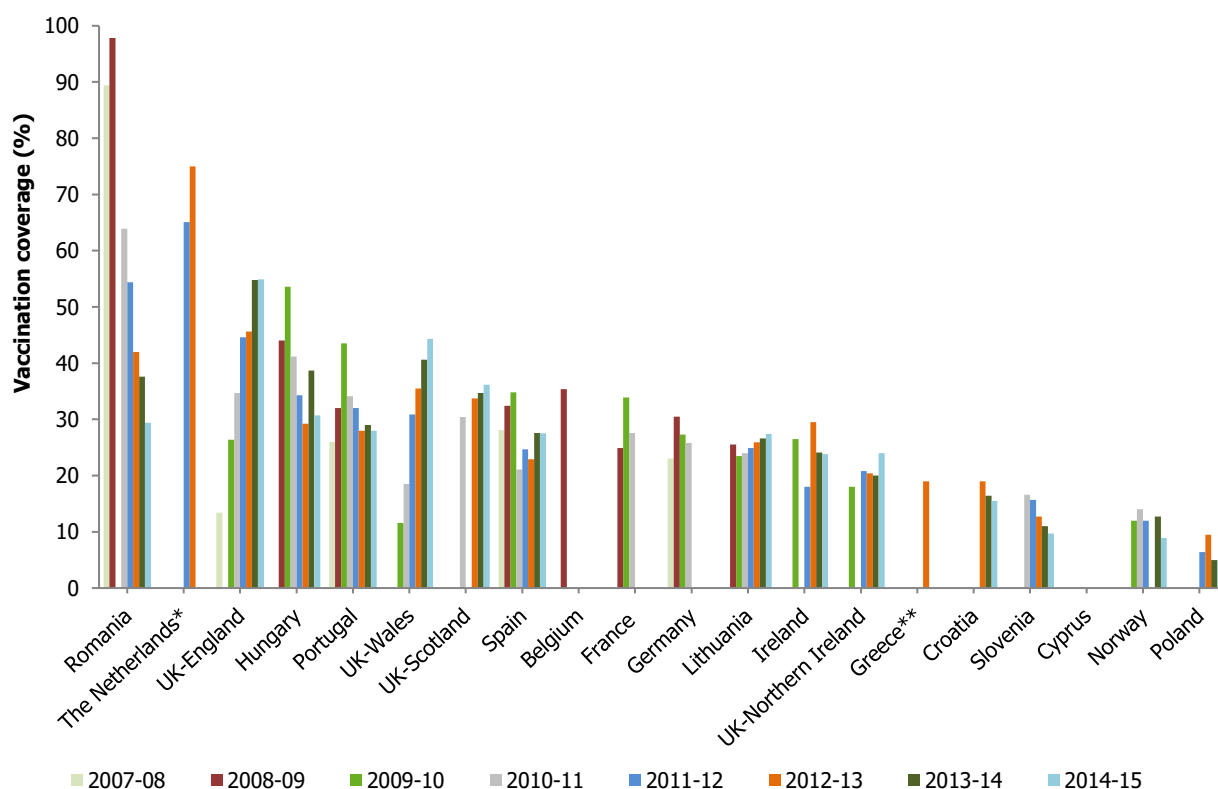


Source: National seasonal influenza vaccination surveys, July 2009–December 2015

### Healthcare workers

Influenza vaccination coverage rates for the 2007–08 and 2014–15 seasons were provided by 17 Member States. Rates ranged from 5% to 54.9% in 2014–15. The median vaccination coverage rate in 2014–15 was 25.7%. The highest vaccination coverage rates were reported by the United Kingdom (except Northern Ireland), Hungary and Romania. In the 2007–08, the vaccination coverage rates ranged from 13.4% to 89.4%; the median vaccination coverage rate in 2007–08 was 26.0%. Median vaccination coverage rates between 2007–08 and 2014–15 were relatively steady, but vaccination coverage rates varied widely at the Member State level. Some Member States reported a substantial increase in vaccination coverage rates in HCWs during this time period while others reported marked declines (Figure 9, Annex 3: Table 4).

**Figure 9. Seasonal influenza vaccination coverage rates among healthcare workers, 17 EU/EEA Member States, influenza seasons 2007–08 to 2014–15**



Source: National seasonal influenza vaccination surveys, July 2009–December 2015

\* There are no systematically collected data available on the percentage of influenza-vaccinated HCWs in the Netherlands.

A small opportunistic survey among 52 of 7 893 (0.7%) GP practices found that in 2012–13 only 7.7% of practices reported that every single employee had been vaccinated; in 67.3% of these practices, only a portion of their employees had received influenza vaccination. A recently published study among hospital HCWs found a median vaccination rate of 13% (spread 2–33%) in 2012–13 [6]

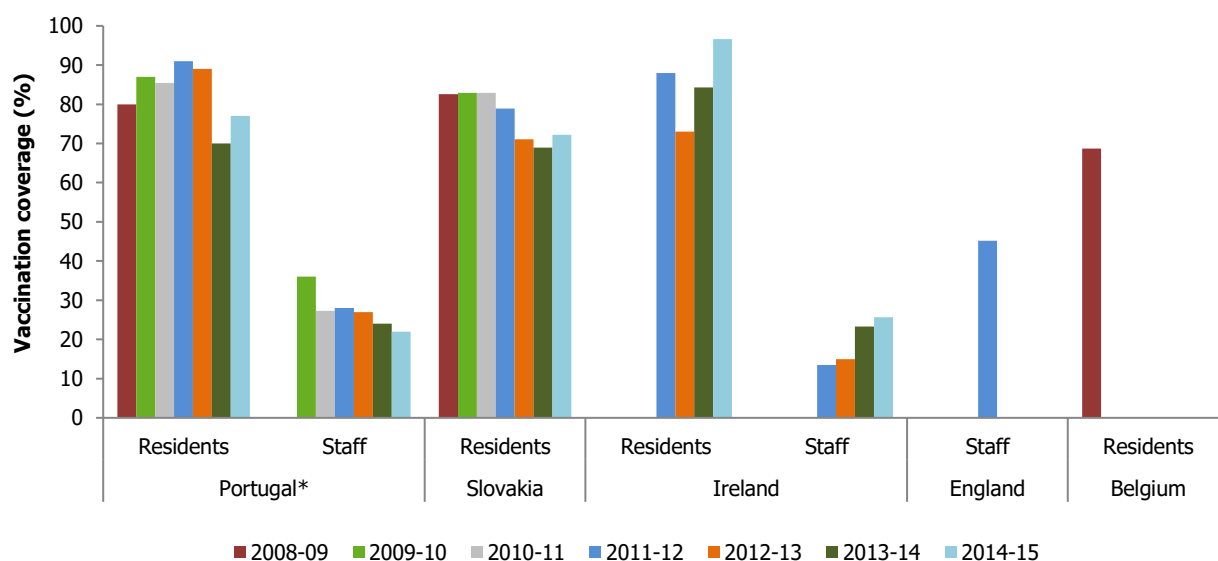
\*\* Inpatient healthcare settings

## Residents of long-term care facilities

Influenza vaccination coverage rates for residents of long-term care facilities were provided by four Member States: Belgium, Ireland, Portugal and Slovakia. The reported vaccination coverage rates were 96.6% in Ireland, 77% in Portugal and 72.2% in Slovakia, in 2014–15 (Figure 10; Annex 3: Table 4).

