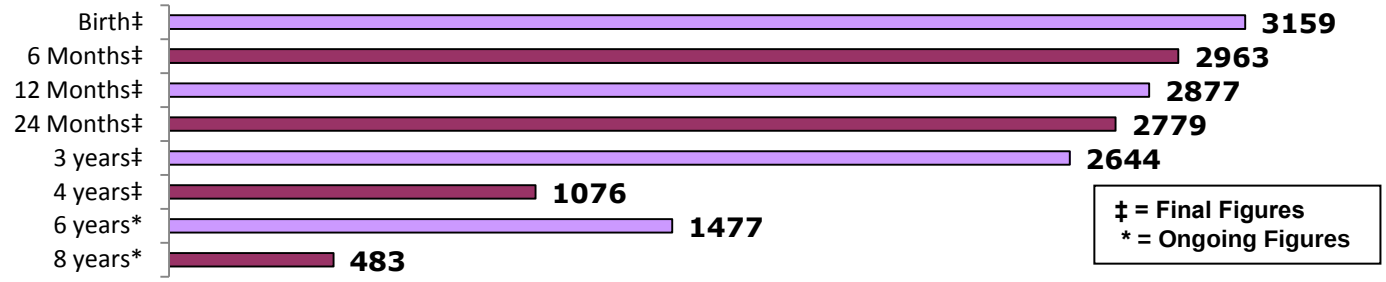
Dear Participants,

There have been lots of developments since our last newsletter, so we decided it was time to update you on all that's been happening! For example, our six and eight year-olds are now on board and we have some new studies to tell you about, so please read our articles and find out how you have been supporting our research. We would like to take this opportunity to thank you for all the time and effort you have given to the Southampton Women's Survey (SWS), without which it would not have been possible for us to carry out this work.

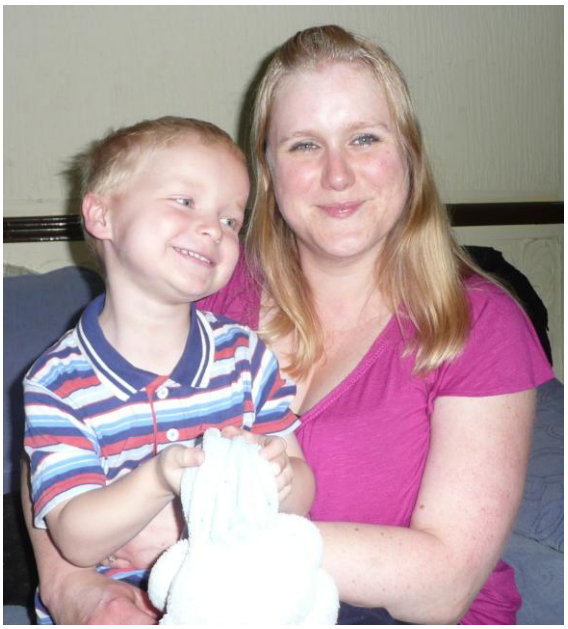
Progress so far .....



These numbers show how many children have taken part at each stage of the study to date

Did you know you are world famous?

SWS data, and data from a study in Bristol, have been used to assess the new World Health Organisation head growth standards for infants. It has been discovered that British children have heads that are slightly larger than the standard around the world and that they grow more rapidly in the first few months of life.



Jacob was the final SWS child to be seen at three years of age. We visited Jacob and his mum, Jennifer, in March 2011. Here are some of their thoughts about taking part in the study:

Did you find giving up your time to take part in the study difficult? *It was not a problem because the study team were always happy to fit in with me and I knew I was helping a worthwhile project.*

Do you find the long-term commitment to SWS a problem? *I enjoy being part of the study and have found it a benefit to me and Jake – the scans and his measurements. The food questions also gave me the opportunity to reflect on his diet.*

How do you feel about us catching up with you again in three years time? *The time will whizz by and I look forward to the findings and it's always good to catch up.*

How do you think Jacob feels about us taking part and being measured? *He has enjoyed the attention.*

Contact details

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Findings so far …

Pregnancy

Thanks to the data provided from the 3159 pregnancies we monitored between 1998 and our last delivery on 23rd December 2007, we have discovered:

