Scottish Oral Health Research Collaboration

SOHRC Conference Programme

.....MID-TERM REVIEW.....

What are we doing ?
How much are we doing ?
How well are we doing ?
What are we planning on doing ?

9:00 – 9:40	Coffee & registration	
9:40 – 9:45	Welcome	Margie Taylor
9:45 – 10:15	SOHRC – an external perspective	Paul Speight
10:15 – 11:15	Public Health & Health Services Research Group • Overview • Child Oral Health Audit Intervention • Oral Health of Older People Programme • HOPSCOTCH project	 Lorna Macpherson Linda Young Andrea Sherriff David Conway
11:15 – 11:45	Coffee Break	
11:45 – 12:45	Craniofacial Research Group • Overview • Novel 3D & 4D Imaging • Genotype - Phenotype Research • Links with Dental Public Health Research	 Peter Mossey Ashraf Ayoub Peter Mossey Peter Mossey
12:45 – 1:50	Lunch (posters & networking)	
1:50 – 2:20	Dental Education Research Group • Overview • Priority Setting Exercise	 Vince Bissell Rola Ajjawi
2:20 – 2:50	Scottish Dental Practice Based Research Network	Linda Young
2:50 – 3:00	Closing Remarks	Margie Taylor

University of Aberdeen · University of Dundee · The University of Edinburgh · University of Glasgow · Chief Scientist Office · NHS Scotland · Scottish Enterprise · Europe & Scotland

ottish Oral Health Research Strategy 2010:

- To ensure that research that was undertaken would support the needs of the Scottish population.
- To focus and build on areas of research in which Scottish scientists are already at the forefront of UK and international oral health research efforts.
- To enhance the reputation of dental research in Scotland by optimising performance in national peer reviewed research appraisal.

ottish Oral Health Research Strategy 2010:

Craniofacial Anomalies / Cleft Lip and Palate

- CFA collaboration built on SYNERGY:
- Research in CFA at two Scottish Academic centres is different but highly complementary.
- Dundee University hosts only WHO collaborating centres for craniofacial anomalies in the world with local, European and NIH funding
- The 3D imaging research at Glasgow Dental School in 3D / 4D imaging to characterise residual facial deformities following cleft repair, is internationally renowned
- Exemplary Managed Clinical Network in cleft lip and palate and has set up a clinical governance system that is an example for other units in the UK and beyond.

ottish Oral Health Research Strategy 2010:

ottish Craniofacial Anomalies Research Group strategy

- **LOCAL STRATEGY & PROGRESS:**
- **1. Exploit existing synergies**,

e.g. genotype-phenotype correlation projects such as "Scotland Facial Biosignature" , "Facereader" and "Facegene" projects that required complementary input.

- **2. Submit applications for research grant funding to local, national and international funding bodies,**

6 grant applications to date, 2 BBSRC, 1 MC_ITN, 2 H2020 and 1 Carnegie Trust

- **3. Sustain and enhance our track record of publishing in the highest impact peer reviewed journals in the field,**

Since 2010, 22 publications using CCS MCN data (and CFA research mentioned in REF2014)

- **4. Increase research capacity and critical mass by recruitment of new staff or by attracting existing staff into the field of craniofacial anomalies research**,

Includes: Toby Gillgrass, Tatiana McFarlane, Khalif Khalad, Craig Russell, Angus Walls, Felicity Mehendale, Paul Sharma (+DPH)

- **5. Provide opportunities for craniofacial anomalies research in higher degrees, taught Masters and intercalated degree programmes,**

Includes: Lorna Dobbyn, Lorna Murphy, Mohammed AlMuzian, Neil Nairn, Kris Carroll, Andrew McBride, Charlene Kasaven, Jennifer Galloway, Elinor Chalmers, Nafeesa Qureshi, Shaho Al-Talabani and Catherine Martin

- **6. Use the Managed Clinical Network in Scotland (CLEFTSiS) and the unique CHI System as a system for carrying out Scotland-wide multi-disciplinary research.**

ottish Oral Health Research Strategy 2010

Can Scotland contribute beyond ?