In addition, three Member States (Ireland, Portugal and United Kingdom-England) reported vaccination coverage rates among HCWs working in long-term healthcare settings (25.7% in Ireland and 22% in Portugal in 2014–15; 45.2% in England in 2011–12) (Figure 10; Annex 3: Table 5).

**Figure 10. Seasonal influenza vaccination coverage rates among residents and/or staff of long-term stay care facilities in five EU/EEA Member States, influenza seasons 2008–09 to 2014–15**



Source: National seasonal influenza vaccination surveys, July 2009–December 2015

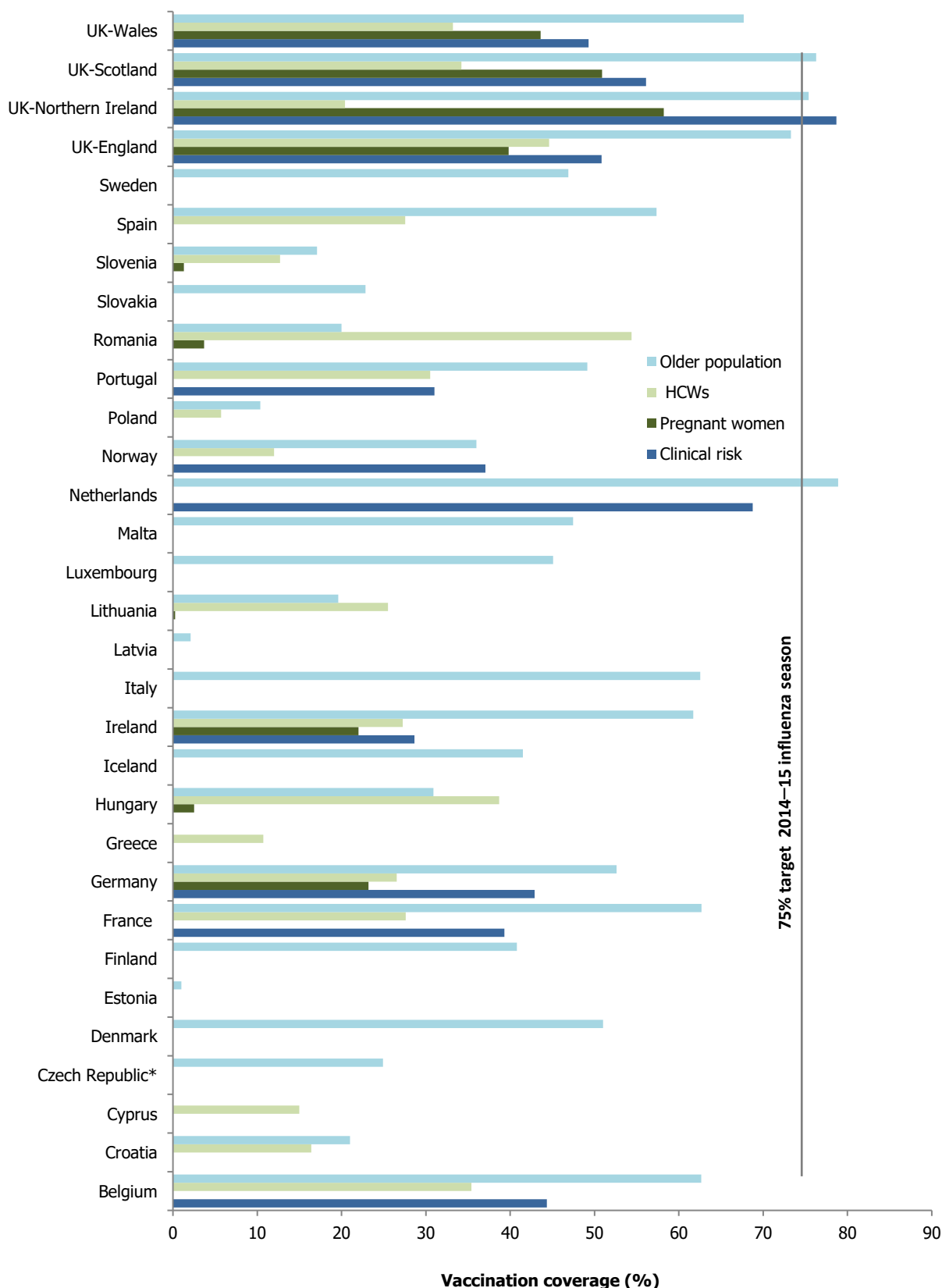
\* Data were not reported from one region in 2008-09

### Median seasonal vaccination rates

The summarised median values (the median value of a range of values) of the seasonal influenza vaccination coverage rates in vaccine-targeted population groups are presented in the Figure 11. The median vaccination coverage rates for older population groups varied from 1.0% to 76.3%; the median vaccination coverage rates for all Member States that provided data for at least one influenza season was 47.6%. The median vaccination coverage rates for those in clinical risk categories varied from 28.7% to 78.7%; the median for all Member States was 44.4%. The median vaccination coverage rates for pregnant women ranged between 0.3% and 58.2%; the median vaccination coverage rates for all Member States was 22.6%. The vaccination coverage rates for HCWs ranged between 5.7% and 54.4%; the median vaccination coverage rates for all countries was 26.9% (Figure 11; Annex 3: Table 5).



