

Infectious Disease Transmission during Transfusion and Transplantation

[Announcer] This program is presented by the Centers for Disease Control and Prevention.

[Mike Miller] Hi, I'm Dr. Mike Miller and today I'm speaking with Dr. Matthew Kuehnert, who is the Director of the Office of Blood, Organ, and Other Tissue Safety, often called the BOOTS Office. Our conversation is based on his report on infections in organ and tissue transplants, which appears in CDC's journal, *Emerging Infectious Diseases*. Welcome, Dr. Kuehnert.

[Matthew Kuehnert] Well thanks for inviting me to talk with you on this interesting topic.

[Mike Miller] Dr. Kuehnert, most people think of donating organs as an altruistic gift, but it looks like things can sometimes go badly for the patients who receive them. What's going on here with these latest reports of infections spread through transplants?

[Matthew Kuehnert] First of all, I think it's important to say that organ transplantation is, for most people who get a transplant, a lifesaving procedure, and the biggest problem is that there aren't enough organs to go around. It's very important for everyone to consider giving consent to be an organ and tissue donor, and to share that decision with their family.

Since organs are in such short supply compared with the thousands of people on the transplant waiting list, screening for infectious diseases in organ donors is not as restrictive as for blood and tissue donors. Actually, there are no restrictions on organ donation and having those organs offered to transplant candidates, except for having a confirmed infection with HIV. However, many types of infections can result in severe illness and death in transplant recipients, so it's important to prevent these events, if possible, and to balance organ availability with transplant safety. For blood and tissues, the screening is more stringent, and any risk for infection found, either through behavior history or laboratory testing, results in the donation being declined. Regardless of the process, it is important that donors and donor families are accurate about the medical and behavioral history for possible risk of infection, so that disease transmission can be minimized as much as possible.

[Mike Miller] Well, how common are transmitted infections through organ transplants? Is it a problem for blood transfusions and tissue transplants, too?

[Matthew Kuehnert] This is a difficult question to answer, because we only know about what we can recognize. It's been estimated that about one in 200, or half of one percent of organ transplants, possibly transmit unexpected infections, and this rate is likely much lower in blood and tissue. In order for such an infection to be recognized, many different individuals have to recognize the infection and alert others. The medical team, the hospital, the donor collection agency, and the public health authorities all need to be involved to give us the chance to know.

Both transfusion and transplantation are very, very safe, in terms of transmission of infectious diseases. The world has learned a lot from the previous tragedies of HIV and hepatitis, where

these infections were spread through transfusion and transplantation. Better screening of donors has reduced the risk of transmitting HIV, hepatitis B, and hepatitis C. However, there will always be a risk of infectious diseases being transmitted from donated blood, organs, and tissues – no matter what screening or testing is done – because pathogens can evade testing, and sometimes testing can't be done because laboratory methods have not been developed yet for the pathogen.

[Mike Miller] What has already been done to prevent transfusion and transplant transmitted infections?

[Matthew Kuehnert] Well, donors are screened using both questionnaires – questions on risk factors for infections – and laboratory testing of the pathogens themselves. Devising new methods to minimize risk is difficult. Laboratory testing for every pathogen isn't feasible and even testing for known pathogens are not foolproof, which makes the questionnaire even more important. For blood, these questions can be asked directly of the donor, while for organs and tissues, the donor is most commonly deceased, so the history is obtained from next of kin or a very close friend.

[Mike Miller] That's interesting. What infections are particularly challenging to prevent, and what does a new infection in transfusion or transplant recipients mean for the rest of us, the general public?

[Matthew Kuehnert] The real challenge arises with prevention of emerging infections. Sometimes we don't know a pathogen can be spread through transfusion or transplant until there's a report of such an event, because the usual mode of spread is really quite different. For instance, human granulocytic anaplasmosis is usually a tick-borne disease, but has been reported to be spread by blood transfusion. Lymphocytic choriomeningitis, or LCMV, is associated with rodent exposure, but has been the cause of multiple transplant disease clusters. It's important to understand this potential so that recipients from the same donor – in a transfusion or transplant situation - can be assessed and treated, and so that screening measures can be improved. Another example: Hepatitis A and E are primarily transmitted by contaminated food or water, but occasionally can be transmitted through transfusion.

