



Prepared for Pregnancy?

Preconception health, education and care in Scotland

Dr Jonathan Sher

**An overview of
*Missed Periods: Scotland's Opportunities
for Better Pregnancies, Healthier Parents
and Thriving Babies the First Time
... and Every Time***

**Both of these independent, national reports
were commissioned by
NHS Greater Glasgow & Clyde (Public Health)**

2016

Both the main 'primer' (*Missed Periods*) and this 'taster' (*Prepared for Pregnancy?*) are Scotland-specific reports based upon the most recent and reliable evidence.

Hundreds of preconception-related articles, reports and websites on three continents were reviewed to create this Plain English introduction to a vast, complex and critically important field. The literature was balanced with more than one hundred interviews and discussions with diverse professionals, practitioners, researchers and prospective/current parents across Scotland (as well as contact with key international experts).

These two e-publications are intended to be catalysts for thought, discussion and action by opinion leaders, policymakers and organisations whose work affects the health, education and care of Scotland's prospective mothers and fathers.

Advance reviews of *Missed Periods* include:

“ This report hits the bull's eye, in three different ways, for top-quality health policy advice, based on evidence: it is very comprehensive; it is scientifically accurate, and it is accessibly framed and written so that a wide audience can digest it. It is philosophically bold in suggesting a whole new approach to parenting ... from the very start. It should be required reading for any relevant Cabinet Secretary, Minister, Government official and parliamentary leader of any party. If properly acted upon, by any nation-state, it would materially improve health, social, and economic outcomes across the life-course of future generations, and likely even save public money ”

Professor John Frank
Chair in Public Health Research and Policy
University of Edinburgh

“ This wonderful report captures all of the complex angles of preconception health and wellness. It does a beautiful job of elevating key issues and presenting them in a highly readable and applied manner. As highlighted in this report, a variety of agencies, professions and organizations addressing the social determinants of health is critically important for lasting change to occur. If taken seriously and translated into action, this report has the potential to improve the health of generations of Scottish children, young adults and families, while setting a high bar of achievement internationally. I predict it will put Scotland on the map in terms of preconception health, education and care. ”

Dr. Sarah Verbiest
Senior Advisor
CDC's National Preconception Health and Health Care Initiative
Executive Director
Center for Maternal and Infant Health
University of North Carolina

Foreword

Public health is concerned with protecting, preserving and promoting the health of current and future generations.

Health emerges from the interplay between physical and social environment; the individual behaviour; genetic inheritance; economic factors. Health in adulthood is the outcome of socially patterned processes acting across the entire life course and starting earlier than ever imagined: in a bundle of cells, a generation or more before a fetus is conceived.

The environments we live in irrevocably influence our life stories and that of future generations by changing the way our genetic material is expressed. Our quality of life directly affects how our genes operate, so much so that there is a view that the post code is more important to health than one's genetic code.

Pregnancy occurs in a limited time period in a woman's life and it is not independent of the prior life experiences that will also have a bearing on the pregnancy outcome. We have a collective responsibility for the next generations that can be best discharged through access to adequate housing, strong neighbourhoods, green space, schools, employment, and healthy food for all, or, in summary, through social justice.

Dr Jonathan Sher has distilled the current evidence on the impact of preconception care and has made a number of recommendations for action.

Dr Emilia Crighton
Interim Public Health Director
NHS Greater Glasgow & Clyde

Disclaimer: The opinions and recommendations in this independent report do not necessarily represent the views of NHS Greater Glasgow & Clyde and do not commit NHS Greater Glasgow & Clyde to any specific actions.

Why the preconception period deserves greater attention and action

In Scotland today, far too many pregnancies do not achieve positive outcomes. Of the 70,000 known conceptions last year, there were fewer than 54,000 live births – which means that 16,000 (more than 1 in 5) pregnancies ended in a termination, miscarriage or stillbirth.ⁱ Of the live births, more than 1 in 10 required ‘extra care’ immediately after delivery and around 1 out of every 5 resulted in longer-term additional support needs.ⁱⁱ

The human, societal and financial costs of Scotland’s ‘blind spot’ about preconception health, education and care are **unacceptably** high.ⁱⁱⁱ Therefore, it is time to **stop accepting** these costs and start treating them as largely preventable, not inevitable.