**Figure 11. Median seasonal influenza vaccination coverage rates in vaccine-targeted population groups (older age groups, those with clinical risk, pregnant women, and HCWs), 28 EU/EEA Member States, influenza seasons 2007–08 to 2014–15**



Source: National seasonal influenza vaccination surveys, July 2009–December 2015  
 \* ≥65 years of age, with chronic medical conditions

## Payment mechanisms for vaccines and vaccine administration

Member States reported that the predominant payment mechanism for influenza vaccination was through the national health services for those population groups for whom seasonal influenza vaccine was recommended (children and adolescents, adults, those with chronic medical conditions, pregnant women, HCWs, and members of closed communities). Approximately 10% of the Member States have national insurance schemes which fund vaccination programmes for targeted population groups. In addition, 20% of the Member States reported that vaccinations had to be paid out-of-pocket. For all occupational groups, including HCWs, the predominant payment mechanism for vaccination was through the employer. In two Member States, vaccination was provided by regional health services (Figures 12 and 13).

### Adults (older population)

In 16 of the 30 Member States that recommend seasonal influenza vaccination for older people (aged >50, >55, >59, ≥60 or ≥65 years, depending on national recommendations), vaccine costs were covered by the national health services; in seven Member States, the national insurance schemes covered the costs. Vaccine administration was covered by the national health services (12 Member States) or the national insurance schemes (eight Member States). In 10 Member States, vaccine costs paid by the vaccinee were not reimbursed, and 11 Member States reported that vaccinees also needed to pay out-of-pocket for vaccine administration. Vaccine and administration was reimbursed by private insurance in five and six countries, respectively (Figures 12 and 13).

### Children and adolescents

Of nine Member States that recommended vaccination to children and adolescents, four paid for the vaccine and vaccine administration through the national health services. In one country, vaccine costs were covered by the national insurance scheme. In two countries, vaccine administration was covered by the national insurance scheme. Four Member States reported that the parents (or caregivers) of children receiving vaccination had to pay for the vaccine; in three countries, parents also paid for vaccine administration (Figures 12 and 13).

### Chronic medical conditions

Vaccine for chronic medical conditions was funded by the national health services (17 Member States) and the national insurance (seven Member States); in eight Member States vaccinees had to pay for the vaccine. Vaccine administration was funded by the national health services (12 Member States) and the national insurance schemes (seven Member States); 11 Member States reported that vaccinees had to pay for vaccine administration (Figures 12 and 13).

### Pregnant women

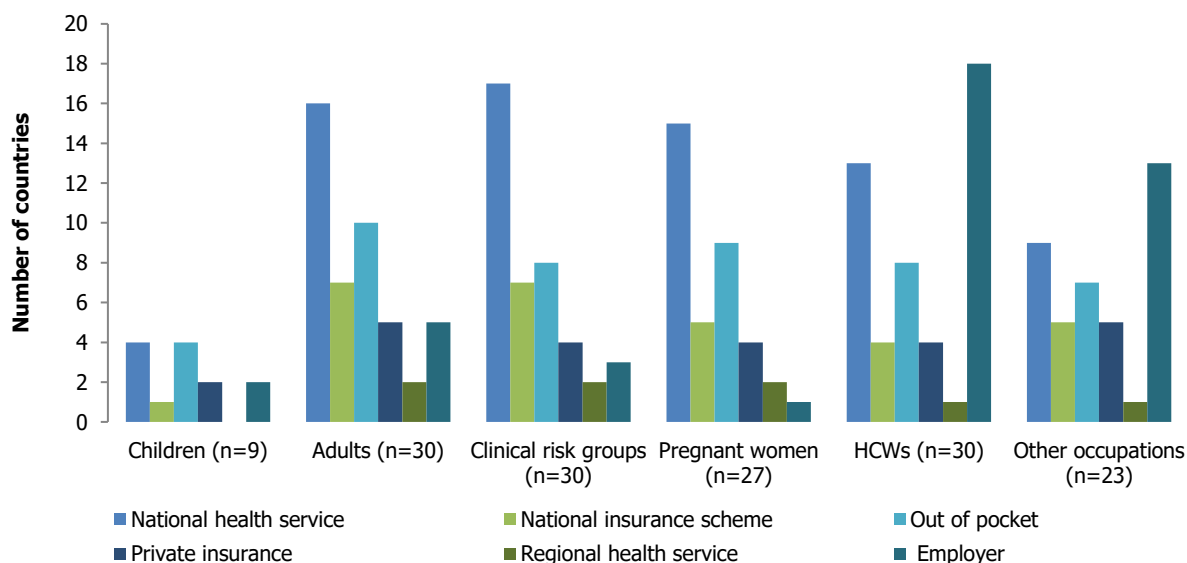
The national health services paid for vaccines for pregnant women in 15 Member States. Administration of the vaccine for this target group was covered by the national health services in 11 Member States. In nine Member States, vaccinees had to pay for the vaccine themselves. In 12 Member States, the vaccinee was required to also pay for vaccine administration (Figures 12 and 13).

### Healthcare workers

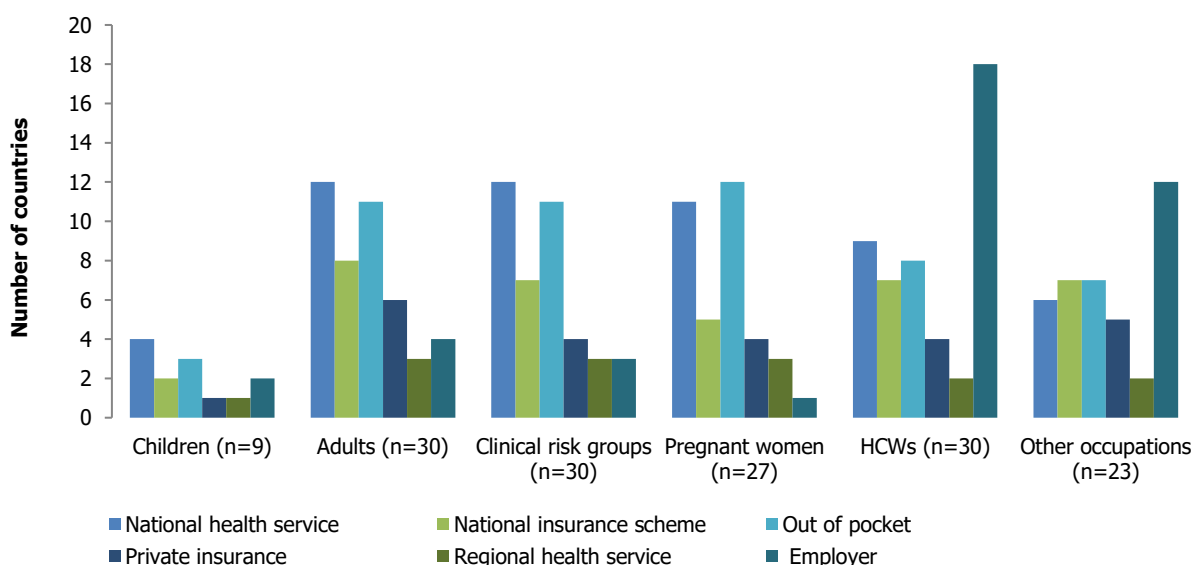
With regard to HCWs, the national health services paid for the vaccine in 13 countries. Nine countries paid for the administration. Employers paid for the vaccine and for its administration in 18 Member States (Figures 12 and 13).

