

**Title:**

Genomic and lifestyle predictors of foetal outcome relevant to diabetes and obesity and their relevance to prevention strategies in South Asian peoples

**Short title:**

GIFTS

**Project No.:**

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Euro 3.0 million

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30 January 2016

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48 months

**Website:**

<http://www.gifts-project.eu>

GIFTS is a large scale project funded by an FP7 EU grant and is composed of an international consortium of world class experts from Europe and South Asia. The aim of the GIFTS project has been to enhance understanding of the early life determinants (genomic, lifestyle and environmental) of diabetes, obesity and related cardiometabolic disease, in South Asians living in Europe and the countries from which they have emigrated.

The outcomes of the GIFTS project will provide invaluable information to assist in creating measures to prevent diabetes and obesity in people of South Asian origin.

**GIFTS project round up**

The final conference for GIFTS was held in Dhaka, Bangladesh (12<sup>th</sup>-13<sup>th</sup> Jan 2016) and was a great success. Presentations were given by all teams and illustrated the cohesive nature of the work packages (WPs), in addition to highlighting the tremendous work that has been achieved in the past 4 years. A summary of the research performed by all the work packages is provided in this newsletter:

**Baseline studies of lifestyle and nutrition: WP2**

The objective of this work package was to determine how lifestyle and nutrition affect pregnancy and foetal outcomes relevant to metabolic disease in South Asian communities living in South Asia (Pakistan and Bangladesh) and Europe (UK and Norway).

Novel cohorts of pregnant South Asian women were established in Bangladesh, Pakistan, Norway and the UK. Baseline data were collected on women and their newborns including: anthropometry, blood tests and health, lifestyle and dietary questionnaires. These data are currently being analysed and each cohort is being compared. The results, together with the data from the qualitative studies, will provide the basis to develop a larger scale complex intervention during pregnancy, to decrease diabetes in mothers and babies in the different settings. Establishing these cohorts has resulted in a unique, comprehensive dataset, and has also provided in-depth insight into the practicality of conducting clinical research in these communities.



### **Intervention studies in pregnant mothers in Bangladesh and health economic analysis of the intervention: WP3 and WP8**

In this intervention pregnant women were given vitamin D and B12 supplements as well as targeted dietary advice, to determine whether these measures reduced cardiometabolic risk. The recruitment for participants began in June 2014 and the sample collection was completed in August 2015. A total of 861 women participated in the study and 619 cord blood samples were collected. Statistical analysis of the results is underway and the preliminary findings are promising. The results of the intervention have been provided for health economic analysis at QMUL, and a health economic report based on the intervention trial in Bangladesh (WP3) will be produced in the next few months.

### **Childhood outcomes: WP4**

The Perinatal Care Project GIFTS survey has now been completed. This survey is a follow up study focusing on the offspring of the mothers that were involved in the initial Perinatal Care project (PCP). In the original intervention, women that were pregnant or intending to conceive participated in community group mobilisation interventions in rural Bangladesh to improve maternal and newborn health. For the PCP GIFTS follow up study anthropometric measurements and buccal swabs were collected from 2-4 year olds born from mothers who participated in the PCP, and compared to children of an equivalent age whose mothers did not receive the intervention. Survey and anthropometric data were collected from 1264 children and their mothers in the intervention clusters, and 1323 children and their mothers in control areas, representing response rates of 94% and 89% respectively. The outcome of the survey has produced significant findings and this work has been submitted for publication.

### **Development of novel nutritional assays: WP5**

The collection of blood samples for research is hampered in low-income settings due to the invasive nature of the procedure and the high cost of storage and analysis. Therefore the team at the Public Health Foundation India embarked on developing affordable assays for nutritionally relevant biomarkers from dried blood spots and low cost DNA extraction methods from saliva, dried blood spots and whole blood. Assays for vitamin C, vitamin D, homocysteine and fatty acids were tested and a number of these assays were successful and have been validated. Analysis of the DNA quality after extraction from saliva and dried blood spots indicate that these methods can also be used, however, the quality does not match that of DNA extracted from a whole blood sample. The results of this work indicate that lower cost and less invasive procedures may prove more useful in epidemiological studies.

### **Genomics and epigenomics: WP6 and WP7**

Close to 650 mother child pairs from the Pune Nutritional Study (PMNS) have been profiled on the Illumina Human Core Exome Beadchip at the Council for Scientific and Industrial Research in India, and analysis of the data have identified a number of variants that may be linked to the onset of type 2 diabetes. Further meta-analysis will be carried out at the University of Exeter by pooling the PMNS data with the data from the SNP profiling of 700 mother child pairs collected from WP2 and 3.





The objective of WP7 was to identify how the epigenetic state of South Asian offspring may be modified by the targeted intervention to mothers in WP3. DNA samples from 384 children (born from mothers who participated in the WP3 Bangladesh intervention trial) underwent bisulfite conversion and their methylation profile was determined using the Illumina Infinium 450K methylation beadchip. Analysis of the data is currently underway at QMUL.

## Qualitative studies: WP9 and WP10

In the qualitative research portion of the GIFTS programme, researchers wanted to explore the illness experience and cultural perspectives in South Asian women with current or past diabetes in pregnancy. The objective in WP9 was to understand the multiple influences on behaviour by conducting a series of group discussions in which participants shared stories about having diabetes during and/or before a pregnancy. A total of 45 South Asian women living in East London took part in the study, were aged between 23-40 years and had been diagnosed with either type 2 or gestational diabetes. The results of this work have been published, "Socio-cultural influences on the behaviour of South Asian women with diabetes in pregnancy: qualitative study using a multi-level theoretical approach"\* and based on the findings the authors have recommended that services intended to prevent and manage diabetes in South Asian women before and during pregnancy need to be redesigned. Specifically, health advice needs to be more culturally meaningful and morally resonant.

The goal in WP10 was to explore the experiences of antenatal care of South Asians living in Europe. This study was designed to investigate uptake of antenatal care and other pregnancy related services by South Asian women living in Newham and Oslo. In particular, the perspectives and experiences of South Asian women and their families in relation to barriers and facilitators to accessing and engaging in relevant services were explored. The results will provide future ways to develop measures to ensure South Asian women present to health care services at earlier stages in their pregnancy.

## Dissemination: WP11

INSTRUCT has created an e-learning portal for the dissemination of the results from the GIFTS project, it also contains detailed information on all aspects of diabetes in European and South Asian populations. The portal is comprised of 8 modules that can be used by the scientific community, health practitioners and educators. It includes videos from contributors to the GIFTS project and leading experts in the field of diabetes, news and discussion forums and self assessments. The e-learning portal is now accessible to the public and the first module is open to view. The remaining modules are currently being assembled and will be available to the portal in the next month. The GIFTS website is being kept up to date with latest meetings and results.

## Concluding remarks

The GIFTS project has generated an enormous amount of research on the clinical and qualitative aspects of diabetes, obesity and cardiometabolic disease in South Asians. Moreover, the primary goal of the GIFTS programme has undoubtedly been reached "to enhance understanding of the convergence of genetic and environmental factors involved in Developing diabetes and obesity, and their transmission through parent-child units". The outcomes of this project will therefore be invaluable for future Research Studies and ultimately benefit South Asian populations in the prevention of diabetes.