Even the majority of positive outcomes were not the result of careful planning and active preparation **before** pregnancy. Unnecessarily risky pregnancies are common across Scotland. Unwanted, mistimed, and ill-prepared-for pregnancies jeopardise the lives of mothers and babies each year, as well as the wellbeing of families, including fathers. Pre-existing good health, good luck and good antenatal care have long been the foundation of most successful pregnancies in Scotland.

This situation is not Scotland’s destiny. Healthier pregnancies, healthier parents and healthier babies are goals Scotland can achieve right now. **Seizing** these opportunities begins with **seeing** the preconception period as the earliest and best time to prevent harm, promote health and reduce inequalities. **Closing gaps in pregnancy and birth at any time is good, but preventing inequalities from opening in the first place is far better.** But, positive outcomes will not happen by accident or by squandering the numerous chances to improve preconception health, education and care.

Traditionally, it has been assumed there are only two stages that matter, i.e. either *avoiding* pregnancy or *being* pregnant. The middle stage of *preparing* for the best possible pregnancy continues to be overlooked in policy, professional practice and individual thinking in Scotland.

Personal and professional experience, as well as a mountain of international research, make it plain that women who are in good shape (physically, mentally,

socioeconomically and in terms of their personal relationships) **before** conception are most likely to come through their pregnancy successfully. They are also most likely to give birth to a thriving baby.

Most of the risks prospective parents face – chronic medical conditions, stress, obesity, depression, exposure to toxic/teratogenic substances, serious illnesses, smoking, domestic abuse, alcohol and drug use – would have been far better dealt with during the preconception period than when already pregnant.

‘Naming, shaming and blaming’ prospective mothers and fathers is both unkind and ineffective. The key is to understand the reasons **why** these risks have developed; how best they can be prevented, reduced or eliminated; and then, to take the compassionate, supportive actions necessary.

Delaying pregnancy is already the norm in Scotland. The average age of giving birth in Scotland today is 29.5 years – and 28 years old for first time mothers. In fact, less than 1 out of every 23 births in Scotland last year was to a mother under the age of 20. Nevertheless, steering clear of childbearing is not the same as **preparing** well for pregnancy.

The Root Causes of Adverse Outcomes: Inequality, Ignorance and Infrastructure

Inequality

Neither high risks nor negative results are fairly, evenly or randomly distributed within Scottish society.^{iv}

Pregnancy and birth outcomes are predictably and consistently worse for people living in areas of the highest deprivation. Nationally, there is a 'stair step' pattern in which overall risks and adverse consequences increase step-by-step as levels of poverty, deprivation and disempowerment deepen.

Practical examples of this perverse pattern abound across Scotland. For instance, at the first antenatal health appointment, the rate of women still smoking tobacco becomes higher and higher as socioeconomic status becomes lower and lower. As a result, smoking rates in pregnancy are **seven times higher in Scotland's most deprived areas** than in the least deprived ones. The poor outcomes attributable to smoking mirror this disparity.

To cite another example, the region served by NHS Greater Glasgow & Clyde is consistent with Scotland's national average on most pregnancy and birth outcomes. And yet, **within** NHS GG&C, there are striking inequalities. For example, there were 278 births to women under the age of 20 last year from the areas of greatest deprivation, but only 4 births to teenagers from GG&C's most well-off communities.

This difference is neither a coincidence nor a reflection of realities and problems that occur only **after** conception. On the contrary, most risks for adverse outcomes exist **prior** to pregnancy. And, some preventive actions can **only** be effective if undertaken during the preconception period, e.g. achieving adequate levels of folic acid to prevent Spina Bifida and other neural tube birth defects.