Although vaccination for HCWs is not nationally recommended in Denmark, vaccination is available free of charge for all HCWs and paid for by the employer.

**Figure 12. Payment mechanisms for vaccine in population groups recommended for seasonal influenza vaccination, 2014–15 influenza season**



**Figure 13. Payment mechanisms for vaccine administration for population groups recommended for seasonal influenza vaccine, 2014–15 influenza season**



Source: National seasonal influenza vaccination survey, December 2015.

Notes for Figures 12 and 13: More than one answer was possible. As a country can issue recommendations for several target groups, the total number of countries recommending vaccination (given in brackets) can be lower.

National health insurance: a scheme in which a premium is paid into an insurance fund, which entitles payers to a range of health services. If no premiums are received, services may be reduced or cancelled.

National health service: a publicly funded healthcare system

Out-of-pocket: costs paid by the vaccinee, not reimbursable

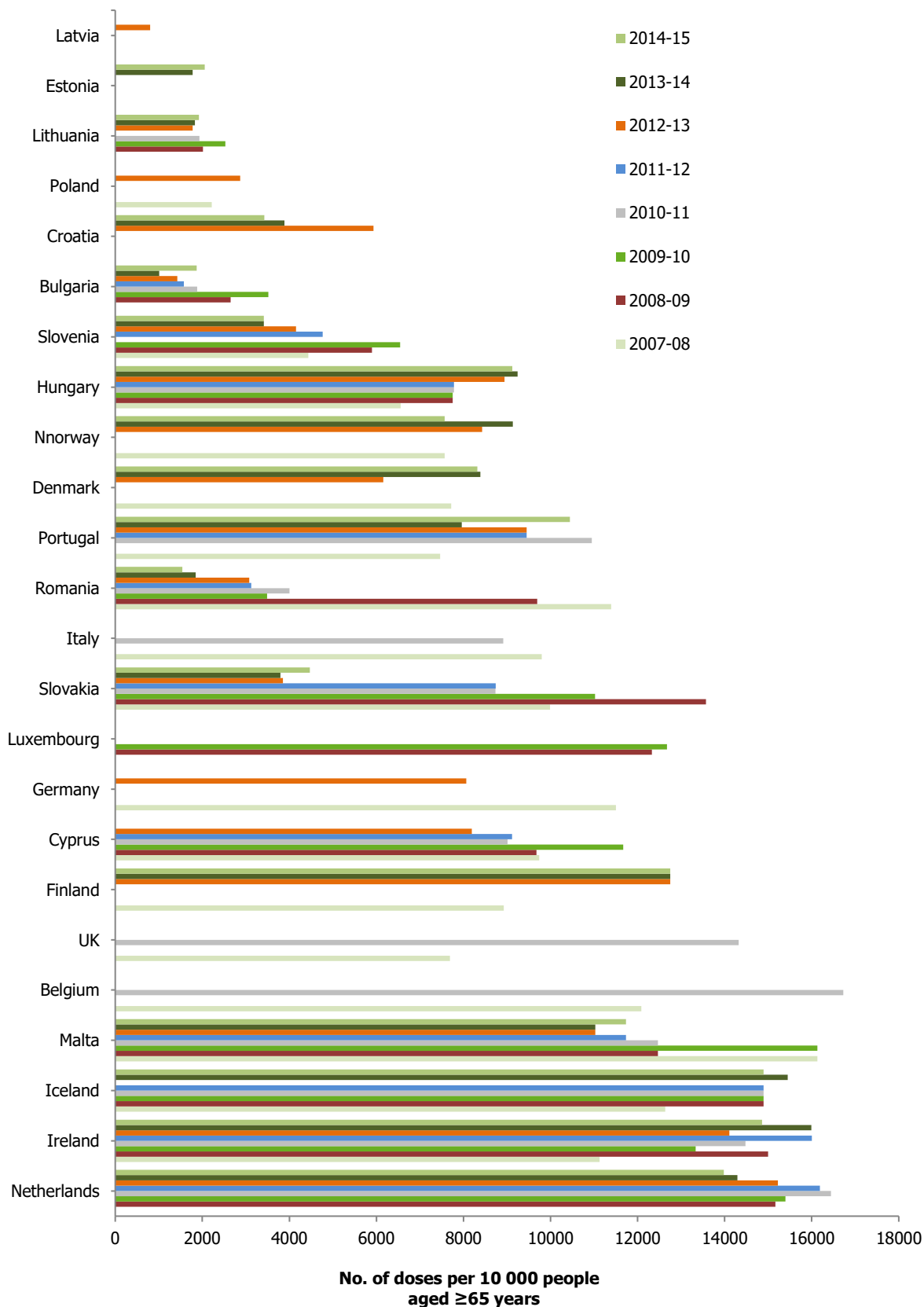
Other payment mechanism: paid for if administered in pharmacies or other authorised venues.

## Number of doses of seasonal influenza vaccine

The number of purchased seasonal influenza vaccine doses was expressed as 'available per 10 000 people aged ≥65 years' and varied widely between countries and different seasons. The number of purchased doses ranged from 2 220 to 16 131 doses per 10 000 people aged ≥65 years in 2007–08, and from 1 540 to 14 895 in 2014–15 (Figures 14–15; Annex 4: Table 6).

In some countries (e.g. Cyprus, Slovakia, Slovenia, Romania) number of doses of purchased vaccine decreased if compared with 2007–08 and 2014–15.

**Figure 14. Number of purchased\* seasonal influenza vaccine doses expressed as vaccine doses available per 10 000 people aged 65 years and over in 24 EU/EEA Member States, influenza seasons 2007–08 to 2014–15**



\* Purchased doses = number of purchased doses through national public procurement

## Limitations

There are some limitations to these surveys.