- Before pregnancy, 27 per cent of mothers smoked but this reduced to 15 per cent during pregnancy, so many mothers successfully managed to quit. Mothers also cut their alcohol and caffeine intakes. However, there was little change from before to during pregnancy in fruit and vegetable intake, and in overall quality of diet.
- Higher levels of vitamin D in the blood of the mothers during pregnancy were associated with improved development of the baby's femur (the long bone in the thigh) in the womb. Also, research indicated that mothers whose vitamin D levels were low during pregnancy had babies who were born with some splaying of the end of the bone which indicates poorer bone development.
- We currently don't have recommendations for suitable or optimal weight gain during pregnancy in the UK. Using SWS data we have shown that women who put on too much weight during pregnancy, or not enough weight, are more likely to bear children with more fat in their bodies at age six. It will be important, using the data we collect at eight years, to see if this effect is still evident as the children grow up.

Folate and depression

Many of you are aware that folic acid supplements are recommended for women before pregnancy and during the first trimester to boost folate levels in the blood. This helps prevent neural tube defects in the child, such as spina bifida.

Good diets, rich in green leafy vegetables also contribute to raising folate levels. There have also been a number of studies showing that people who are depressed have lower levels of folate in their blood. This has led to suggestions that folic acid supplements might prevent depression.

However, the SWS data suggests that being depressed leads to lower folate levels rather than the other way round. This could be because becoming depressed can affect the quality of your diet.

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Factors associated with depression

The SWS has found that women who suffer from depression and anxiety before pregnancy tend to have infants whose sleep is more disturbed.

Previous studies have suggested that smaller babies may be prone to depression when they are adults. Among SWS women no such relationship was seen, indicating that growth in the womb isn't strongly related to risk of depression.

Premenstrual syndrome

In nearly 1000 SWS women, we looked at risk factors for premenstrual syndrome (PMS). Around 24 per cent of women suffer from this, but it appeared that women who used hormonal contraception, such as the pill, were less likely to report symptoms relating to PMS.

Grip strength

Grip strength is an indication of general muscle strength. Grip strength of SWS women in pregnancy was associated with their own birth weights; bigger babies tended to have stronger grip in adult life.

Although grip strength of the SWS children aged four was also related to their birth weight, it was more dependent on their current size; taller children had stronger grip.

It is not known how grip strength changes as children grow and so we will continue to measure grip strength on our six and eight year follow-up visits.

Colouring competition information

We have a competition for all of the children who have taken part in the SWS. It will be divided into two age groups, **Group 1** (4-7 years), and **Group 2** (8 years and over). We would like you to draw a picture which shows how you remember your visit with the SWS team. There is a sheet enclosed for you to use. Please write your name and age at the top of the page and then return it to:

Prizes to be won!

Tina Horsfall / Julia Hammond
MRC Lifecourse Epidemiology Unit
Southampton General Hospital
Southampton SO16 6YD