While socioeconomic differences matter greatly, major risks to healthy outcomes are too complex to be explained solely by the distinction between richer and poorer people. For instance, obesity, domestic abuse, depression and alcohol consumption are serious risk factors affecting pregnant women across the socioeconomic spectrum.^v

And yet, the historic tendency to 'name, blame and shame' people – especially women – for what

objectively is unhealthy behaviour (e.g. smoking, drinking or other substance misuse) reflects an inability or unwillingness to address the root causes of these behaviours. The balance must shift to prevention and meaningful preparation.

Overcoming the social determinants of adverse pregnancy and birth outcomes – and ending the current 'social gradient' in preconception health – could and should become an example of honouring the **social justice** commitments of Scotland's political parties.

Ignorance

A widespread lack of knowledge and understanding in Scottish society about preconception health, education and care perpetuates adverse pregnancy and birth outcomes. Scotland's preconception health 'blind spot' (i.e., ignorance) results in prospective mothers and fathers knowing far less than they should about planning and preparing for pregnancy. Equally important, professionals and service providers are often poorly equipped to offer accurate, up-to-date information and advice that would truly help the next generation of parents.

Internationally, the preconception period is still an emerging field of research, public attention and professional development. However, it is not as far 'under the radar' as is the case in Scotland and across the UK. There is now a wealth of evidence, insights and experiences from other OECD countries that can enhance Scotland's understanding of preconception health, education and care.

Overcoming this blind spot will challenge the prevalent belief that Scotland is somehow destined to have a high rate of pregnancies that are unwanted, unintended, mistimed or for which prospective parents are unprepared. According to the evidence-based estimates, 1 in 3 pregnancies in Scotland fit at least one of these negative categories.^{vi}

In other countries currently taking preconception health, education and care more seriously than Scotland, there is a focus not only on the first pregnancy, but also on the potential **next** pregnancy. Preparing well for **every** pregnancy is a neglected necessity not only in Greater Glasgow & Clyde, but also throughout Scotland.

Throughout Scottish society, planning and preparation are commonplace for most other decisions regarded as important. The passivity and *que sera sera* attitude implicit in the widely used term 'falling pregnant' are not consistent with how Scots routinely plan and prepare for their education, employment, homes or even holidays. Scotland's preconception blind spot helps to explain why that same inclination and ability to plan and prepare for key life events is applied too infrequently to pregnancy and parenthood. As long as Scots' vision is limited to **avoiding** pregnancy or **being** pregnant, the benefits of **preparing** for the possibility of parenthood will be lost.

The great work underway in Scotland to keep improving antenatal care is vital and often successful. But, **reacting** well to difficult situations and risky pregnancies is never as good (or as inexpensive) as **preventing** or overcoming these problems – and thereby, increasing positive outcomes – through effective **preconception action**.

Infrastructure

There are specific individuals and groups throughout Scotland who are very knowledgeable about, and deeply committed to, improving preconception health, education and care. However, they remain a minority and their reach is usually very limited. The societal, political and organisational infrastructure needed to tap the potential of the preconception period **throughout the life course** is largely missing. The major milestones on this life course leading to (or away from) healthy procreation are:

- The hand dealt before birth
- Early childhood experiences and environments.
- Socialisation and habit-formation during childhood and adolescence
- Decision-making about parenthood
- Getting ready for pregnancy

The Scottish agencies, institutions, organisations and other resources able to influence the preconception period too often do not even 'see themselves in this picture'. But 'not my job' is an inadequate response to the pressing need for better preconception health, education and care.

The preconception period **could become** a time of transformational improvements in pregnancy and birth outcomes. But, for this to happen, Scotland's powerful networks connecting education, professional development, civic society and public bodies will have to add this area of opportunity to their agendas and activities. The early years have enjoyed this kind of growing recognition and inclusion in the thinking, planning, policies and practices of Scotland's social and institutional infrastructure.

The fundamental point is that shifting individual and societal attitudes toward understanding that 'prevention and early intervention' actually begin far earlier than has been assumed. Life trajectories do not begin at primary school or even in childcare. While it is never too late to influence and improve lives, it is simpler, more effective and less expensive to do so in the years before birth and during infancy.

