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## Viral infections: occupational risk for pregnant health-care personnel?

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### Abstract

Health-care personnel (HCP) are exposed to infectious diseases throughout the course of their work. The concerns of pregnant HCP are considerable because certain otherwise mild infections may affect fetal development.

We studied 424 pregnant HCP at the University Hospital Frankfurt / Germany between March 2007 and July 2011. Serological tests were carried out for varicella zoster virus (VZV), measles, mumps, rubella (MMR), cytomegalovirus (CMV) and parvovirus B19.

Our overall seroprevalence data with regard to VZV, MMR, CMV and parvovirus B 19 corresponded to the general population. It was striking that, only 57.1% of the study population was immune against the four vaccine-preventable diseases (MMR, VZV).

Our study suggests that a comprehensive approach to improving the vaccination status of said HCP before pregnancy is paramount.

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*Keywords:* health-care personnel; maternity protection law; pregnancy; occupationally acquired viral infections

**1. Introduction:** Due to their contact with patients or infective material from patients, health-care personnel (HCP) are at risk for exposure to infectious diseases throughout the course of their work [1].

In general, pregnant HCP do not have an increased risk of acquiring infectious diseases compared with non-pregnant HCP. However, because of the increased severity of certain infectious diseases during pregnancy (e.g. varicella), developmental disabilities of the fetus (e.g. CMV, parvovirus B 19, rubella), and the fact that associated fever (e.g. measles, mumps) might initiate premature labor, almost any infection can potentially be harmful during pregnancy [2,3].

In Germany, there is an ongoing debate on the exclusion of seronegative pregnant employees from the workplace if they are not immune against several viral diseases. If reassignment to other duties is not possible, withdrawal from work is mandatory [4].

**2. Methods:** We studied 424 pregnant HCP at the University Hospital Frankfurt between March 2007 and March 2011. Serological tests were carried out for varicella zoster virus (VZV), measles, mumps, rubella (MMR), cytomegalovirus (CMV) and parvovirus B 19.

**3. Results:** Overall, 84.9% of the pregnant HCP demonstrated sufficient immunity against measles, 69.1% demonstrated sufficient immunity against mumps, 95.5% against rubella and 97.9% against VZV. With regard to CMV, 43.9% were seropositive and parvovirus-specific antibodies were detected in 71.0% of the pregnant HCP (see Table 1).

Table 1: Seroprevalence of specific antibodies in pregnant HCP (n = 424)

	sufficient immunity	low-level immunity	no immunity
measles	84.9%	6.6%	8.5%
mumps	69.1%	13.4%	17.5%
rubella	95.5%	3.8%	0.7%
varicella	97.9%	0.5%	1.7%
cytomegalovirus	43.9%		56.1%
parvovirus B 19	71.0%		29.0%

Remarkably, only 57.1% of the study population was immune against the four vaccine-preventable diseases (MMR, VZV).

Table 2: For every pregnant HCP the individual immunity status was determined and the overall number of immunities against the pregnant-relevant viruses was calculated

No of immunities regarding the six tested viruses	total	physicians	nurses	others
six	20.3%	17.0%	22.8%	18.9%
five	39.9%	38.6%	41.5%	38.5%
four	26.9%	34.1%	23.3%	27.3%
three	10.6%	8.0%	11.4%	11.2%
two	2.4%	2.3%	1.0%	4.2%

**4. Conclusion:** HCP ought to be vaccinated against hepatitis B, seasonal influenza, MMR, VZV, and pertussis [1]. The vaccination status of the pregnant German HCP was unsatisfactory [5]. Our study suggests that a comprehensive approach to improving the vaccination status of said HCP before pregnancy is paramount. Occupational health physicians play a crucial role in helping to prevent vaccine-preventable diseases in HCP. However, lack of awareness of the benefits of immunizations and concerns about vaccine safety, efficacy and effectiveness are common barriers among HCP to accept recommended vaccines. Efforts should continue to focus on educating HCP about the safety and effectiveness of immunizations [6].

In addition, conferring immunity to the pregnant HCP, vaccination may transfer protective antibodies to the fetus, providing short-term fetal immunity [2,7]. For example, it is of utmost importance that pregnant women get vaccinated against influenza. In the US the influenza vaccine has been recommended for all pregnant women since 2004 [7]. Reducing the risk for influenza among HCP is a major focus of reducing nosocomial infections.

Pregnant HCP who are susceptible to CMV and parvovirus need to be informed about hygienic interventions and personal protective equipment in order to reduce the risk of virus transmission [8-10].

### Key messages

- Routine exclusion from the workplace due to non-immunity would lead to the fact that the majority of pregnant staff can't be employed in health care.
- There is an urgent need to improve the vaccination status of German HCP.
- Pregnant HCP who are susceptible to CMV and parvovirus B 19 need to be informed about hygienic interventions and personal protective equipment.

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