Who are we?
SPIRAL is an alliance of researchers from around the world committed to understanding how unpredictable stressors encountered during pregnancy affect both mother and unborn child.

What is our goal?
We know that there are both positive and negative effects of stress in pregnancy, but we do not know what kind of stress or how much stress is good or bad. Therefore, our goal is to identify the short- and long-term effects of maternal stress, caused by a severe stressor, on child development.

Why study a disaster?
Disasters provide opportunities to:
1) Study prenatal maternal stress in natural experiments with large numbers of women
2) Separate objective hardship (scientific measure) from subjective distress (personal account)

What are we looking at in the children?
- Birth outcomes (e.g. a baby’s weight and height at birth)
- Mental and physical development
- Maternal attachment
- Hormone levels

Aerial view of the destruction caused by the 2011 Brisbane flooding.

Dear Participant,
We would like to take this opportunity to thank you for your continued support and participation in Project Ice Storm, The Iowa Flood Study, or QF2011.
You are one of almost 700 women who have chosen to embark in a large-scale research initiative, examining the impact of prenatal stress, caused by exposure to a natural disaster, on child development.
The SPIRAL Newsletter was created as a means of connecting with our participants around the globe. Within this newsletter you will find background information related to SPIRAL, updates on the progress and stage of assessment for each study, and photos that have been captured throughout the years.
We hope you and your family enjoy our first SPIRAL Newsletter, and we look forward to your continued support and participation!
Global Disasters

Québec, Canada
A series of ice storms struck Southern Québec in January 1998 knocking out electricity for more than 3 million people for as long as 6 weeks during the coldest months of the year. The ice storm caused 27 deaths, and created financial and logistical hardships for everyone. The Insurance Bureau of Canada and Environment Canada count the ice storm as the worst and most costly ($1.5 billion) natural disaster in Canadian history.

Iowa, United States
In June 2008 Iowa suffered the worst floods in more than 50 years. By June 15, 2008, 1800 blocks of Cedar Rapids, Iowa were under water. By July 22, the Midwest storms and torrential rains had killed at least 24 people. More than 38,000 people were driven from their homes, mostly in Iowa where 83 of 99 counties were declared federal disaster areas. This flooding may rank among the top 10 disasters in U.S. history.

Queensland, Australia
Heavy rainfall in the Australian state of Queensland caused severe flooding in January 2011. At least 70 towns, including the state capital of Brisbane, and over 200,000 people were affected. Three-quarters of Queensland were declared a disaster zone. Residents of 2,100 Brisbane streets were told to evacuate, and 20,000 homes were inundated. 35-40 deaths have been directly attributed to the floods. Damage was estimated at around $1.5 billion Australian.

SPIRAL Logo - Artist Biography

The SPIRAL logo was created by Shirley Jenkins Vermace, an artist from Decorah, Iowa. The original print, from which the SPIRAL logo was derived, was created in the summer of 1988, when Iowa was affected by extreme drought. At this time, Shirley found herself surrounded by many pregnant women, which inspired her to create an abstract painting of three women, two of whom were pregnant. This print was given as a thank-you gift to her OB/GYN, Dr. Jane Engeldinger (wife of Alliance researcher Dr. Michael O’Hara). The SPIRAL logo was created by enhancing Shirley’s original artwork to bring the pregnant women into greater relief and to incorporate a spiral within the womb of one of the original pregnant figures. Shirley was enthusiastic to collaborate with SPIRAL due to her own exposure to prenatal maternal stress. Due to the immense flooding of Iowa in 1993, Shirley was displaced from her home and her office, while pregnant with her second child. After briefly moving to Alabama, Shirley now resides in Iowa with her husband and three children.
Study Timelines

Our longitudinal studies are currently taking place in Canada, the United States and Australia. Below you will find the Timeline of each study, as well as the current stage of that study (indicated by the green tracker). For your interest, we have outlined some features that make each study unique.

- Questionnaires Only Assessment
- Face-to-Face Assessment

**Project Ice Storm: The effects of prenatal maternal stress on development during adolescence**

![Timeline of Project Ice Storm](image)

- Recruitment: 16 Mos
- 2½ Yrs
- 4 Yrs
- 5½ Yrs

**Unique Study Features**

World’s first, largest and longest prospective study of prenatal maternal stress caused by a natural disaster

Study measured participants’ objective hardship (scientific measures) and subjective distress (personal account)

**The Iowa Flood Study: Effects of prenatal maternal stress on pregnancy outcomes and infant development**

![Timeline of The Iowa Flood Study](image)

- Recruitment: 16 Mos
- 2½ Yrs
- 4 Yrs
- 5½ Yrs

**Unique Study Features**

Larger sample size than Project Ice Storm

The Iowa Flood Study piggybacked onto an already existing study that recruited women during pregnancy prior to the Iowa flooding

Benefits of recruiting prior to the Iowa Floods:

1) Started assessing women sooner after the disaster than Project Ice Storm
2) Allowed for a sub-sample of women with data pre- and post-Iowa Flood exposure

**QF 2011: Effects of the Queensland flood on pregnant women, their pregnancies and their children’s early development**

![Timeline of QF 2011](image)

**Unique Study Features**

First study to collect birth biologicals (placenta samples, maternal blood, infant saliva, umbilical cord, and cord blood)

QF2011 piggybacked onto a pre-existing study (M@NGO RCT of two forms of prenatal care)

Benefits of recruiting prior to the Queensland flooding:

1) Started assessing women faster (less than 3 months after the disaster)
2) Allowed for data collection pre- and post-Queensland Flood exposure
Study findings available online:

www.mcgill.ca/spiral

Contact Us

If you have any comments, questions, or concerns, we welcome your feedback. Please contact us at the following address:

SPIRAL
Psychosocial Research Division
Douglas Institute Research Centre
6875 LaSalle Blvd.
Montréal, QC, Canada, H4H 1R3
E-mail: SPIRAL@douglas.mcgill.ca
Fax: 1-514-762-3049

Suzanne King, PhD, Psychologist
Department of Psychiatry
McGill University and
Douglas Mental Health University Institute
Montreal, Québec, Canada

Michael O’Hara, PhD, Psychologist
Department of Psychology
University of Iowa
Iowa City, Iowa, USA

Sue Kildea, PhD, Nurse & Midwife,
Australian Catholic University and
Mater Medical Research Institute
Brisbane, Queensland, Australia

In Cedar Rapids, Iowa, the flooding of 2008 left approximately 5,390 residential properties damaged or destroyed.