Vaccination of Health Care Workers
Recommendations, Screening & Barriers

Dr. Daniel Tiefengraber, DTM&H

Institute for Specific Prophylaxis and Tropical Medicine
Outpatient-Clinic for Vaccination & Travel Medicine
Medical University of Vienna
Head: Univ. Prof. Dr. Ursula Wiedermann-Schmidt
www.meduniwien.ac.at/tropenmedizin
Vaccination of Health Care Workers (HCWs)

I. Why vaccinate HCWs?
II. Vaccine Recommendations
III. Screening
IV. Barriers / Vaccine Hesitancy
Whom to vaccinate and why?
Health Care Worker (HCW)

WHO-Definition: „All persons involved in patient care such as health care professionals (HCPs), residents, students, laboratory staff, administrative and service staff, as well as persons in public health such as field workers, epidemiologists, laboratory staff and community health workers."

Healthcare facilities have the obligation to protect the patients/HCWs and to promote a safe environment for providing healthcare services.
Measles in healthcare personnel in Greece, 2017–2018

Maltezou et al.
Journal of Hospital Infection 2018;100:e261-263
Nosocomial measles outbreak in Italy, February-April 2017

- One HCP hospitalized because of “allergic rash” after being treated with an antibiotic because of “cough and rhinorrhea”
- 35 Measles cases
Measles-Immunity among HCPs in hospitals (Europe)

9% - 63% complete vaccination against measles
13% - 36% susceptibility
Measles is more contagious than you think

Measles is an acute, highly contagious viral disease capable of producing epidemics. It is very infectious and spreads easily among unvaccinated people. A person with measles infects on average of 12 to 18 previously uninfected people. Vaccination is the best way to protect yourself and others against measles.

- Measles: 12-18 people
- Influenza: 1.4-11 people
- Pertussis: 12-17 people
- Smallpox: 5-7 people
- Mumps: 4-7 people
- Diphtheria: 6-7 people
- Rubella: 6-7 people

The centre dots represent one person affected by a disease. The connected dots indicate the maximum and minimum number of previously uninfected people who could get infected by a single case of the disease.

**Nosocomial Pertussis in Neonatal Units - Review**

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Setting</th>
<th>Source</th>
<th>Clinical presentation</th>
<th>Infected cases</th>
<th>Attack rate among infants</th>
<th>Vaccination status of infants</th>
<th>Severity of illness among infants</th>
<th>Case fatality among infants</th>
<th>Infections</th>
<th>Case fatality among infants</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>Australia</td>
<td>Special care nursery</td>
<td>Mother</td>
<td>Non-productive cough</td>
<td>Three neonates, One HCW</td>
<td>15.8%</td>
<td>Unvaccinated</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2003</td>
<td>Kentucky, USA</td>
<td>Intermediate care nursery</td>
<td>HCW</td>
<td>Cough</td>
<td>One infant, four HCWs</td>
<td>1.4%</td>
<td>Unvaccinated</td>
<td>NICU admission, ventilation</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2003</td>
<td>Pennsylvania, USA</td>
<td>Paediatric unit</td>
<td>Neonate</td>
<td>Cough, fever, vomiting, dyspnoea</td>
<td>17 HCWs, two children</td>
<td>NR</td>
<td>Unvaccinated</td>
<td>NR</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2004</td>
<td>Texas, USA</td>
<td>Newborn nursery</td>
<td>HCW</td>
<td>Cough, vomiting, dyspnoea</td>
<td>11 infants</td>
<td>9.7%</td>
<td>Unvaccinated</td>
<td>PICU: five infants, three ventilated</td>
<td>0</td>
<td>three</td>
<td>0</td>
</tr>
<tr>
<td>2004</td>
<td>UK</td>
<td>Neonatal unit</td>
<td>HCW</td>
<td>Prolonged cough</td>
<td>Two infants</td>
<td>NR</td>
<td>Unvaccinated</td>
<td>Both mechanical ventilation</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2004</td>
<td>Louisiana, USA</td>
<td>Two NICUs</td>
<td>Unknown</td>
<td>NA</td>
<td>Four infants</td>
<td>12.1%</td>
<td>Unvaccinated</td>
<td>Two had severe disease</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2009</td>
<td>Australia</td>
<td>Maternity ward</td>
<td>HCW</td>
<td>Cough</td>
<td>Four neonates</td>
<td>10.2%</td>
<td>Unvaccinated</td>
<td>Hospitalization, no severe disease</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2012</td>
<td>UK</td>
<td>NICU + general paediatric ward</td>
<td>Mother</td>
<td>Prolonged cough</td>
<td>Two neonates</td>
<td>4%</td>
<td>Unvaccinated</td>
<td>One: ventilation + thalamus infarct</td>
<td>0</td>
<td>thalamus</td>
<td>0</td>
</tr>
</tbody>
</table>

HCW, healthcare worker; ICU, intensive care unit; NICU, neonatal intensive care unit; PICU, paediatric intensive care unit; NA, non-applicable; NR, not reported; DTaP, diptheriae--tetani--acelular pertussis vaccine.