Comparisons of vaccination coverage data are difficult because European Member States use different methods to estimate coverage. Most countries use administrative methods of data collection, whereas other countries use population-based surveys or vaccination registries; some countries combined several methods. Even within a given Member State, comparisons between years may be difficult if methods or response rates differ from year to year.

How Member States enumerate the denominator data (numbers of those eligible for vaccination) is often not clear, especially when it comes to less specific groups, such as people with chronic medical conditions or HCWs.

Most EU/EEA Member States report difficulties in estimating denominator data relating to the numbers of individuals with chronic medical conditions. This reflects a lack of information systems (disease registers) or other standardised methodologies for collecting these data in most Member States.

Verifying the number of vaccinated people (numerator data) is difficult because countries may use data from administrative records, immunisation registries or surveys, which all have their own limitations.

Vaccination coverage rates were collected as proportions (the number of vaccinated individuals (numerator) divided by the number of individuals in each population group targeted for vaccination (denominator)), calculated for each participating Member State. Due to the fact that actual numerator and denominator data (numbers) were not recorded it is not possible to use statistical tests to compare different seasons between participating countries.

Some countries reported using population surveys to estimate the number of individuals at risk. Again, comparing the number of individuals at risk between countries is difficult because of the wide range of methodologies, e.g. household surveys, mail, face-to-face interviews, and telephone interviews.

Comparing median values to calculate vaccination coverage rates has its limitations as medians were calculated based on the data provided by each country. The reason for comparing median values was to not lose data. If we had restricted data analysis to the few seasons for which all participating countries provided data, we would have excluded data from those countries that only reported data for one or two seasons; however, comparing such data subsets would have been more accurate.

In this report, we estimated the number of influenza vaccine doses used in each country, expressed as a rate per 10 000 of those aged 65 years or above, as a very crude indicator to assess supply against need. As vaccine procurement must take into account the expected uptake by risk group (usually identified by demand reported in the most recent season) most countries will order quantities to match expected demand in order to minimise vaccine wastage and inefficient use of public funds.

The use of the same denominator (Eurostat data 2011) and its application to all influenza seasons is also a limitation. Changes in the population size would influence the size of population at risk, therefore annual population data would be a preferred; however, no such data were available for this report.

The reasons for low or high vaccination coverage in EU/EEA countries were beyond the scope of these surveys.

## Conclusions

The VENICE network surveys are supported by ECDC and participating Member States. The standardised data collected through these surveys ensures the ongoing monitoring of progress towards the implementation of internationally accepted recommendations and goals with regard to seasonal influenza vaccination in the EU/EEA Member States.

## Recommendations for seasonal influenza vaccination

- Recommendations for seasonal influenza vaccination for targeted or at-risk groups are standard in most countries. Targeted or at-risk groups typically include the older population, pregnant women, healthcare workers, people with chronic medical conditions, and residents of long-term care facilities. One third of the countries are also targeting children. Recommendations in most countries broadly comply with the Council Recommendation and WHO recommendations.
- There were no major changes in the number of Member States that recommended certain older age groups for influenza vaccine in the 2007–08 and 2014–15 influenza seasons. However, several countries lowered the recommended age for vaccination: more countries in 2014–15 recommended that those aged 60 years or older should be vaccinated (six in 2014–15 vs. three in 2007–08).

- There were few changes in recommendations for children and/or adolescents between 2007–08 and 2014–15. Three countries (Malta, Poland and the United Kingdom) introduced recommendations to vaccinate this specific age group.
- Changes in recommendations were seen for people with chronic medical conditions and pregnant women. Compared with the average for six influenza seasons, more countries recommend to vaccinate those with morbid obesity, people with hepatic and neurological diseases and pregnant women (more countries now recommend vaccination at any pregnancy trimester as opposed to earlier recommendations for only the 2nd and 3rd trimesters). A similar trend was observed in relation to recommendations for HCWs.
- With the exception of HCWs, the vaccination of occupational groups is not common in EU/EEA Member States: only around one third of the responding countries recommend influenza vaccine for occupational groups.

## Vaccination coverage rates during in 2007–08 and 2014–15 influenza seasons

- Vaccination coverage rates in EU/EEA Member States vary widely across groups recommended for vaccination.
- Member States reported different methodologies for collecting vaccination coverage rates, e.g. administrative data, survey data.
- Although all surveyed countries recommend vaccination for older people (26 Member States reported vaccination coverage for this group for at least one influenza season), most countries did not meet the targeted coverage of 75%. Only the United Kingdom–Northern Ireland and the United Kingdom–Scotland managed to do so. The 75% target was achieved by the Netherlands for a few influenza seasons, and the United Kingdom–England and the United Kingdom–Wales almost achieved this target. However, the vaccination coverage rate in the Netherlands has declined since 2007–08. In almost all countries, vaccination coverage rates are declining since the baseline season of 2007–08. Vaccination coverage rates are well below the EC target and did not increase in eight influenza seasons. Five Member States were not able to provide vaccination coverage rates for older population groups in any of the six VENICE surveys.
- Although seasonal influenza vaccine is recommended in all EU/EEA Member States for those with chronic medical conditions (e.g. pulmonary diseases, cardiovascular diseases, renal diseases, metabolic disorders and immunosuppression due to disease or treatment), vaccination coverage rates for this population group were only available for at least one influenza season in approximately one-third of the Member States. Vaccination coverage rates in this group were considerably lower than among the older population groups in most Member States. Vaccination coverage rates did not meet the EU target, except for the United Kingdom–Northern Ireland, where coverage among the elderly was high. High vaccination coverage rates were also reported in Netherlands; however, similar to the vaccination coverage rates among the older population, the vaccination coverage rate is also declining in this population group. Vaccination coverage rates are well below the EC target and did not increase over the eight influenza seasons covered in this report, and there is no any indication that vaccination coverage rates are rising compared with the baseline season 2007–08.
- Vaccination coverage rates among HCWs were only available from 17 of the 29 Member States that recommend vaccine for this population group. In 2014–15, vaccination coverage rates for HCWs varied greatly, e.g. from 54.9% in the United Kingdom–England and 36.2% in the United Kingdom–Scotland to 5% in Poland. The vaccination coverage rates in the United Kingdom increased since the baseline season 2007–08. In the remaining Member States, vaccination coverage rates were low – and even lower for HCWs than for other targeted population groups. Overall, vaccination coverage rates in all countries, except the United Kingdom, did not increase during eight influenza seasons. In most of these countries, vaccination coverage rates declined slightly from season to season. Vaccination coverage data for staff working in long-term care facilities were available from three Member States (Ireland, Portugal, England) and were equally low as among other HCWs.
- The four Member States that provided vaccination coverage rates for residents of long-term care facilities also reported high coverage rates.
- Although vaccination was recommended for pregnant women in 27 of the participating Member States in 2014–15, only seven of these Member States reported vaccination coverage for this group for more than four influenza seasons; vaccination coverage rates varied widely between these Member States.
- The results of these surveys show that achieving high vaccination coverage rates for those at risk of developing severe complications due to influenza infection remains a serious public health challenge.