Closing Date
30th April 2012

Contact details
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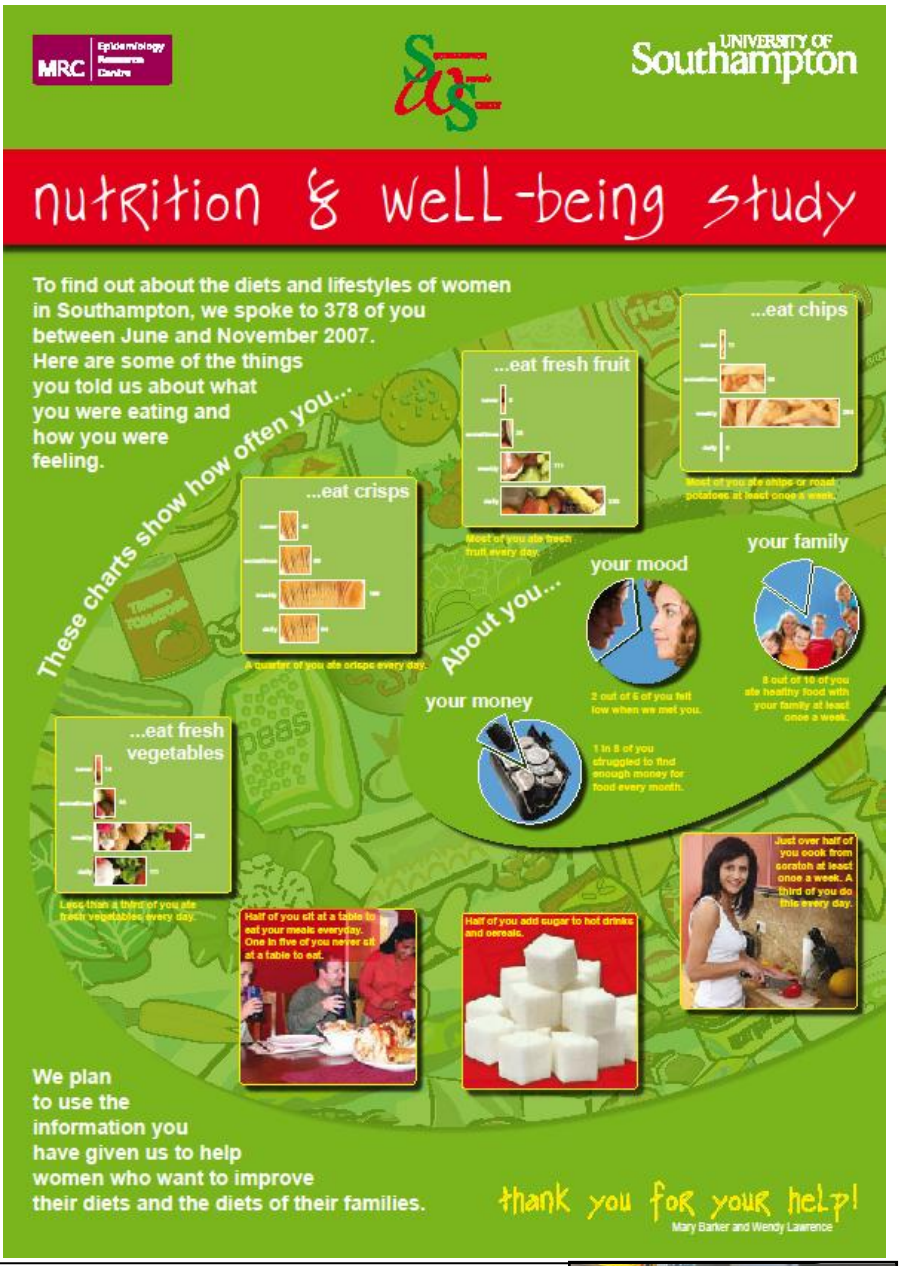
The SWS has led to …

Southampton Initiative for Health

The SIH has arisen out of findings from the SWS and subsequent studies. We aim to improve the diets and lifestyles of women before they become pregnant so as to improve the health and development of the child. We are training staff in the Sure Start Children's Centres to have "Healthy Conversations" with the women who attend the Centres. Although these women already have children, they may become pregnant again.

We are doing this work in Southampton and comparing the findings with Sure Start Children's Centres in Gosport and Havant.



Mavidos

We have previously shown, both in the SWS and an earlier study, that women who have higher levels of vitamin D in pregnancy tend to have children with stronger bones. These findings have led to a trial to test whether giving vitamin D supplements to pregnant women will result in improved bone strength in their babies.

In the MAVIDOS Maternal Vitamin D Osteoporosis Study we are recruiting women at the initial dating/nuchal scan at around 11 weeks' gestation and if found to have a vitamin D level in the low range, they are randomly allocated to either a vitamin D supplement or a placebo tablet daily until delivery of the baby. We measure bone strength in the baby after birth using a DXA scan, in much the same way that we have done in the SWS. This is the first such study in Europe and will be extremely important in helping national policymakers to decide on the best approach to vitamin D supplementation in pregnancy.

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The Southampton Women's Survey, has highlighted the importance of young adults taking responsibility for their health; not only for themselves but for the effects it will have on their future children.

LifeLab Southampton is an innovative project which aims to help Southampton secondary school students gain a better awareness of how the lifestyle choices they make ***now*** will impact on their future health and that of their children. It is a unique collaboration between the NIHR Nutrition, Diet and Lifestyle Biomedical Research Unit based in Southampton General Hospital, the Medical Research Council Lifecourse Epidemiology Unit (MRC LEU), the University of Southampton's School of Education, and Faculty of Medicine, the Science Learning Centre South East, University Hospital Southampton NHS Foundation Trust, (previously Southampton University Hospitals NHS Trust), and local schools.

