

Study finds children in marginalized communities more likely to experience cardiac arrests

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A new study shows children living in marginalized communities are at a higher risk of experiencing pediatric out-of-hospital cardiac arrest

(POHCA)—a rare, life-threatening event occurring outside a hospital setting in which a child's heart suddenly stops beating.

It is estimated in other studies that the survival rate for POHCA is less than 10%, and one-third of the children who survive POHCA will develop a significant neurological condition.

A province-wide case-control study from Western, Lawson Health Research Institute and the Institute for Clinical Evaluative Sciences (ICES) addressed a gap in current literature related to how social determinants of health impact the risk of POHCA. The [study](#) was published in the *Journal of the American Heart Association*.

"We know the outcomes for children who experience POHCA are really poor. Most don't survive, and those who do often develop new and severe neurological impairments," said lead author Samina Idrees, MSc'23 (epidemiology and biostatistics), who completed the work while studying at Western. "Given the significance of this health outcome and its potential preventability, we wanted to investigate further and shed light on any potential disparities."

The study established that the odds of POHCA were higher for children living in areas with the highest levels of material deprivation—which incorporates average income, education, the proportion of lone parent families and housing quality. The likelihood of experiencing POHCA was also greater for those living in urban centers in Northern Ontario (relative to those in urban centers in Southern Ontario) with a population greater than 10,000, [rural areas](#) in Southern Ontario, and in areas with highest levels of unpaid professions, unemployment or non-working age individuals, high levels of instability and lower levels of ethnic diversity.

"Racialized communities sometimes have higher risks for certain health conditions," said Idrees, in reference to the finding that children living in

areas with the lowest levels of ethnic diversity had a higher risk of POHCA. "However, these findings are in line with the finding that immigrants have a lower risk of experiencing POHCA relative to those born in the country, likely due to the healthy immigrant effect, where immigrants arriving in Canada are usually in good health."

Most cases of POHCA are caused by respiratory failure, and cardiac arrests in children can be attributed to a wide range of preventable and unpreventable factors, including drowning, sudden infant death syndrome, accidental ingestion or existing [medical conditions](#).

Western professor Dr. Janice Tijssen, senior author on the study, associate scientist at Lawson and adjunct scientist at ICES, noted that while there is a variety of factors that may contribute to out-of-hospital cardiac arrests in children, a common theme was that kids living in these marginalized communities are at higher risk of experiencing cardiac arrest.

The case study group included 1,826 children, aged one day to 17 years, who were transported to an [emergency department](#) in Ontario after they suffered an out-of-hospital cardiac arrest between April 1, 2004 and March 31, 2020. The case study group was matched to a [control group](#) on a one-to-four ratio and researchers identified cases of POHCA using the National Ambulatory Care Reporting System—which contains data for hospital-based and community-based ambulatory care.

Solutions to reduce rates of POHCA in marginalized communities

The researchers emphasized that these findings underscore the need to address disparities through targeted prevention and intervention efforts to reduce the odds of POHCA. These include finding opportunities to

increase public health education and awareness around POHCA, as well as implementing measures related to social determinants of health such as improving access to health care, health literacy and preventative health care.

The study also suggests other ways for communities to help improve outcomes from POHCA, such as improving emergency medical services, providing education to equip more people with cardiopulmonary resuscitation (CPR) skills and improving access to automated external defibrillators (AED).

"Information on how to provide CPR or how to apply an AED is very simple and anyone can learn," said Tijssen, associate professor in the departments of pediatrics and epidemiology & biostatistics at the Schulich School of Medicine & Dentistry and medical director of the Pediatric Critical Care Unit at Children's Hospital at London Health Sciences Center. "Children as young as six or eight can learn how to respond to a cardiac arrest so it's crucial to get out to these communities with this information."

More information: Samina Idrees et al, Sociodemographic Factors and the Risk of Pediatric Out-of-Hospital Cardiac Arrest in Ontario, Canada: A Province-Wide Case–Control Study, *Journal of the American Heart Association* (2023). [DOI: 10.1161/JAHA.123.032718](https://doi.org/10.1161/JAHA.123.032718)

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