

Title: Determination of the Presence and Infectivity of Swine Hepatitis E Virus (HEV) in Swine Manure Storage Facilities and Nearby Water Sources - **NPB# 02-123**

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Abstract: Hepatitis E virus (HEV) was discovered in pigs in the U.S. in 1997. Swine HEV has been shown experimentally to infect non-human primates. HEV does not cause clinical disease in pigs; however, there is concern that pigs are an important reservoir of HEV and that swine HEV may infect and cause disease in humans. Recent evidence of clinical outbreaks of HEV in Japan further supports this concern.

This study was conducted to get a better understanding of where HEV persists on a pig farms and if there is evidence of contamination of drinking water and nearby surface water with HEV from pigs. We visited 28 Iowa pig farms in the late summer and fall of 2002 and collected fresh feces from growing pigs, pit manure, lagoon manure, and water samples from the farm drinking water supply and the nearest upstream and downstream surface water (streams or rivers). We confirmed the presence of HEV in fresh feces (a pool of feces from 5 pigs per site) collected from the floors of pig barns on 7 of 28 farms. We demonstrated HEV in pit manure samples from 15 of 28 sites indicating that the virus nucleic acid persists in pit manure. Only eight of the sites we visited had outdoor lagoons and 3 of 8 lagoon samples were positive for HEV nucleic acid. Despite exhaustive testing using several accepted techniques, we were not able to detect the presence of HEV in the drinking water on the sites or in the upstream or downstream surface water sources.

Inoculation of HEV-free pigs with the pit and lagoon manure samples from 2 of the 28 farms with the highest titer of HEV was performed to determine if the HEV in the manure samples was infectious. HEV-free pigs were inoculated intravenously or orally with the inocula. Feces and blood was collected weekly from these pigs and tested by RT-PCR and serology for evidence of HEV transmission. Two of three pigs inoculated intravenously with pig manure from a pit sample were confirmed to shed the virus in feces by 3 weeks after inoculation. To date (5 weeks post inoculation), the pigs inoculated orally with pit manure and the pigs inoculated with lagoon manure (either intravenously or orally) have remained negative. The swine bioassay will be terminated at 8 weeks post inoculation (January 2, 2004).

This work suggests that HEV is commonly present in fresh pig feces and in manure stored in pits and lagoons on swine farms. HEV detected by RT-PCR in pig manure from storage pits is infectious. However, evidence that HEV from fresh pig feces, pit manure, or lagoon manure is contaminating drinking water supplies or surface water is lacking.

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