- **National & International strategy:**
- CFA research in Scotland is significant at a global level in that isolated CP is disproportionately prevalent in Scotland compared with other countries in the world (with the exception of Finland) and therefore research into aetiological factors carried out in Scotland carrys a special significance.
- Scotland is capable of leading in aspects of national and international CFA research, through strong links with EU and global bodies and in 2014 WHO collaborative status has been strengthened.
- It is now acknowledged that CFA is a global problem and following the resolution at the 2010 World Health Assembly (WHA) is targeted by the WHO, and their strategic 'global burden of disease' (GBD) project in OFC is being led by Dundee.
- International Association for Dental Research (IADR), along with FDI and WHO have set up GOHIRN – a research Network to address 'global oral health inequalities'. CFA is one of the areas of oral health inequalities to be addressed as part of this initiative.
- Scotland will host the 2021 International Craniofacial Congress – through which there is a Cleft lip and palate "Global Task Force" initiative and Scotland is playing a leading role in the co-ordination of research that underpins these global efforts.

ottish Oral Health Research Strategy 201

Genotype – phenotype correlation

- JMed Genet 1998;35:371-378

Prediction of liability to orofacial clefting using genetic and craniofacial data from parents

Peter A Mossey, Reynir Arngrimsson, John McColl, Gill M Vintiner, J Michael Connor

Abstract

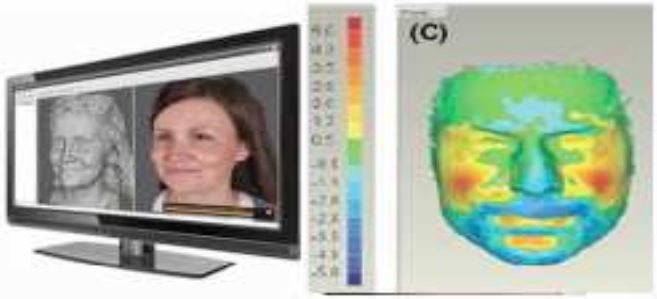
Background-Cleft lip with or without cleft palate (CL(P)) and isolated cleft palate (CP) are separate clinical entities and for both polygenic multifactorial aetiology has been proposed. Parents of children with orofacial clefting have been shown to have distinctive differences in their facial shape when compared to matched controls.

Objective-To test the hypothesis that genetic and morphometric factors predispose to orofacial clefting and that these markers differ for CL(P) and CP. Methods-Polymorphisms at the transforming growth factor alpha (TGFa) locus in 83 parents of children with nonsyndromic orofacial clefts were analysed, and their craniofacial morphology was assessed using lateral cephalometry.

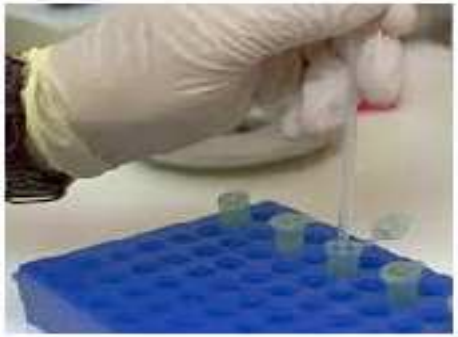
Results-Parents of children with CL(P) and CP showed an increased frequency of the TGFalTaqI C2 allele (RR=4.10, p=0.009) relative to the comparison group.

The Face Gene Project

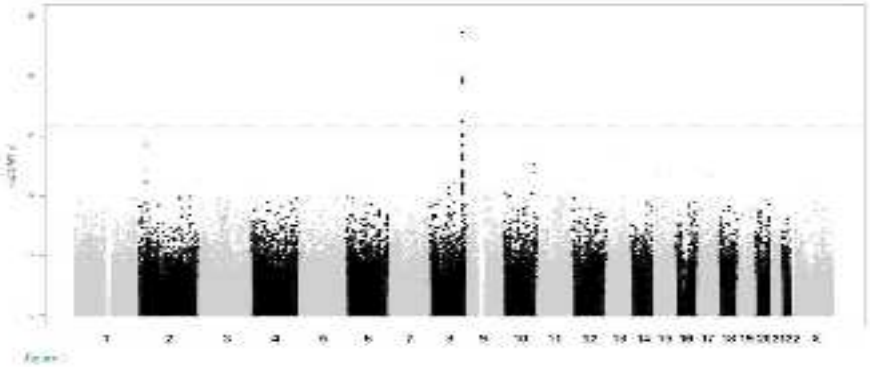
2D Selfie



3D face analysis (with texture)



DNA analysis



GWAS (38,000 subjects)

GCTA

3D face prediction from DNA sample

ottish Oral Health Research Strategy 2010:

The “Facegene” project?