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Meningococcal Disease in Microbiologists

• 16 cases during 1985-2001 globally
• 16 (100%) in microbiologists
  (9 serogroup B, 7 serogroup C)
• 8 (50%) died

Attack rate in the US

13/100,000 microbiologists
0,2/100,000 in adults
Influenza in HCPs

- Meta-analysis of 58,245 influenza cases (diagnosed by serology, PCR or culture)
  - 18.7% in non-vaccinated HCPs
  - 5.5% in non-vaccinated non-HCPs

Kuster et al.
PlosOne. 2011;6:e26239
Nosocomial Influenza Outbreaks

- Attack rates
  - up to 55% among patients
  - up to 18% among HCWs
- Case fatality rates
  - up to 25% in Neonatal Care Units
- Case fatality rates
  - up to 60% in transplant patients and ICU patients

Meara et al. Irish Medical Journal 2006;99: 175-177
Maltezou HC, Drancourt M. Journal of Hospital Infection 2003;55:83-91
Influenza – Mortality in high-risk groups

- Associated cardiovascular and pulmonary disease: 870
- Associated cardiovascular disease and diabetes: 481
- Pulmonary disease: 240
- Cardiovascular disease: 104
- Healthy adults: 2
Immunocompromised Patients

- 29y-old male, history of Aplastic Anemia, Cyclosporin-treatment
Exposure and illness of HCPs

- Influenza
- Measles
- Rubella
- Mumps
- Hepatitis A, Hepatitis B
- Pertussis
- Chickenpox
- Tuberculosis
- Meningococcal disease
Transmission from HCPs to patients

- Influenza: frequent
- Measles
- Hepatitis A, Hepatitis B
- Pertussis
- Mumps
- Rubella
- Varicella: rare

Haviari S et al. Human Vaccines & Immunotherapeutics 2015 vol: 11 (11) 2522-2537

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Rationale for Vaccination of HCPs

#1

HCPs are at increased risk for occupational exposure to vaccine-preventable diseases (compared with adults working in non-healthcare settings)
Rationale for Vaccination of HCPs

#2

HCPs provide care to vulnerable patient groups:

• age (neonates, elderly)
• underlying conditions (pregnancy, immunosuppression)
• chronic diseases (malignancy, COPD)
Rationale for Vaccination of HCPs

#3

Unvaccinated HCPs often are the source of infection in nosocomial outbreaks

#Psy

HCPs often continue to work despite having symptoms, putting patients & colleagues at risk
Rationale for Vaccination of HCPs

#Best

VACCINES ARE SAFE AND EFFECTIVE
HCW - Vaccine Recommendations
Vaccination Policies for HCPs

National recommendations should exist and be followed.

These differ in terms of:

1. Vaccines
2. Targeted groups
   - All HCPs?
   - HCP in direct patient care?
   - Following risk assessment?
3. Implementation: mandatory vs. voluntary
HCW-Vaccination policies in 36 European countries (2018)
**HCP Vaccine Recommendations in Europe (2018)**

- **Hepatitis B**
  - recommended for all HCP in 15 countries
  - recommended for specific groups in 6 countries
  - mandatory for all HCP in 8 countries
  - mandatory for specific groups in 2 countries
  - required for employment for all HCP in 6 countries and for specific groups in 3 countries

- **Influenza**
  - recommended for all HCP in 31 countries
  - recommended for HCP in direct health care in 3 countries
  - mandatory for specific groups in Serbia (hospital-level)
  - no official recommendation in Denmark
The Austrian „Impfplan“

- Overview of currently available vaccines in Austria
  - Evidence-based recommendations

- Published by the Austrian Ministry of Social Affairs, Labour, Health & Consumer Protection

- Medical & Technical Expertise by the Nationales Impfremium (NIG) => Austrian NITAG

- Revised annually
- Target audience: Medical Doctors and Pharmacists

www.sozialministerium.at/Impfplan
### Austrian Recommendations for HCWs

<table>
<thead>
<tr>
<th>Personengruppe</th>
<th>MMR</th>
<th>DTetPert-Polio</th>
<th>Varizellen</th>
<th>Influenza</th>
<th>Hep. B</th>
<th>Pneumokokken¹</th>
<th>Spezielle Empfehlungen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ärztinnen, Ärzte, Zahnärztinnen, Zahnärzte</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td></td>
<td>++³</td>
<td></td>
<td></td>
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<tr>
<td>Gesundheits- und Krankenpflegeberufe, Ordinationsassistent, Hebammen, zahnärztl. Assistenz, Hilfspersonal im Gesundheitsbereich, Optometrie</td>
<td>+++</td>
<td>++</td>
<td>++¹</td>
<td></td>
<td>++³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rettungs- und Krankentransportedienste</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td></td>
<td>++³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Therapeutisches Personal (Logopädie, Ergo-, Physiotherapie, Radiologieotechnologie, Röntgenassistent)</td>
<td>+++</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
<td></td>
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<tr>
<td>Nicht medizinische Patientendienste (Heilmhilfen, Friseurinnen und Friseure, Pediküre, u.a. und nicht gesetzlich geregelte Gesundheitsberufe)</td>
<td>+++</td>
<td></td>
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<tr>
<td>Sozial- und Fürsorgepersonal (im Spitalsbereich)</td>
<td>+++</td>
<td>-</td>
<td>-</td>
<td></td>
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</tr>
<tr>
<td>Laborpersonal, biomedizinische Analytik, Laborassistenz</td>
<td>+++</td>
<td>++ (bei Stuhlverarbeitung)</td>
<td>+++⁵</td>
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<tr>
<td>Reinigungspersonal</td>
<td>+++</td>
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<td>-</td>
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<tr>
<td>Servicepersonal im med. Bereich</td>
<td>+++</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Orthopädiotechnik</td>
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<td>-</td>
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</tr>
<tr>
<td>Apothekerinnen, Apotheker</td>
<td>+++</td>
<td>-</td>
<td>-</td>
<td></td>
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</tr>
</tbody>
</table>