The theme of LifeLab is ***Me, My Health & My Children's Health***.

Between March and May 2011 190 secondary school students from Cantell Maths and Computing College, Bitterne Park School, and Thornden School came to the Science Learning Centre for their LifeLab day programme.

Topics they studied included:

- The Southampton Women's Survey
- What a "healthy start to life" means and why it is important to them
- How the heart works, including measurements to give them a "snapshot" of their heart.

A programme of work prepared the students in the schools during the lead up to the visit and follow-up projects linked to the national curriculum embed the messages of the LifeLab visit. The students and the teachers who accompanied the students were very impressed with the sessions they participated in. The full impact of the sessions will be evaluated using pre and post questionnaires which students, their parents and their teachers have all completed. One of the striking findings from the SWS was the strong relationship between women's educational attainment and their dietary choices. This led us to feel that part of the solution clearly lay in education and there is evidence that education outside the classroom tends to have a stronger impact on teenagers' behaviour and learning. Both Andrew Lansley, the government's Secretary of State for Health and Lord Robert Winston have visited Life Lab activities and said they were impressed with the work.

Media coverage and public engagement:

Most years we take part in public engagement activities at the **Southampton University Science week** *(March)* and the **Cheltenham Science Festival** *(June)*. This really puts our research on the map both locally and nationally.

The founder of the SWS, **Prof. David Barker** has now retired from the MRC LEU, but continues with his research. In August 2011, he, and our current Director **Prof. Cyrus Cooper** took part in a series of Dr Mark Porter's Medical Matters programmes on Radio 4 entitled **"The First 1,000 Days: A Legacy for Life"**. In September 2011 the BBC Horizon programme **"The Nine Months That Made You"** focused on the work carried out by Prof. David Barker and colleagues.

Things to look out for... Southampton General Hospital Open Day in October each year. Lots of activities for adults and children-come and visit us on our MRC, LEU stand. University Science Week in March each year. Visit the website: http://www.southampton.ac.uk/schoolsandcolleges/scienceweek/

Spring 2012 - BBC Horizon TV Programme, featuring SWS research. Filming has already taken place but we don't yet know exactly when the programme will be on air.

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Current SWS children's follow-up

SWS six year follow-up:

(Some children may be 7 years old when they are seen). At this stage we are trying to find out how children develop and why some become asthmatic. We are also exploring their activity and lifestyle as well as measuring their growth since they were last seen by us.

2007-10 Six year follow-up: what we learnt

From 2007–2010, when more than 900 SWS children were around 6 years old, they helped us to find out information about children's lungs and the development of asthma. Many of you may remember huffing and puffing down our tubes and blowing out candles on the computer. Some of you came to the Wellcome Trust Clinical Research Facility at Southampton General Hospital to find out how well your lungs were working. You may remember trying to help a little girl on the computer cross a river safely in her hot air balloon. We found that babies' and children's diets did not seem to affect the health of the lungs, but levels of some vitamins in the mother's blood when she was pregnant were linked particularly to allergies. Mothers with high levels of vitamin D in their blood had children with marginally lower risks of allergic wheeze.

Six year follow-up – present

At this visit we carry out some assessments on the children to gain information on thinking skills. They undertake four different activities on a touch screen computer, which they normally enjoy, as well as two other activities which we also ask the mums to complete.

Parents and children are often very alike in their abilities, so knowing about the mums' thinking skills will help us when we look at the information on the children.

Bones:

Six year olds continue to be scanned on a 'bone density' scanner, to establish the strength of their bones. To date approximately 975 six-year olds and 1076 four-year olds have had DXA scans. The children have three scans taking less than 10 minutes. One is of their whole body; one is of the spine; and the other of a hip. From the scans we are able to see how strong their bones are.

Some six-year olds have an additional pQCT scan of their leg, taking approximately 5 minutes. This scan gives detailed information about the structure of the different areas of the bone, and the force the bone is able to sustain. For this scan, the children are seated with their right leg horizontally through a hole. DVDs are used to keep the children distracted, and more importantly – STILL!