It is time to embrace and 'normalise' the preconception period. This will **not** happen by creating yet another separate service or professional 'silo'. The preferable alternative is to embed preparation for pregnancy/parenthood within existing universal public services and the remarkable network of third sector (non-governmental) organisations/programmes operating at the national, regional and community levels.

How can prospective parents make wise decisions about their reproductive lives if the crucial information, resources and support they need continues to be largely absent or hard to reach?^{vii} Everybody will win when preconception health, education and care become 'part of the wallpaper' in Scottish society.

That is true because everything on the preconception agenda to increase individual health and wellbeing – as well as to enable and support informed and empowering decision-making – significantly benefits prospective mothers and fathers ... **whether or not they ever become birth parents**.

Making preconception health a Scottish reality: raising awareness, taking action

The paramount importance and value of the preconception period is increasingly being understood and acted upon in other OECD nations. The 2013 report on this topic by the World Health Organisation (WHO) is still helping policymakers and professional leaders see an opportunity long hidden in the shadows.^{viii} The US Centers for Disease Control and Prevention sponsor and run numerous research, education and action projects focussed on the preconception period.^x There is also a periodic European Congress devoted exclusively to this subject.^x And, the Chief Medical Officer for England's most recent report included an entire chapter on preconception health.^{xi}

Scotland is at a crossroads. It can choose to stick with the *status quo* and remain an 'also ran' in this emerging field. Or, Scotland can choose to become a leading UK and international force in preconception health, education and care. Scotland is well positioned -- politically, socially and professionally -- to rise to this challenge and benefit from the outstanding and abundant preconception health opportunities.

There are encouraging signs about the direction of travel Scotland will pursue. The new Chief Medical Officer in Scotland (Dr Catherine Calderwood, herself an obstetrician) and the Scottish Government have already led the way for the rest of the UK by recommending **no alcohol during pregnancy or when trying to conceive**.^{xii} Although implementation is not yet robust, there is now at least an official governmental/professional Scottish Pathway to prevent, identify and better deal with fetal alcohol harm. In addition, NHS Education Scotland commissioned and offers free the UK's first online course/resource for all health and related professionals on Fetal Alcohol Spectrum Disorder (FASD).^{xiii}

Based upon the international epidemiological evidence, the **conservative** estimate is that more than 500 babies born each year in Scotland have been harmed by exposure to alcohol *in utero*.^{xiv} **This translates to around 10,000 children and young people -- under the age of 18 and part of the next generation of Scottish parents -- who are burdened with FASD.**^{xv} Fetal alcohol harm remains the most widespread preventable (non-genetic and irreversible) learning disability in Scotland today. Preventing FASD

is a prime example of action during the preconception period. More significant steps forward are needed to forestall Scotland's most common, but often invisible, brain-damaging birth defect.

Similarly, late in 2015, the Public Health Minister indicated that Scotland intends to join 80 other nations by fortifying the nation's grain supply with folic acid -- to prevent a variety of other serious birth defects, including Spina Bifida -- whether or not the rest of the UK chooses to do so.^{xvi} This political leadership in the field of preconception health deserves to be applauded, especially when their good intentions are actually brought to fruition.

Two fundamental and complementary next steps for Scotland

- The first is to support individual prospective parents to **make genuinely informed decisions and take empowering, preparatory actions** in relation to pregnancy and parenthood (whether it will be their first or their 'next' baby)
- The second is that policymakers, educators, clinicians, other professionals and their civic society partners should **explicitly and robustly include preconception health, education and care** as a normal part of their on-going plans and actions

At the *individual* level

The following 'stop light' checklist on getting ready for pregnancy – derived from a variety of international sources – should be widely distributed, posted (physically and through social media) and **discussed** routinely with (and among) prospective parents.

