Seroprevalence of vaccine preventable and blood transmissible viral infections

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What’s next?

- Bloodborne and airborne infections are important **occupational hazards** for healthcare workers (HCWs)
- **Seroprevalence** of vaccine-preventable diseases
- **Attitudes and beliefs** toward occupational vaccinations
- **Risk of needlestick injuries**
Frankfurt University hospital

- 4000 healthcare workers (HCWs)
- 3700 medical and dental students
- 200 dental healthcare workers (DHCWJs)
Why don’t HCWs get vaccinated?

- Believe they aren’t at risk
- They deny the risk they represent to their patients
- Inappropriate fear of vaccine side effects
- Believe the vaccine “does not work”
- Fear of needles
- Ignorance about the vaccine (i.e. “it causes the flu”)

Serological tests for **223** medical students who were in their first clinical semester:

- **Varizella**: 94.6% demonstrated **sufficient** immunity
- **Rubella**: 90.1% demonstrated **sufficient** immunity
- **Measles**: 83.9% demonstrated **sufficient** immunity
- **Mumps**: 65.0% demonstrated **sufficient** immunity

Wicker et al. 2007 Med Microbiol Immunol
Vaccination status

Overall, 150 (67%) students submitted a immunization record

- Date and total number of vaccinations

- Self-reported medical history data regarding infection with the relevant viruses was also documented

- The reliability of the self-reported medical history statements was compared with the serological findings

Wicker et al. 2008 BMC Public Health
Reliability of vaccination histories

The overall correlation between self-reported medical history statements and serological status:

- Varizella: 93.3%
- Measles: 86.7%
- Rubella: 78.0%
- Mumps: 66.7%

Wicker et al. 2008 BMC Public Health
Vaccination status of pregnant HCWs

Serological tests for 424 pregnant HCWs between March 2007 and July 2011  
Wicker et al. 2012

• Measles: 8.5% IgG seronegative
• Mumps: 17.5% IgG seronegative
• Rubella: 0.7% IgG seronegative
• Varizella: 1.7% IgG seronegative
• Cytomegalovirus: 56.1% IgG seronegative
• Parvovirus B19: 29.0% IgG seronegative
Vaccination status of pregnant HCWs

- For every pregnant HCWs the individual immunity status was determined and the overall number of immunities against the pregnant-relevant viruses was calculated.

<table>
<thead>
<tr>
<th>No of immunities regarding the six tested viruses</th>
<th>Total</th>
<th>Physicians</th>
<th>Nurses</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Six</td>
<td>20.3%</td>
<td>17.0%</td>
<td>22.3%</td>
<td>18.9%</td>
</tr>
<tr>
<td>Five</td>
<td>39.9%</td>
<td>38.6%</td>
<td>41.5%</td>
<td>38.5%</td>
</tr>
<tr>
<td>Four</td>
<td>26.9%</td>
<td>34.1%</td>
<td>23.3%</td>
<td>27.3%</td>
</tr>
<tr>
<td>Three</td>
<td>10.6%</td>
<td>8.0%</td>
<td>11.4%</td>
<td>11.2%</td>
</tr>
<tr>
<td>Two</td>
<td>2.4%</td>
<td>2.3%</td>
<td>1.0%</td>
<td>4.2%</td>
</tr>
</tbody>
</table>

- Remarkably, only 20.0% of the study population were immune against all of the six pregnant-relevant viral diseases tested.
Attitudes toward occupational vaccinations

Survey among 650 medical students

• 359 pre-clinical semester
• 291 clinical semester
Frankfurt needlestick study

Between October 2010 – April 2012:

• Evaluation of all reported needlestick injuries (NSI) at the university hospital

• 519 NSI during 547 working days

Himmelreich et al. in press
Current Frankfurt NSI study

How serious are these NSI?
Prevalence in the patients population

Overall (HBV, HCV, HIV) 20.5%
HIV 11.4%
HCV 9.8%
HBV 3.6%
co-infections 4.2%
Hepatitis B vaccination status among HCW

- 81.7% anti-HBs >100 IU/l
- 14.5% anti-HBs >10 - 99 IU/l
- 3.9% anti-HBs <10 IU/l
HCWs immunization

• It’s a patient safety issue
• It protects the HCW
• It is the ethical thing to do
• We need a well sophisticated vaccination program!
• HCWs are the problem – and the solution!
Conclusion

• Vaccinations are effective, easy, and generally without serious side-effects. However, our studies showed insufficient vaccination rates among HCWs.

• Effective communication strategies should focus on educating HCWs about vaccine safety and the benefits of vaccination.

• If this does not work, new approaches need to be implemented!
Thank you for your attention!

Any questions?
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