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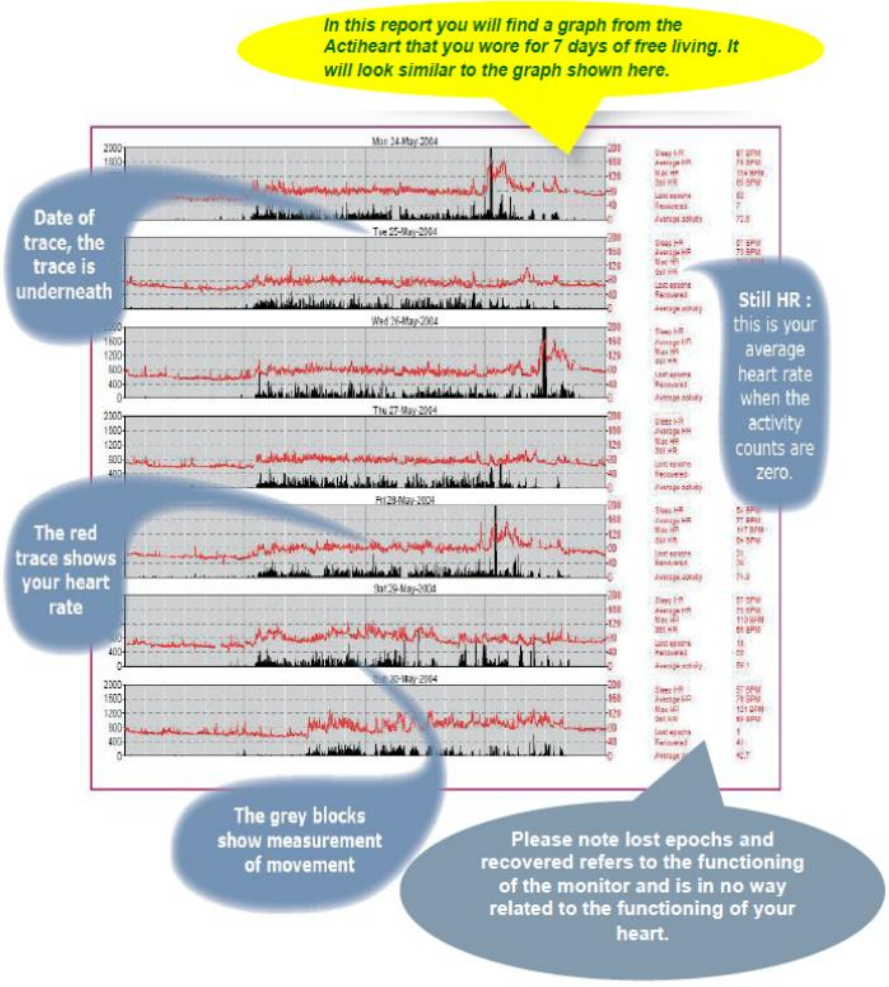
Physical activity

At the four and six year measurements, some children and their mothers were asked to wear an Actiheart activity monitor for up to 7 days. We also asked mothers to complete a questionnaire about factors related to physical activity.

More than 600 mothers and children took part in the 4-year Actiheart activity readings and we are currently looking at these data, which will hopefully answer some important questions. We will be looking at how physical activity is linked with health, such as weight gain and bone strength. In addition, we're interested in how mothers' and children's physical activity behaviours are linked and what factors in the home and family environment can predict how active children are. We are also doing these same measurements at the ongoing six-year visits, which will help us study how and why children change their behaviour. All of this information aids in the development of interventions to promote healthy living in young children across the UK.

Heart and Activity Monitor reading



Here is an example of the information we download from the monitors you wear. It will help us gain information about patterns of physical activity and related energy expenditure.

SWS eight year follow-up

Although it is called the eight year follow-up many of the children may have reached their ninth birthday by the time we see them. The children come and see us at our clinic in the Princess Anne Hospital. This visit focuses on how the heart and blood vessels work and how much the children have grown. We use special ultrasound equipment to look at the heart and blood vessels. A bone scan tells us the size of the children's skeleton and how much fat and muscle they have. The children have to lie still for a few minutes while they are having this done so that the pictures are not too fuzzy, and the research nurses measure the children to see how much they have grown since we last saw them.
Due to the nature of the clinic it is a longer visit than some of our previous ones so we are very grateful for all of the parents and especially the children for coming to see us and being so patient.