This involves making information and conversations available at both conventional and unconventional locations (from GP surgeries, maternity wards and sexual health clinics to pubs, clubs, fast food outlets, leisure centres, clothing shops and barbers/hair salons). It should also include persuading manufacturers or retailers and other providers to hand out this 'stop light' checklist free with every pregnancy test.^{xvii}

To **GET READY** for a healthy pregnancy

STOP

- 1 Drinking alcohol from preconception until after giving birth
- 2 Smoking (permanently, if possible)
- 3 Taking street drugs, including so-called 'legal highs'
- 4 Highly stressful, violent or abusive relationships and situations
- 5 Exposure to radiation or toxic substances in your home and work environments
6. Risking illnesses that can harm pregnant women and babies, e.g. HIV, diabetes, rubella and now Zika virus

CHECK and DISCUSS (with your GP or other primary health professional)

- 1 Is it a good time to become pregnant, given your overall physical and mental health?
- 2 Do you have a medical condition creating significant risks to good pregnancy and birth outcomes?
- 3 Are all your vaccinations up-to-date and still protecting you – or is a booster needed before conception?
- 4 Are any of your prescription medicines, over-the-counter drugs or supplements unsafe or unwise to continue if you become pregnant?

START

- 1 Taking folic acid and Vitamin D supplements (check with your GP)^{xviii}
- 2 A nutritious diet to get to, and maintain, a healthy weight
- 3 Regular physical activity that is right for you before becoming pregnant
- 4 Healthy ways of relaxing, strengthening positive relationships and improving your mental wellbeing
- 5 Learning about your and your partner's family medical history, in case genetic screening or counselling might be helpful
- 6 Preparing for your potential next pregnancy, e.g. by becoming as healthy as possible and by ensuring safe birth spacing^{xix}

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At the *collective* level

The international evidence points to crucial next steps that – if taken – will result in significantly improved pregnancy and birth outcomes throughout Scotland.

- **Agencies, institutions and professionals should keep their potential impacts during the preconception period ‘in sight and in mind’.** Seeing and treating the people they influence and affect as ‘**prospective parents**’ is the key. This does not require new laws, new units or major new investments; just an attitude shift. It is more along the lines of adding a new arrow to existing quivers.

- **Increase professional and organisational understanding about preconception health, education and care, in order to increase capacity to influence the next generation of Scottish parents more positively.** It is time to end Scotland’s professional, policy and societal ‘blind spot’ about what could and should be done during the preconception period.

This ‘taster’ and its companion primer (*Missed Periods*) should be used as catalysts for discussion within and across all the relevant parties. **What** to do next is for each individual, organisation and agency to decide. But, the key is to start exploring: “How can I (or we) improve the preconception period during the year ahead?”

- **Take indirect, early universal actions that lay the foundation for better pregnancy and birth outcomes.** Preparing well for eventual parenthood can, and must, happen **throughout** each individual’s ‘life course.’^{xx} Some of the most powerful and enduring influences happen (or fail to happen) before people even reach childbearing age. The key action is to refine, develop or support initiatives that: develop healthy habits; build positive relationships; increase rights-based understanding; promote feeling and exercising personal agency; enhance non-violent conflict resolution; and, strengthen the capacity to make wise decisions.
- **Take direct, extra actions preparing the most vulnerable prospective parents to advance their own wellbeing and that of any future**

children they may create. This means being sensitive to, respectful of, and dealing well with those prospective mothers and fathers who predictably will need **additional** support to make wise reproductive choices and to have the safest, healthiest possible pregnancies. This group includes, for instance, care leavers, people with mental health issues, homeless and persistently impoverished individuals, those with drug or alcohol dependencies, obese women and those affected by domestic abuse or a legacy of toxic stress or maltreatment.^{xxi} Sharing the ‘stop light’ checklist about getting ready for pregnancy is necessary, but not sufficient, for many prospective parents. No checklist can heal underlying traumas.