Vaccination coverage rates did not increase in the eight influenza seasons covered in this report in any vaccine-targeted population group.

## Number of doses of seasonal influenza vaccine

A crude analysis of the number of purchased seasonal influenza vaccine doses potentially available per 10 000 people 65 years or older indicates that there is a lack of vaccine for this segment of the population in one third of Member States, in particular in those countries that most recently joined EU. In addition, these data also indicate that there is not enough vaccine, not only for older population in these countries, but also for other targeted population groups (e.g. those in risk groups) for which recommendations exist. Some countries purchased less vaccine in 2014–15 than in 2007–08. Although the number of purchased doses is likely to reflect the uptake in previous years, the lack of vaccine in some countries might be a barrier to achieve better vaccination coverage rates.

## Payment mechanisms

The predominant payment mechanism for influenza vaccinations, as reported by Member States, was through national health services (or equivalent): health services usually cover the costs for those population groups for whom seasonal influenza vaccine is recommended (e.g. children, adolescents, adults, those with chronic medical conditions, pregnant women, HCWs and members of closed communities). However, around one third of the Member States indicated that vaccines in this groups have to pay for vaccine and/or administration out-of pocket. This is likely to be one of the barriers to achieve better vaccination coverage rates in those countries.

## The way forward

- Annual EU/EEA surveys on seasonal influenza vaccination policies and coverage are useful to monitor trends in vaccination policies across the region, provided that these surveys use consistent methods, e.g. the same questions, to ensure comparability. Additionally, conducting a survey also serves as an incentive for the Member States to evaluate and improve their vaccination programmes.
- In order to assess the performance of national influenza vaccination programmes, countries should consider expanding their influenza vaccination coverage monitoring systems to those target groups for whom vaccination is most commonly recommended (older people, people with chronic medical conditions, pregnant women, and HCWs). Data on coverage, collected on an annual basis at the end of each influenza season, could be used to identify gaps and challenges in national vaccination programmes.
- The data from summarised VENICE surveys demonstrate that vaccination coverage rates need to be improved in all target groups: older people, people with chronic medical conditions, pregnant women, and healthcare workers.
- Public health authorities should consider encouraging healthcare workers to recommend seasonal influenza vaccination to people in the target groups. Communication campaigns on influenza and influenza vaccines, directed specifically at these population groups, could increase coverage.
- Adequate and sustainable funding for influenza immunisation programs is an important factor to achieve higher vaccination coverage rates.
- More work is needed to explore how recommendations (at all levels) can be effectively translated into higher vaccination coverage rates. Research should try to identify the reasons why some countries achieve a 75% vaccination coverage rate and others do not.
- Comparison of vaccination coverage rates at the European level could be obtained by annual population-based surveys, which use identical or very similar methods.

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# Annex 1. Recommendations for children, adolescents and adults

**Table A-1. Member States recommending seasonal influenza vaccination for children, adolescents and adults, influenza seasons 2014–15 and 2007–08**

Country	Influenza season	Age groups: children								Age groups: adults (years)					
		≥6 –24 <sup>s</sup> months	≥6 – 36 months	≥6 – 59 months	≥2–4 years	≥2–11 years	11 years	≥6 months–12 years	≥6 months–<18 years	≥18–64	≥50	≥55	≥59	≥60	≥65
Austria <sup>a,c</sup>	2014-15								R	R	R				R
	2007-08								R	R	R				R
Belgium <sup>b</sup>	2014-15										R				R
	2007-08										R				R
Bulgaria	2014-15														R
	2007-08	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Croatia	2014-15														R
	2007-08	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyprus	2014-15														R
	2007-08														R
Czech Republic	2014-15														R
	2007-08														R
Denmark	2014-15														R
	2007-08														R
Estonia <sup>c</sup>	2014-15								R	R					R
	2007-08								R	R					R
Finland	2014-15		R												R
	2007-08		R												R
France	2014-15														R
	2007-08														R
Germany	2014-15													R	
	2007-08													R	
Greece	2014-15													R	
	2007-08													R	
Hungary	2014-15													R	
	2007-08														R
Iceland	2014-15													R	
	2007-08													R	
Ireland <sup>d</sup>	2014-15										R				R
	2007-08										R				R
Italy	2014-15														R
	2007-08														R
Latvia	2014-15	R													R
	2007-08	R													R
Liechtenstein	2014-15														R
	2007-08	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithuania	2014-15														R
	2007-08														R
Malta	2014-15			R								R			
	2007-08											R			
Netherlands	2014-15													R	
	2007-08														R
Norway	2014-15														R
	2007-08														R
Poland <sup>c</sup>	2014-15								R	R		R			
	2007-08											R			
Portugal <sup>e</sup>	2014-15												R		R
	2007-08												R		R
Romania	2014-15														R
	2007-08														R
Slovakia	2014-15							R					R		
	2007-08							R					R		
Slovenia	2014-15	R													R
	2007-08	R													R

Country	Influenza season	Age groups: children							Age groups: adults (years)						
		≥6 – 24 <sup>§</sup> months	≥6 – 36 months	≥6 – 59 months	≥2–4 years	≥2–11 years	11 years	≥6 months–12 years	≥6 months–<18 years	≥18–64	≥50	≥55	≥59	≥60	≥65
Spain <sup>f</sup>	2014-15														R
	2007-08														R
Sweden	2014-15														R
	2007-08														R
United Kingdom–England <sup>g</sup>	2014-15				R										R
	2007-08														R
United Kingdom–Northern Ireland <sup>h</sup>	2014-15					R									R
	2007-08														R
United Kingdom–Scotland <sup>i</sup>	2014-15					R									R
	2007-08														R
United Kingdom–Wales <sup>j</sup>	2014-15				R		R								R
	2007-08														R

Source: National seasonal influenza vaccination surveys, July 2009, December 2015

R = recommended. 'Recommended' is defined as the existence of a written recommendation in an official policy document stating that a particular population group should receive seasonal influenza vaccine.