- **IMPACT and UTILITY**
- **Biological** : This would have significant implications for craniofacial biology, craniofacial dysmorphology, orthodontics, and prediction of facial growth
- **Forensic : F**acial reconstruction with the possibility of identification of facial appearance and digital facial reconstructions from a DNA sample.
- **Criminology** : Each human face is unique, and is the image by which individuals are recognized and facial recognisability allows identification of individuals with regard to the possibility of facial image generation from DNA.
- **Computational biology** : methodology would be generalisable to shapes or measurable phenotypes other than facial shape, and to species other than the human.

ottish Oral Health Research Strategy 2010:

The “Facegene” project: IMPACT?

- From February 2006 to March 2011, Generation Scotland GS:SFHS recruited 24,000 individuals from families across Scotland.
- All participants filled in a health and lifestyle questionnaire and provided a blood or saliva sample which were used to extract DNA.
- Over 21,000 also underwent clinic assessments (e.g. blood pressure, lung function and mental health) and provided a urine sample.
- GS has now received requests from researchers all over the world to use GS:SFHS samples.

Generation Scotland: Family Health Study

E-mail message 14th January 2015

Dear Blair and Peter,

“A fortunate convergence of like-minded local interests has got us started on this in earnest. Professor Angus Walls in his recently established role as Edinburgh Dental Institute Director came to see me about what Generation Scotland might offer by way of support for his joint interests in oral health and healthy ageing.

Dr Mairead Bermingham, one of our genetic epidemiologists came to see me about the potential to link dental health records to GS:SFHS as we have already done for SMR data. We have visited ISD to discuss practicalities and Mairead has put together a bid to the CSO for a pilot data linkage and heritability estimate project (deadline this Friday).

If that bid fares well, then we should most certainly talk. I have copied Angus and Mairead in so that they can pick this discussion up with you and your colleagues in the SOHRN as and when that suits and makes sense.

Best wishes,
David

Professor David J. Porteous,
Medical Genetics Section,
Centre for Genomic and Experimental Medicine,
Institute of Genetics and Molecular Medicine,
University of Edinburgh

OFC research **focus**: Links with Dental Public Health Research

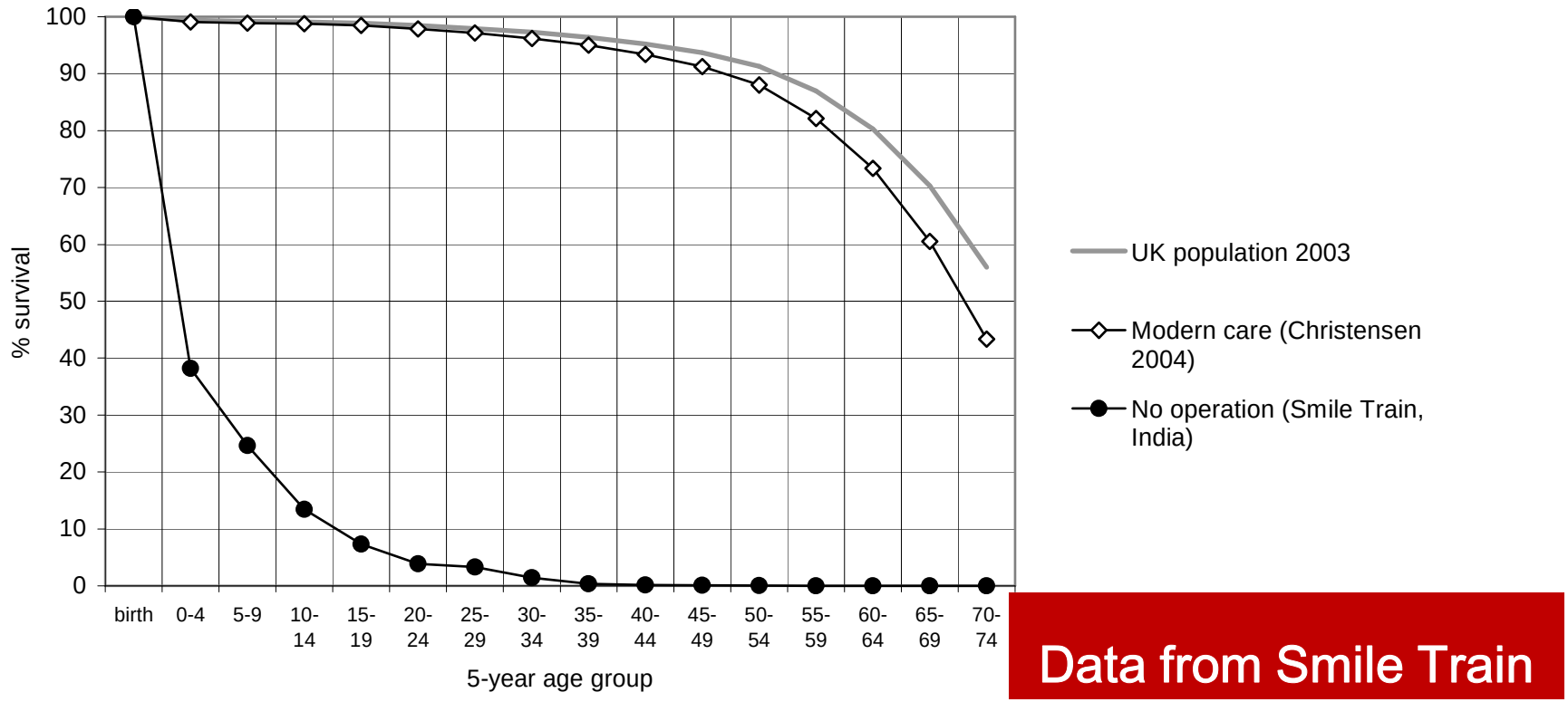
OFC is a rare group of congenital disorders with multifactorial aetiology (genetic and environmental) classically well suited to public health research as we seek to: (a) improve evidence based quality of care, (b) reduce inequalities and (c) strive towards primary prevention:

