

New method will triple amount of genetic information from newborn blood spot screenings

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Van Andel Research Institute (VARI) researchers have developed a method that can yield more information from archived newborn blood that has implications for a vast array of research, including population health studies and answering questions about diseases in infants and children.

In a recent study published in *Pathology International*, VARI researchers detected approximately 9,000 activated genes in samples from adult [blood spots](#) on Guthrie cards that had been archived anywhere from six months to three years. Researchers say their modified method uses commercially available tools and can be easily adopted by others in the scientific community for use on newborn blood spots.

"[Genetic information](#) from Guthrie cards is a valuable resource," said VARI Distinguished Scientific Investigator Jim Resau, Ph.D. "It opens doors to examine [risk factors](#) and potentially diagnose diseases before the clinical features are present. One such disease might be Cerebral Palsy, which currently can't be diagnosed until a child is nearly two. The information could also be used to study pediatric cancers such as [neuroblastoma](#), which is known to be present at birth in many cases."

Guthrie cards have been used for the past 20-30 years to collect blood for mandatory newborn screening programs in the United States, Australia, New Zealand, Japan, and most countries in Europe and South

America. Blood is usually collected through a heel prick 24 to 48 hours after birth and is placed on the cards, which may be archived after screening. Although [genetic material](#) in blood from Guthrie cards has been presumed to be degraded because of varying storage conditions, VARI researchers were able to detect more than 3,000 activated genes in each sample in a 2009 study, and recently, they were able to detect three times that amount using the new method.

"We were looking for the best possible way to extract the most information from blood on Guthrie cards using the least amount of this precious resource," said Resau.

"Showing that mRNA is reasonably well preserved in archived filter paper blood spots, whether frozen or not, opens up a very important avenue for clinical and translational research, especially in child health, because the largest such archive is samples used for newborn genetic screening," said Nigel Paneth, M.D., M.P.H., University Distinguished Professor in the Departments of Epidemiology and Pediatrics & Human Development at the Michigan State University College of Human Medicine.

Messenger ribonucleic acid or mRNA is a molecule that carries instructions from DNA to protein making structures in cells.

Since archived blood spots can be more than 20 years old, the researchers' next step is to investigate the power of activated gene detection in various archival periods. Resau said the cards could also be used for population studies, such as finding out when a particular virus first appeared in a specific region, or levels of compounds in that region that could be affecting public health.

Provided by Van Andel Research Institute

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