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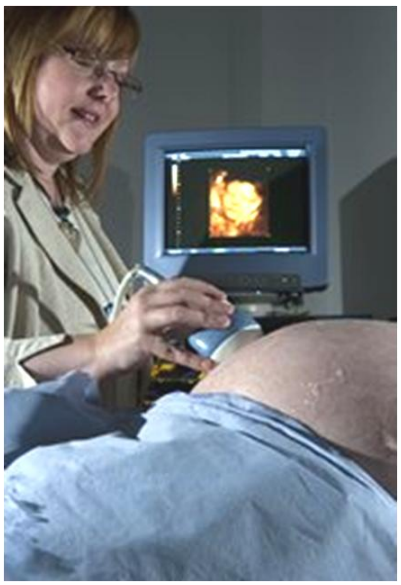
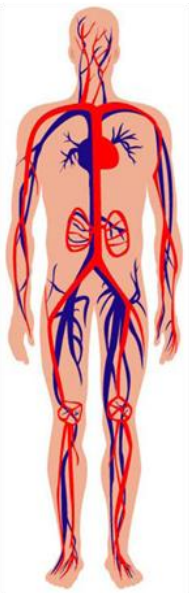
Ultrasounds and why we use them

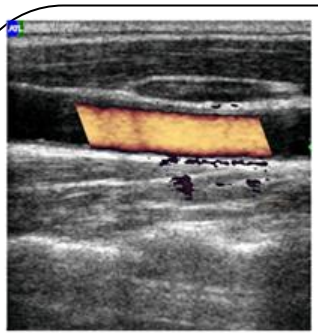
This is the first time we have used ultrasound for the follow-ups and it is an opportunity for our sonographers, Pam and Corinne, to meet up with the children they last scanned nine years ago as unborn babies!



Sound waves, scans and healthy circulation

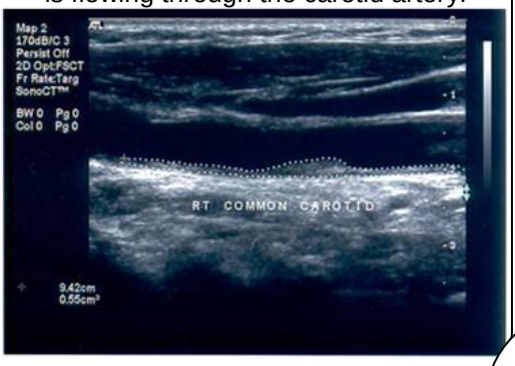
As part of our SWS eight year follow-up, we are focussing on growth and development of the heart and blood vessels.
By using ultrasound, we can see the blood vessel walls and measure blood flow, check development of the heart and the children's blood pressure.
All of these results will be related to the children's diet and lifestyle, and the diet and lifestyle of their mums whilst they were developing.



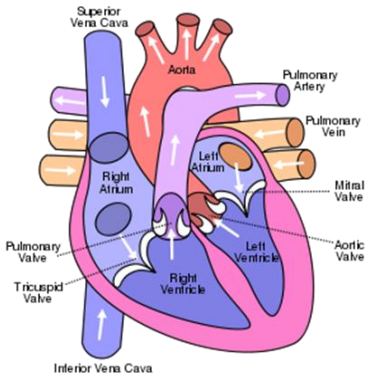


Right: An ultrasound image of a carotid artery in an elderly person. The dotted line shows a feature often associated with cardio-vascular disease, later in life.

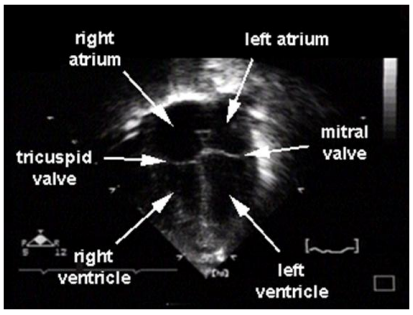
Right: Corinne scanning the carotid artery of one of our eight year-olds.
Left: The colour shows where blood is flowing through the carotid artery.