1. Adult CLP – an area of perceived neglect (AW)
2. Mortality – an area of uncertainty ? (TMcF)
3. Inequality – the world's greatest scandal (DC / LM)
4. Work out the cost, and cost benefit of better care / prevention (SL)

Evidence: OFC – survival curves reveal mortality

- Limited access to care….increased mortality risk
- Adults with CLP die younger

Danish study needs to be replicated – Scotland well placed to carry out



Data from Smile Train

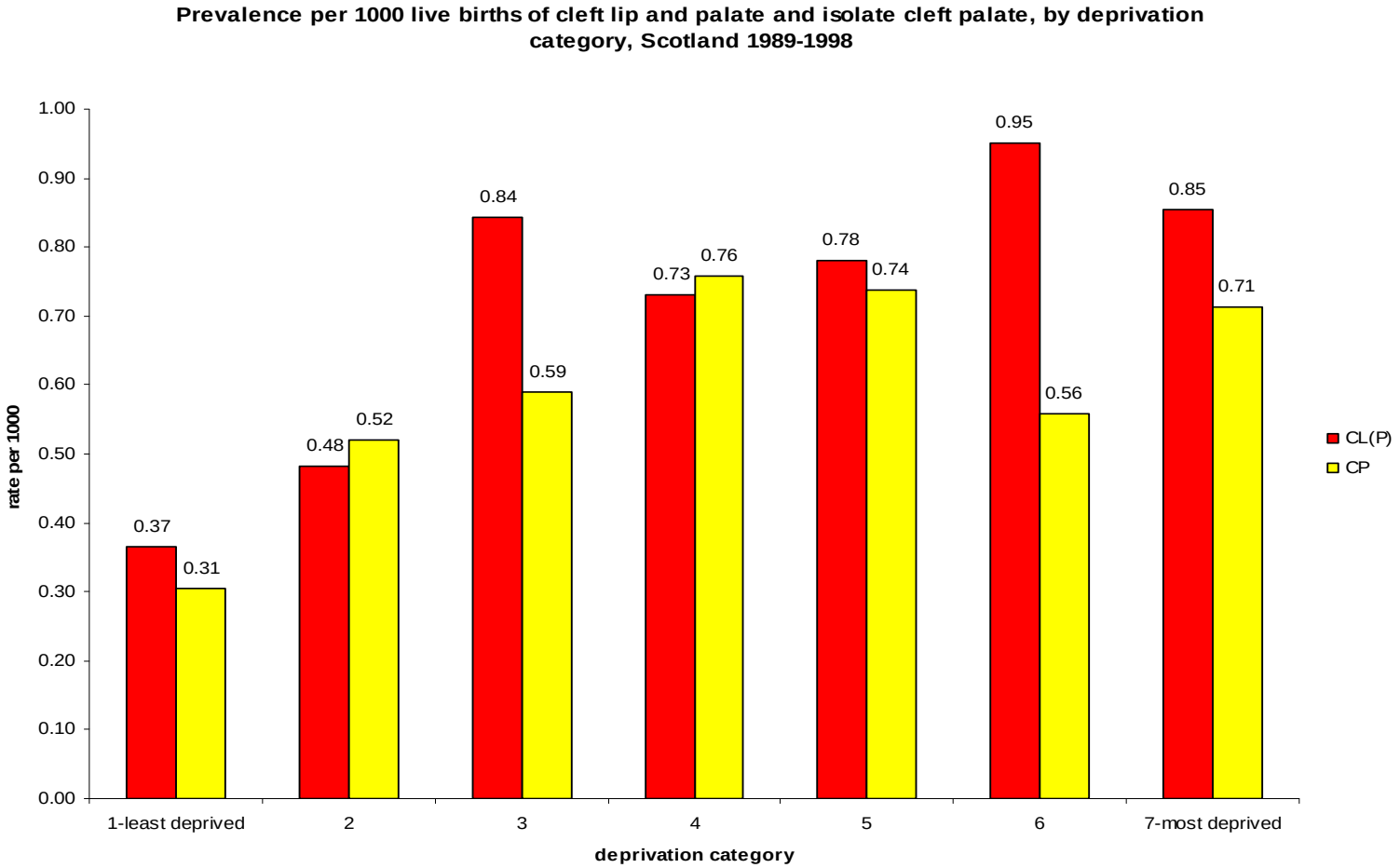
Evidence: Socio-economic status & OFC in Scotland

603,825 live births ; 834 clefts

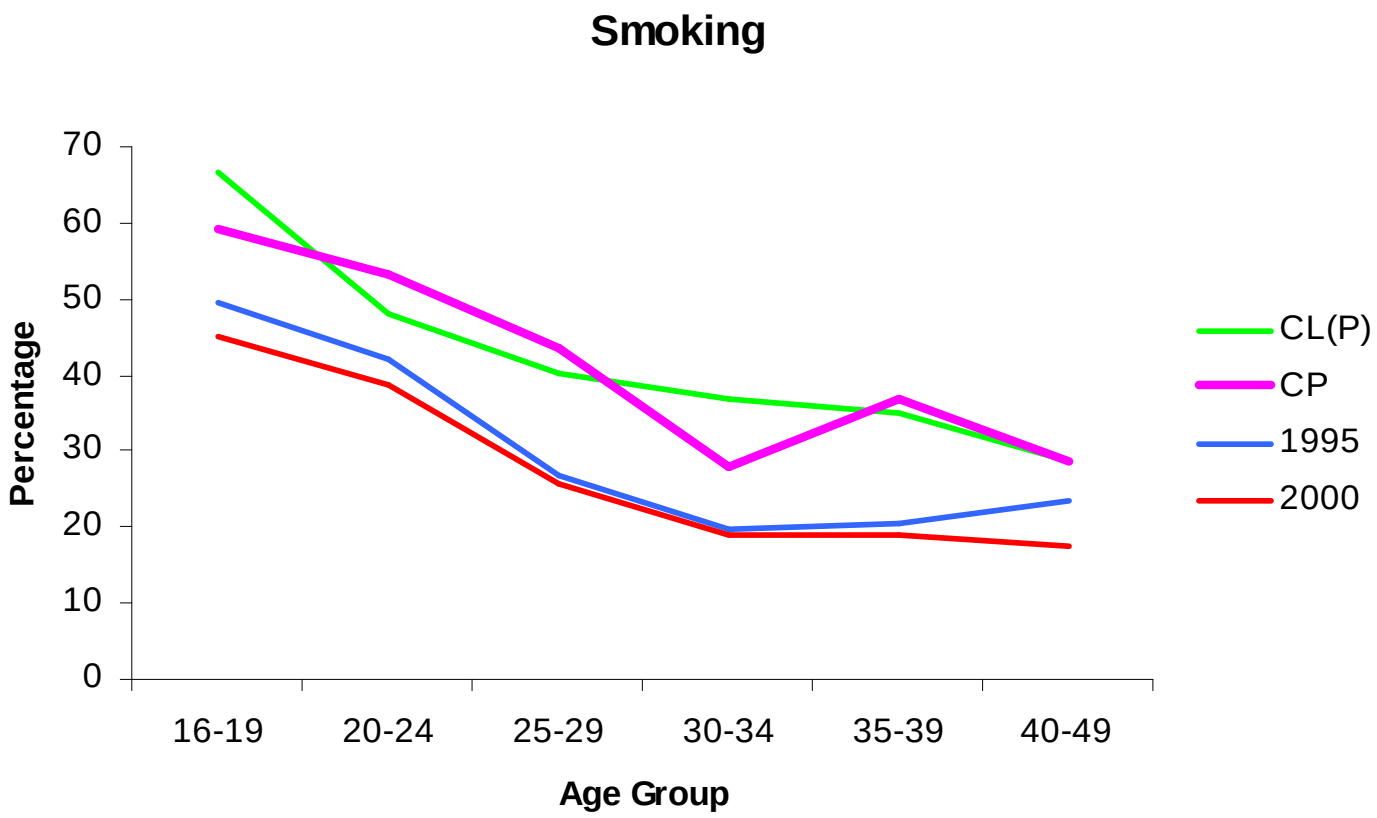
Deprivation category by postcode (Carstairs index)