- **Get the balance right among the cultural, political, socioeconomic, medical and individual factors that determine Scotland’s pregnancy and birth outcomes.** Obviously, reducing poverty would make a real difference. So would preventing (or overcoming) the other **root causes** of risky pregnancies and ill-conceived conceptions. Improving preconception health, education and care is complex and beyond the remit and resources of any single agency, sector or profession. The need for collaboration and collective action should not result in the preconception period being ‘kicked into the long grass’. Individuals, groups and agencies that **are** part of the problem **can** also be part of the solution.
- **Create and maintain the *relationships* of mutual respect, trust and meaningful communication that will translate good intentions into good results for Scotland’s prospective parents.** From the relationships between prospective birth mothers and fathers to the ways in which professions, agencies and organisations interact with these women and men (as well as with each other), getting this ‘intangible’ element right is an irreplaceable part of achieving tangible, desirable pregnancy and birth outcomes.
- **Really ‘do what it says on the tin’ of Scotland’s impressive collection of excellent laws, policies, strategies, programmes, frameworks and pathways that *should* contribute to preparing for better reproductive health and positive**

pregnancy and birth results. From cross-party commitments on social justice and preventative spending to such major initiatives as 'Equally Well', the Early Years Collaborative, and Curriculum for Excellence (plus the efforts underway to improve the antenatal and early years workforce), Scotland's direction of travel is praiseworthy. However, the research indicates that actual **implementation** remains patchy, under-supported and in need of more attention.

- **Kickstart preconception health, education and care as a priority at the national, regional, local authority and community levels.** Examples emerging from the information and advice gathered for this overview include:

- ✓ Add preconception commitments in the political party manifestos for the 2017 Scottish local elections and subsequent Scottish Parliament elections
- ✓ Focus on the inclusion of preconception health, education and care in the National Conversation on Creating a Healthier Scotland and other emerging strategies, policies and front-line activities
- ✓ Strengthen sexual health, relationship and parenthood education (formal and informal) at all levels from pre-school through post-graduate
- ✓ Follow through on the Scottish Government's intention to add folic acid to the grain supply (folate fortification) – with or without the rest of the UK – in order to prevent Spina Bifida and other brain/spine birth defects
- ✓ Intensify actions to prevent fetal alcohol harm prior to conception^{xxii}
- ✓ Establish preconception health, education and care **implementation** groups – perhaps through Community Planning Partnerships or Public Social Partnerships, where appropriate – that will bring together all relevant parties (governmental, professional, community and third sector) to plan and act collaboratively
- ✓ Encourage and support the relatively minor, pragmatic adjustments to current universal services and clinical practice that would make

preconception planning of, and preparation for, **every** pregnancy part of the 'wallpaper' in Scotland, e.g. promoting Reproductive Life Plans and routinely asking about the likelihood of pregnancy in the year ahead)

- ✓ Embed rigorous monitoring and evaluation of policies, programmes and practices intended to enhance the preconception period (since not all policies, programmes and practices are equally effective/valuable)^{xxiii}

None of the recommendations offered here are either expensive or impractical. The **preventable** human, financial or societal costs of adverse pregnancy and birth outcomes are much too high to allow a continuation of Scotland's 'blind spot' in relation to every prospective mother and father **preparing well** for each pregnancy.^{xxiv}

To cite only one example, it does not require a sophisticated economic analysis to understand that the modest costs of a public health/education effort to prevent fetal alcohol harm will compare very favourably with the high human, social, health, economic and education costs for each child suffering irreversible brain damage – and its resulting learning and behavioural problems – because of Fetal Alcohol Spectrum Disorder. The 2016 meta-analysis published in *The Lancet* reveals that the comorbidities occurring with fetal alcohol harm have long-term physical/medical health (and major cost) implications that argue for seriously investing in the prevention of FASD.^{xxv}

Procreation choices and behaviours are profoundly personal, individual ones. But, the reproductive lives of individuals are not isolated 'islands'. Potential parents are surrounded by an 'ocean' of influences powerfully shaping what they actually think, decide and do. The words and actions of that ocean's inhabitants -- from policymakers to peer groups, and from health/education professionals to the media -- can either greatly help or negatively impact Scotland's next generation of parents and children.

It does not cost a great deal to spark conversations about how best to get the positive outcomes virtually everyone already wants (if ever becoming a birth parent is desired and possible) – namely, **safe, healthy pregnancies with the right person at the right**

Endnotes

time resulting in a thriving baby and leading to a rewarding parenthood.