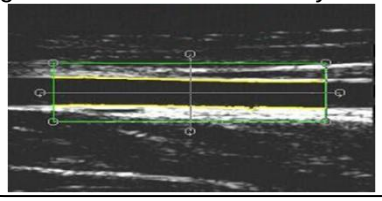
Ultrasound is used to show the chambers and blood vessels of the heart.



The scan we get looks like the picture below



Above: Corinne is positioning the ultrasound probe over the upper arm, so we can see the brachial artery on screen.
Below: Measuring the size of the artery and speed of blood flow and linking these to the mother and child's diet and lifestyle, may help us understand what influences changes in the cardiovascular system.



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Magnetic Resonance Imaging (MRI) scans

As part of the eight year follow-up some of the children are being invited to have a Magnetic Resonance Imaging (MRI) scan. This is a very safe, non-invasive type of scan that does not involve the use of x-rays, and gives us excellent images of the heart and body. We are looking at the heart, the aorta (the major artery in the body that takes blood away from the heart), and body composition on the scans.

The dedicated scan of the heart gives us virtually 'real-time' movie images of the heart from many different angles. Measurements taken from these images provide detailed information about the structure, anatomy and function of the heart. For example we can calculate the volume of blood that is pumped out of the heart each heartbeat, and how many litres of blood are pumped from the heart every minute. We can also calculate how much the muscular wall of the heart weighs.

We are also looking at the flow of blood through the aorta. Using special 'flow' scans to measure the speed at which blood flows through the aorta, at two different levels, we get an idea of how elastic the walls of the aorta are.

MRI scans are excellent at demonstrating body fat so we are also looking at the composition of the body. We are able to measure the amount of body fat both within the abdomen, and around it. On the scans we will also be measuring the amount of fat inside the liver. We will be looking at the information collected at earlier stages in the study such as maternal diet, birth-weight and lifestyle to see how these affect the development of the child's heart and blood vessels, and body composition at the age of 8 to 9 years.

Jen Bryant-Radiographer

Jen does all the MRI scanning. She studied Radiography at Auckland, New Zealand School of Radiography and then went on to obtain an MSc in Medical Magnetic Resonance at City University in London. She has worked in Auckland (CT Scanning) and Saudi Arabia (CT Scanning and MRI), as well as in London and Southampton (CT Scanning and MRI). Jen now works in Cardiac MRI Scanner whilst undertaking her PhD. She has been involved with the SWS 8 year MRI scanning since January 2009 – and from this picture it looks like she enjoys it!

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Meet some of the SWS staff

Hazel Inskip

Hazel is Deputy Director of the MRC Lifecourse Epidemiology Unit, and Professor of Statistical Epidemiology at the University of Southampton. She has run the Southampton Women's Survey since it began. Her work involves planning all stages of the Survey with others, applying for grant funding to keep it going, getting all the necessary regulatory approvals, ensuring that the data are of high quality, analysing the data and writing up the results for publication. The SWS has been a great team effort and she is grateful to all her colleagues as well as all those many families who have taken part in the study and given us such valuable data. Hazel's signature appears on all the letters to those participating in the SWS so her name may be known to you!

Jane Lucas

Jane Lucas is a children's allergy and respiratory consultant at Southampton General Hospital. Within the SWS, she has been investigating factors that might increase the risk of children developing allergies or asthma. Early on, Jane measured the lung function of some very young SWS babies and found that lung development is poorer in babies who did not grow well during pregnancy. As the SWS children grew older, Jane continued to investigate their respiratory health, with a particularly detailed assessment at age 6 years. Jane says "*Being involved with the SWS study has been one of the highlights of my career. Respiratory doctors all over the world have been interested in our results and the implications for advice that we can give pregnant women in the future. I am so grateful to the families who have taken part*."

Recruitment team -

Tina Horsfall (front) – Research Data Coordinator for SWS & Communications Officer for MRC LEU

Wendy Johnson (back) - Administrative Assistant for SWS and MAVIDOS.