Prevalence of CLP at birth increased with increasing deprivation (**RR=2.33**)

Cleft Palate Craniofac J. **2003**;40(5):481-5



Smoking among women in Scotland
All women v OFC mothers



BBC Breaking News: 17th February 2015

“A major European obesity investigation has called for urgent action to prevent obesity in women of child-bearing age. The authors, including a team from Edinburgh University, say children born to overweight mothers are at greater risk of health problems in later life”.

Prevention of Orofacial Clefts: Does Pregnancy Planning Have a Role?

Cleft Palate–Craniofacial Journal, May 2007, Vol. 44 No. 3

(Peter A. Mossey, B.D.S., Ph.D., F.D.S., R.C.S. (Edin), Janet A. Davies, B.Sc., M.Sc., M.P.H., Julian Little, Ph.D)

ABSTRACT

- *Objective:* To investigate the association between pregnancy planning and orofacial clefts in the United Kingdom.
- *Design:* Case–control study. *Setting:* Scotland and the Manchester and Merseyside regions of England.
- *Participants:* One hundred and ninety-one children born with nonsyndromic orofacial cleft, 1997 to 2000, and 247 controls.
- *Results:* There was an inverse association between planning for pregnancy and orofacial cleft in the offspring ([OR] = 0.51, 95% confidence interval [CI] 0.33–0.79).
- *Conclusions:* Planned pregnancies were associated with a lower risk of orofacial clefts.

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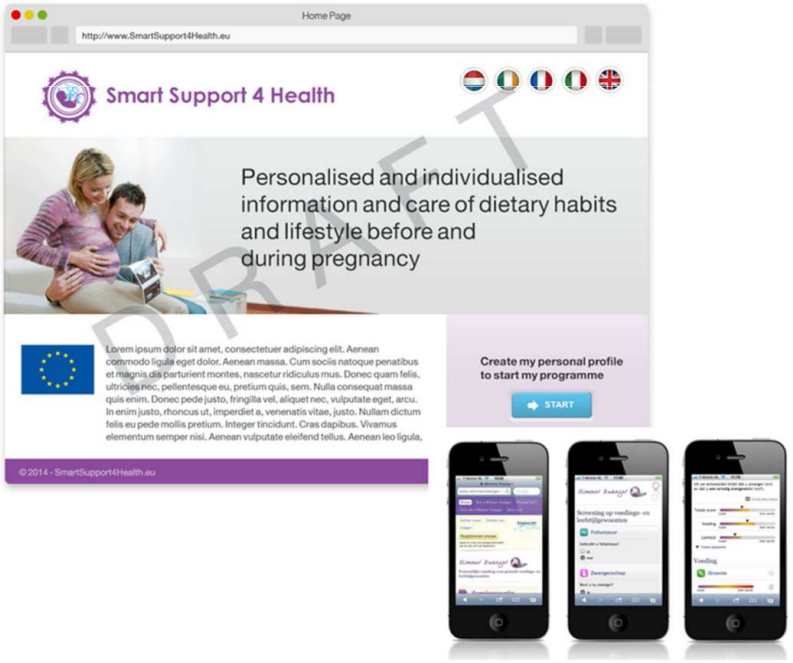
Smart Support 4 Health

Amendable risk factors – the efficacy of personalised coaching ?