¹ ab dem vollendenden 50. Lebensjahr und für Risikogruppen entsprechend der allgemeinen Empfehlung, siehe Kapitel Pneumokokken
² ausgenommen Zahnärztinnen und Zahnärzte
³ wenn in Pädiatrie, Infektionsabteilung, ICU oder Labor tätig: auf Grund der Schwere der Erkrankung auch bei geringem Ansteckungsrisiko empfohlen
⁴ ausgenommen zahnärztliche Assistenz und Optometrie
⁵ nur in Laboratorien, die Proben von PatientInnen und Patienten mit Meningokokkeninfektionen untersuchen

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**www.sozialministerium.at/Impfplan**

Dr. Daniel Tiefengraber
Institut für Spezifische Prophylaxe und Tropenmedizin

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Immunization of HCWs
Screening & Mandatory Vaccination
Screening of VPD-Immunity

Possible & accepted antibody threshold

- Measles: IgG - ELISA
- Mumps: IgG - ELISA
- Rubella: IgG - ELISA
- Varicella: IgG - ELISA
- Hepatitis A: HAV-Ab quant – ELISA
- Hepatitis B: HBs-Ab quant – ELISA
- Polio (IPV): NT
- Diphtheria: IgG - ELISA
- Tetanus: IgG - ELISA

Not commercially available
OR
No accepted Ab-treshold of immunity

- Pneumococcal disease (Ab mix)
- Meningococcal disease
- Influenza
- Pertussis
Mandatory Vaccinations for HCWs in Europe (2018)

- Influenza: Serbia (for specific groups)
- Measles-Mumps-Rubella: Albania, Croatia, Portugal, Serbia (specific groups), Slovenia
- Hepatitis B: Albania, Belgium, Czech Republic, France, Moldova, Poland, Portugal, Romania, Serbia (specific groups), Slovenia
- Tetanus: Croatia, France, Portugal, Slovenia, Ukraine
- Diphtheria: Albania, France, Portugal, Slovenia, Ukraine
- Pertussis: Albania, Croatia, Portugal, Slovenia
- Poliomyelitis: Albania, Croatia, France, Slovenia
- Hepatitis A: Slovakia (specific groups)
- Meningococcus A, C, W, Y: Serbia (specific groups)
- Tuberculosis: Croatia, France
In Case of Refusal of Mandatory Vaccinations

• Movement to a post with no patient contact (Croatia, France, Romania)
• Termination of employment (Albania, France, Serbia)
• Fine (Albania, Serbia, Slovakia)
• Refusal of training to students who refuse hepatitis B vaccination (Belgium)
• Refusal of employment in Albania, Croatia, Czech Republic, Hungary, Malta, Netherlands, Poland, Romania, Russia, Slovakia, Slovenia
• No regulatory policy in Czech Republic, Moldova, Poland, Portugal, Ukraine
Implementation in Europe

• Focus on Measles & Influenza

• Mandatory Measles Vaccination:
  „In 9 EU Member States (Bulgaria, Croatia, Czech Republic, France, Hungary, Italy, Poland, Slovakia and Slovenia), vaccinations against measles are mandatory for children, while in the remaining 19 countries they are voluntary, but recommended by the relevant authorities.”

• Main problem:
  “The factor mentioned in most country fiches (20 countries) was vaccine hesitancy.”
Anti-Vaxxers vs. Vaccine Hesitancy

The Cow Pock or the Wonderful Effects of the New Inoculation!

The Age-Old Struggle against the Antivaccinationists
Gregory A. Poland, M.D., and Robert M. Jacobson, M.D.
Vaccine Hesitancy – The SAGE Model

HCWs are not exempt from Vaccine Hesitancy

“Paradoxically, while healthcare professionals (HCPs) remain among the most trusted information sources by the public, some of them are losing confidence in vaccines.”

The nature of HCP concerns, among those who are hesitant, are similar to those of their patients.

Important to include and engage HCWs in decision-making for vaccine recommendations and/or policies

HCPs have the responsibility to promote safety within healthcare facilities and to comply with infection control measures.

VACCINES ARE SAFE AND EFFECTIVE