Tina has been recruiting mothers and children onto the SWS study since 1998 and says, *"I am amazed at how our study participants are so generous with their time. We have 6-7 year olds and 8-9 year olds still on board and still excited to be taking part in our research. All SWS parents and children are very important to our study, without them, we would not be able to do our research, so it is really important for us to keep in regular contact in whatever way we can. What is impressive is the number of participants who move away, but still come to see us, both in this country and abroad; our furthest study participant visits us from Australia!" "We realise that people lead very busy lives, and it's not always possible to take part in our research for various reasons. However, no-one is excluded, even if they have missed some of the earlier components. Occasionally some study participants join us again at a later stage.* ***Please call us on our freephone number 0800 783 4503 or return your yellow reply slip with your new contact details if you have had a break from us but would like to participate again – we would love to hear from you."***

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SWS nurses

Left to right back row – Julia Hammond, Sue Collins, Sue Macey, Suzanne Wood, Valerie Davill
Left to right front row – Dian Rogers, Christine Taylor, Sue Higginbottom

All in a Day's Work – by Christine Taylor

A disgruntled three year old once shouted from behind the sofa, "Why don't you just go and measure yourself?" A baby once vomited in my handbag. I've worked in wee-soaked clothes more than once. And one dismal December day, struggling to find someone's house, I drove the wrong way down a one way street and met a police car! Yes, I'm an SWS nurse.

With a mind-blowing 3,000 unique families in SWS, every day is different. I love it, even the misunderstandings. One Mum, when asked to show us her butter, brought out her beautiful china butter dish, and many, mishearing the word 'wheezed,' are shocked to be asked if their child has 'wee-ed ' in the last 12 months.

But the children are the stars. The six year vocabulary activity lets us glimpse how they see the world. One little boy when asked "What is a holiday?" answered, "When you go on an aeroplane." Could he say more? "Yes," he replied, "It's a big shiny thing with wings."

And by the way that lovely policeman didn't fine me, he stopped the traffic while I turned in the road, red-faced and sheepish, still looking for the house. I do love my job, honestly!

MAVIDOS team

Left to Right: Nick Harvey (Doctor), Karen McGill (Nurse), Sarah Crozier (Statistician), Pam Mahon (Superintendent Sonographer), Sue Macey (Nurse), Valerie Davill (Nurse)
Below: Lyn Barron (Nurse)
Many of the staff work on both the SWS and MAVIDOS studies

DXA staff

Left to right Leanne Jones (Clinical Technologist), Pat Taylor (Clinical Scientist), Alison Beaumont (Clinical Technologist)
These staff carry out the DXA scans at the Princess Anne Hospital as well as on those children who visit us at the Osteoporosis Centre, Southampton General Hospital.

Eight year MRI interview

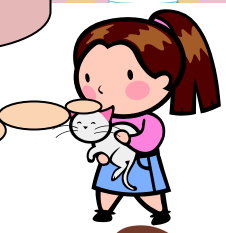
What is it like being part of SWS?

I feel honoured and it is interesting to take part in something other mothers and children can benefit from.

Do you think you have benefited from being part of the study?

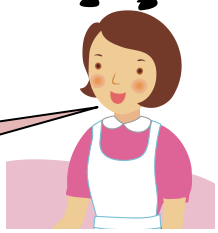
Yes. The additional scans during my pregnancy were very reassuring. It has permitted an insight into the growth of our child which would not normally be available.

What was it like having an MRI?



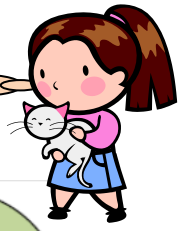
I felt quite safe – not at all scary. Although noisy I didn't mind. It was fun, especially when I first went in.

What was it like to see the pictures afterwards?



Amazing, absolutely amazing, like a documentary.

It's odd to see your insides as you normally wouldn't. It was very interesting.



… and just for fun

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B	R	A	I	N	R	F	V	G	B	T	R	G	T
R	F	V	C	D	E	W	S	H	X	Z	I	A	I
V	F	R	E	D	C	X	S	T	W	Q	C	N	N
S	T	O	M	A	C	H	B	G	T	Y	H	N	E

Can you find these words in this wordsearch?

BRAIN
LUNGS
HEART
LIVER
STOMACH
LARGE INTESTINE
SMALL INTESTINE
GRIP
CIRCULATION
SWS
SPLEEN
HEIGHT
WEIGHT

A big thank you to all SWS mums, children and their families from the SWS Team.

Contact details

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