Healthier lifestyle is the way towards primary prevention, and the topic of an application to H2020 in March 2014 “Smart Support 4 Health”



Preconception eHealth tool for tailored nutrition and lifestyle coaching (*launch January 2012)*

https://www.slimmerzwanger.nl/nl/demo-en.php

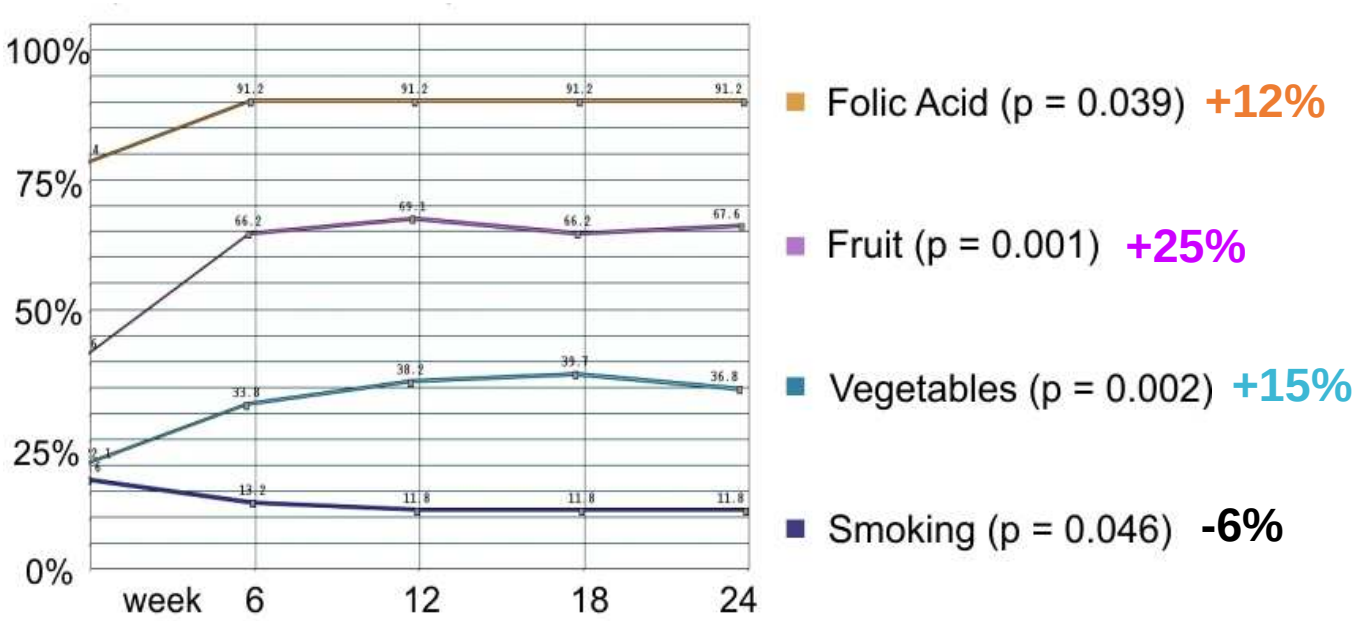
Parents-to-be and health care givers

Internet excellent medium to reach the target group anonymously (cheap)
Web-application with email and SMS, at any time and place (smartphone)
Personal screening profile linked to a personal coachingsprogramme
Attitude- Social influence- Efficacy model

Steegers-Theunissen, May 2013

Efficacy

% improvement in nutrition and lifestyle behaviours



Scottish Oral Health Research Collaboration

One outstanding challenge in OFC research !

Amendable risk factors – but how do we change behaviour ?

Behaviour change is the key to primary prevention, and research needed on methods that reliably change behaviour !

Can we enhance the SOHRC synergy further…… ??