It's important to search for emerging infectious diseases, and threat assessment is an important part of the work that we do. New emerging infections are constantly coming to our attention. Of course it's good to recognize a threat before it's transmitted, so when we look at a potential threat, we ask a number of questions. First, is it transmitted between people? Can it survive in blood, organs, or other tissues? Does it cause disease after it's transmitted in the recipient? And finally, can a screening test be developed to detect it in donors?

Another issue is that these events can be recognized only through the awareness of clinicians and laboratory staff caring for patients so that they can make the diagnosis and realize that the source of infection could have been from the donor. To make things even more complicated, sometimes multiple patients receiving say, transplants, become very ill. Let's say two kidneys, a liver, and a lung from the same donor, but the cause of the infection is unknown. The syndrome common to all the recipients transplanted might be, say, a generalized brain infection, such as encephalitis. Therefore, the investigation becomes a race to find out what the cause is, so that patients can be

treated. We've seen and described this previously for transplant clusters found to be caused by infections such as LCMV, West Nile virus, rabies, and tuberculosis. Sometimes, the appearance of an emerging disease in an immunosuppressed population like transplant patients is a sentinel for more infections in the general public. These pathogens even give clues to the expansion of vectors associated with the disease, such as ticks or rodents.

For transplant clusters manifesting as encephalitis, and the cause unknown, as with LCMV, the situation is very challenging, and the availability of patient samples is critical. Donor autopsy, which is not always done, may be important to put the clues together.

[Mike Miller] Well could you tell us a little bit about the steps that lead towards solutions to all of these challenges?

[Matthew Kuehnert] Recently, a workshop was convened by the Food and Drug Administration, with participation by CDC and other partners, to address some of these challenges. Solutions discussed at the workshop included the need for a standardized donor screening, compiling disease transmission risk, assessing effectiveness of measures to minimize disease transmission, close monitoring of transplant recipient health, and the need to pool resources of stakeholders, including government, industry, and clinicians, to improve the safety of transfusion and transplantation.

Whether a pathogen is primarily transmitted through food, rodents, ticks, or some other vector, it's important to consider whether an emerging pathogen can be transmitted through transfusion or transplantation, and conversely, if the appearance of a pathogen is transmitted through transfusion or transplantation signals an emerging threat to the public at large – whether it's West Nile virus, LCMV, or something new.

[Mike Miller] What can be done to protect people?

[Matthew Kuehnert] It's very important to have screening programs to ensure the safety of blood, organs, and tissues, while ensuring that transfusions and transplants are readily available, and to constantly monitor for new risks. The health care community can join in this effort by looking for the possibility of infections transmitted by these procedures and to report them to public health, because that's the only way we're gonna to know.

To put it in a broader perspective, transfusion and transplantation is as safe as it's ever been. This is in part because of safety programs, including public health surveillance and investigations, to point out what we've missed so there can be improvement.

[Mike Miller] Well let me turn that question around then. What can *people* do to protect themselves?

[Matthew Kuehnert] That's a really good question. Knowledge is an important way for people to protect themselves, so it's important that every patient be aware when they've received a transfusion or transplant and have given informed consent for such a procedure. As with any healthcare procedure, it is important for patients to know the risks beforehand, and to ask

questions about the risks. Again to put it in perspective, the risk of getting an infectious disease from a transplant or a transfusion is quite low. However, if there are signs of infection afterwards, patients need to alert their doctors that this could have come from the transfusion or transplant, because the patients may be the only ones to recognize that connection.

[Mike Miller] Thanks, Dr. Kuehnert. I've been talking with Dr. Matthew Kuehnert about his report, *Infectious Disease Transmission during Organ and Tissue Transplantation*, which appears online in the August 2012 issue of CDC's journal, *Emerging Infectious Diseases*.

You can see the entire article at www.cdc.gov/eid. If you'd like to comment on this podcast, send an email to eideditor@cdc.gov. I'm Dr. Mike Miller, for *Emerging Infectious Diseases*.

[Announcer] For the most accurate health information, visit www.cdc.gov or call 1-(800)-CDC-INFO.