– = A dash means that these countries did not respond or participate during the survey period.

§ Up to and including children aged 24 months

a Vaccination is recommended for people ≥50 years of age, particularly for people ≥65 years of age.

b During the influenza season 2007–2008, vaccination was recommended for people 50–64 years of age. In 2014–2015, vaccination was still advised for this age group but this group was no longer considered high priority.

c In Austria, Estonia and Poland, vaccination against seasonal influenza is recommended for all population groups six months or older.

d The National Immunization Technical Advisory Group (NITAG) recommends vaccination for all people ≥50 years of age, but the national influenza programme specifies ≥65 years.

e Vaccine recommended for those ≥60 years of age; vaccine is free of charge for those 65 years or above.

f The recommendation at the national level is for those ≥65 years of age; however, 10 out of 19 regions recommend vaccination for all people 60 years and older.

g In 2013–14, vaccination was recommended for all two- and three-year-old children; in 2014–15, four-year-olds were added to this group.

h In 2013–14, vaccination was recommended for all two- and three-year-old children and all children in grade 6 (10 years of age); in 2014–15, vaccination was recommended for all children aged 2 to 11 years.

i Recommended for all children aged 2 to 11 years.

j Since the 2014–15 influenza season, vaccination has been recommended for all children aged two to four years. Vaccination is also recommended for all children in grade 7 (11 years of age).

## Annex 2. Recommendations for specific groups

**Table A-2. Population groups recommended for seasonal influenza vaccination in EU/EEA countries during six influenza seasons**

Recommendation for targeted population groups	Number of countries where vaccination was recommended by influenza season <sup>†</sup>					
	2007–08 (n=27)	2009–10 <sup>§</sup> (n=28)	2010–11 (n=28)	2011–12 (n=28)	2012–13 (n=30)	2014–15 (n=30)
<b>Clinical risk groups, disorders</b>						
Chronic pulmonary diseases <sup>a</sup>	27	28	28	28	30	30
Cardiovascular diseases <sup>b</sup>	27	28	28	28	30	30
Renal diseases	25	28	28	28	30	30
Haematologic/metabolic disorders	26	28	28	28	27	30
Immunosuppression due to disease or treatment	25	28	28	28	29	30
HIV/AIDS	24	24	25	25	25	28
Hepatic diseases	15	17	19	21	27	27
Children on long-term aspirin therapy	18	17	16	15	17	15
Morbid obesity (Body mass index $\geq 40\text{kg}/\text{m}^2$ ) <sup>c</sup>	-	-	9	10	15	19
Chronic neurological diseases or neuromuscular conditions <sup>d</sup>	-	-	19	21	25	26
Any conditions that can compromise respiratory function <sup>e</sup>	13	18	19	23	22	23
<b>Pregnancy-related recommendations</b>						
Recommended	10	16	22	23	27	27 <sup>f</sup>
Any trimester	-	-	9	13	18	21
Either 2nd or 3rd trimester	-	-	13	10	9	7
<b>Occupational setting</b>						
HCWs	22	23	25	26	29	29
Essential services (police and firemen)	5	8	8	7	7	10
Military	6	9	10	11	11	12
Poultry industry	13	11	12	9	11	12
Families that raise poultry, pigs or waterfowl	4	9	9	7	5	5
Educational	-	-	5	3	3	4
Public transport	-	-	6	4	4	5
Energy sector	-	-	3	1	2	3
Veterinary services	-	-	-	-	7	8
Border control/immigration/customs staff	-	-	4	3	5	5
<b>Other settings/groups</b>						
Residents of long-term care facilities	22	24	25	25	28	27
Household contacts of:						
Individuals belonging to the risk groups	-	10	14	15	19	18
Children <6 months of age	-	6	11	9	7	7
Immunosuppressed individuals	-	9	16	17	20	22
Older population (e.g. $\geq 65$ years)	-	4	10	10	10	11

Source: National seasonal influenza vaccination surveys, July 2009–December 2015

<sup>§</sup> Data refer to seasonal influenza vaccine recommendations in the 2009–10 pandemic influenza season.

<sup>†</sup> No data collected for influenza seasons 2008–09 and 2013–14.

<sup>a</sup> Respiratory (pulmonary) diseases, e.g. chronic obstructive pulmonary disease, cystic fibrosis, asthma.

<sup>b</sup> Cardiovascular diseases, e.g. congenital heart disease, congestive heart failure and coronary artery disease, except hypertension.

<sup>c</sup> Morbid obesity is defined as having a body mass index of  $\geq 40\text{kg}/\text{m}^2$ .

<sup>d</sup> Chronic neurological diseases or neuromuscular conditions, e.g. disorders of the brain, the spinal cord, the peripheral nerves and muscles such as cerebral palsy, epilepsy (seizure disorders), stroke, intellectual disability (mental retardation), moderate to severe developmental delay, muscular dystrophy, or spinal cord injury.

<sup>e</sup> Any condition that can compromise respiratory function, e.g. cognitive dysfunction, spinal cord injury, seizure disorder, or other neuromuscular disorders.

<sup>f</sup> Recommended for all pregnant women in 25 countries in 2014–15; recommended for those with additional clinical risk in two countries.

## Annex 3. Vaccination coverage rates and method of monitoring by countries

**Table A-3. Seasonal influenza vaccination coverage rates among children and adolescents, EU/EEA Member States, from 2008–09 to 2014–15 influenza seasons**

Country/ age group	Estonia		Finland§	Latvia	Poland		Slovakia	Slovenia		UK-England	UK-Northern Ireland	UK-Scotland	UK-Wales	UK-Northern Ireland	UK-Scotland	UK-Wales	UK-Northern Ireland	UK-Wales	UK-Northern Ireland	UK-Wales
	≥6 months ≤5 years	5–14 years	≥6 months ≤3 years	≥6 months ≤2 years	≥6 months ≤5 years	5–14 years	≥6 months –15 years	≥6 months ≤5 years	5–18 years	2–3 year olds			2–4 year olds			5–11 year olds		9–10 year olds	11 year olds	
2008–09	1	2	-	0.3	2	2.9	8.6	0.7	1.1	-	-	-	-	-	-	-	-	-	-	-
2009–10	1	1	39	0.1	1	1.7	7.5	0.8	1.2	-	-	-	-	-	-	-	-	-	-	-
2010–11	-	-	21	0.1	1	1.8	4.3	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-
2011–12	-	-	13	0.1	1.4	2.4	2.7	0.3	0.5	-	-	-	-	-	-	-	-	-	-	-
2012–13	-	-	14	0.12	-	-	1.6	0.2	0.4	-	-	-	-	-	-	-	-	-	-	-
2013–14	-	-	15.3	0.2	1	1.7	1.3	0.3	-	41.1	55.5	50.7	37.8	-	-	-	67.2	68.7	80.5	-
2014–15	-	-	16.5	-	0.85	1.6	1.2	-	-	39.9	-	-	-	54.4	56.4	36.6	79.7	71.8	-	74.3

§ Vaccinated with at least one dose



facilities reported data for these seasons; hospital participation was high (80.7% in 2013–2014 and 79.7% in 2014–2015), but data may not represent all vaccinated individuals, particularly if HCWs were vaccinated outside the facility.

*h* In the Netherlands, no systematically collected data are available on the percentage of influenza-vaccinated people. A small opportunistic survey among 52 of 7893 (0.7%) GP practices found that in 2012–13, only 7.7% of practices reported that every single employee was vaccinated; in 67.3% of these practices, only a portion of the employees had received an influenza vaccination. A recently published study among hospital HCWs found a median vaccination rate of 13% (spread 2–33%) in 2012–13 [6]

<sup>i</sup>Data were not reported from one region in 2008–09.

<sup>j</sup>In Sweden, the 2014–15 data on the older population (collected through the administrative method) were taken from regional vaccine registers in 11 of 21 counties, covering circa 65% of the Swedish population.

## Annex 4. Number of doses of seasonal influenza vaccine

**Table A-5. Number of doses of seasonal influenza vaccine, EU/EEA Member States, influenza seasons 2007–08 to 2014–15**

Influenza season	2007–08			2008–09		2009–10		2010–11			2011–12			2012–13			2013–14			2014–15		
	Purchased	Purchased	Distributed	Purchased	Distributed	Purchased	Distributed	Used	Purchased	Distributed	Used	Purchased	Distributed	Used	Purchased	Distributed	Used	Purchased	Distributed	Used		
Belgium	2276000	-	-	-	-	3150000	2650000	2550000	-	2800000	-	-	-	-	-	-	-	-	-	-	-	
Bulgaria	-	360632	-	478551	-	256395	-	-	214600	214600	-	194398	-	-	137161	137161	137161	254586	254586	254586		
Croatia	-	-	-	-	-	-	-	-	-	-	-	450000	445000	288440	295000	292350	255375	260000	258520	232951		
Cyprus	108926	108254	94614	130499	129309	100800	95440	95440	101992	94762	94762	91640	76708	76708	-	-	-	-	-	-		
Denmark	720718	-	-	-	-	-	-	-	-	-	-	575000	575000	-	783340	777500	-	777000	731340	-		
Estonia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40800	26929	16496	47200	32390	15943		
Finland	840000	-	-	-	-	-	-	-	-	1009971	-	1200000	900000	900000	1200000	1100000	700000-1000000	1200000	1100000	700000-1000000		
France	-	-	11601793	-	10492999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Germany	19000000	-	16526700	-	-	-	-	-	-	-	-	13322945	-	-	-	-	-	-	-	-		
Hungary	1100000	1300000	-	1300000	-	1305000	1275000	-	1305000	1270000	-	1500000	1300000	1000000	1550000	1300000	898086	1530000	1300000	775230		
Iceland	50900	60000	51852	60000	56350	60000	47590	-	60000	45384	-	-	-	-	62240	62240	-	60000	58593	-		
Ireland	591299	797180	605210	708660	649520	769640	759930	712700	850630	702450	-	749992	702027	659596	849999	742359	692788	790000	769380	728393		
Italy	12137127	-	12640362	-	12609193	11040568	-	-	-	-	-	-	-	-	8825063	-	-	9304534	-	8273559		
Malta	110000	85000	65000	110000	73000	85000	85000	78000	80000	76000	75200	75200	75200	75200	75200	75200	75200	80000	75600	75500		
Latvia	-	-	-	-	-	-	-	-	-	-	-	30500	23640	9201	-	-	-	-	-	-		
Lithuania	-	110000	110000	138035	138035	105508	105508	90747	-	-	114725	97177	97177	95136	100000	100000	97114	105000	105000	102268		
Luxembourg	-	88450	80457	90936	89182	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Norway	579888	-	579888	-	599111	-	583480	-	-	517000	466000	645894	541771	526134	700000	520476	486302	580000	479437	435661		
Netherlands	-	3935860	3800860	3994760	3987940	4266110	4025990	3789949	4200000	3956010	3637545	3950000	3735000	3490000	3709640	3606120	3435599	3628570	3541640	3344906		
Poland	1158878	-	-	-	-	-	-	-	-	-	-	1500000	1500000	910000	-	-	-	-	-	-		
Portugal	1500000	-	1600000	-	1800000	2200000	2200000	1600000	1900000	1900000	1350000	1900000	1900000	-	1600000	1600000	-	2100000	2100000	-		
Romania	3700000	3147500	3147500	1132800	1132800	1300000	1300000	1205917	1015115	1015115	650589	1000000	1000000	904251	600000	600000	578057	500000	500000	492176		
Slovakia	682117	926643	692217	752615	669531	596370	-	496943	596900	407417	407417	262996	249684	249684	259220	259192	259192	305122	247887	247887		
Slovenia	150261	199820	190529	221850	198272	-	-	-	161600	137233	100390	140755	121491	88000	115600	105138	80000	115600	90600	68087		
UK	7976165	-	-	-	-	14859000	14517000	-	-	-	-	-	-	17566957	11914798	-	-	-	-	-		
England	-	-	-	-	-	12412000	-	9497000	-	-	-	-	-	-	-	-	-	-	-	-		
UK-Northern Ireland	-	-	-	-	-	-	-	-	-	-	408 000	-	-	-	-	-	-	-	-	-		
UK-Scotland	-	-	-	-	-	-	-	-	-	-	-	1156463	-	-	-	-	-	-	-	-		

Source: National seasonal influenza vaccination surveys, July 2009–December 2015

– (dash): no data provided

'Purchased doses': number of purchased doses through public procurement

'Distributed doses': number of doses distributed for vaccination in the country during a given influenza season

'Used doses': number of doses used for vaccination in the country during a given influenza season

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