Encouraging and supporting prospective mothers and fathers to understand, and take to heart, the 'stop light' preconception checklist is vital work to which nearly everyone can contribute in their own distinctive ways. That is why preconception health, education and care should be an 'all hands on deck' effort unifying Scottish society.

'Getting it right for every child,' 'Giving children the best start in life' and 'Making Scotland the best place to grow up' are widely-shared, brilliant aspirations for the next generation of Scottish parents and children. Achieving them, however, does not begin at pre-school, at birth or even during pregnancy. **The real beginning of social justice can be found during the preconception period.** Understanding, embracing and acting upon that reality offers a tremendous new opportunity not only to deliver better babies, but also to deliver a better Scotland.

For a more in-depth primer, including links to extensive international research and resource materials, as well as free e-newsletters, on preconception health, education and care, see: Missed Periods: Scotland's Opportunities for Better Pregnancies, Healthier Parents and Thriving Babies the First Time ... and Every Time (2016). It is available to download free from the website for NHS Greater Glasgow and Clyde.

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- i All statistical data in this section are drawn from *Births In Scottish Hospitals (2015)* -- <http://www.isdscotland.org/Health-Topics/Maternity-and-births/>; 2015 report, *Termination of Pregnancy Statistics* -- <http://www.isdscotland.org/Health-Topics/Sexual-Health/Abortions/>; and, *2014 Scottish Perinatal and Infant Mortality and Morbidity Report* -- <http://www.isdscotland.org/Health-Topics/Maternity-and-births/>
- ii 2015 Scottish Additional Support Needs -- <http://www.gov.scot/Topics/Statistics/Browse/School-Education/TrendSpecialEducation>
- iii See, as only one example about only one preventable, pre-conception-relevant birth defect: http://www.camh.ca/en/research/news_and_publications/reports_and_books/Documents/Burden%20and%20Eco%20Costs%20FASD%20Feb%202015.pdf
- iv Again, all statistical data in this section are drawn from *Births In Scottish Hospitals (2015)* -- <http://www.isdscotland.org/Health-Topics/Maternity-and-births/>
- v For new Scottish evidence about alcohol consumption during pregnancy across the socioeconomic spectrum, see: http://www.heraldscotland.com/news/14460210.Newborn_babies_tested_for_alcohol_while_in_hospital/
- vi No Scotland-wide data. Estimated from studies using London Measure of Unplanned Pregnancy -- <http://www.lmup.com/>. More generally for the UK, see: David Spiegelhalter, *Sex by Numbers: What Statistics Can Tell Us About Sexual Behaviour*, Profile/Wellcome Books, 2015
- vii See, for example, <https://britishfertilitysociety.org.uk/2016/04/15/fertility-health-submit-survey-results/>
- viii For WHO, see: http://www.who.int/maternal_child_adolescent/documents/concensus_preconception_care/en/
- ix Centers for Disease Control and Prevention: <http://www.cdc.gov/preconception/index.html>
- x European Congress on Preconception Care and Health: <http://www.preparingforlife.net/en/home>
- xi S. Davies (England CMO), et al, *The Health of the 51%: Women*, (See Chapter 5) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/484383/cmo-report-2014.pdf
- xii http://www.heraldscotland.com/news/health/14191685.UK_following_Scotland_s_lead_on_zero_alcohol_pregnancy_advice/
- xiii <http://www.knowledge.scot.nhs.uk/home/learning-and-cpd/learning-spaces/fasd.aspx>
- xiv For a review of the international estimates, see:

- Section 2.1 on the Epidemiology of Fetal Alcohol Spectrum Disorders (FASD) in the 2016 British Medical Association (BMA) report cited in Endnote xvii below, as well as L Burd, "FASD: Complexity from comorbidity" in [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)01346-X/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)01346-X/abstract) [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)01346-X/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)01346-X/abstract)
- xv For Scottish birth data over time, see: <http://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/vital-events/births/births-time-series-data>. For the calculation of Scottish estimates (since no definitive data are available), see Endnote 44 in J Sher (2016) *Missed Periods*
- xvii See: http://www.heraldsotland.com/news/14225252.Scottish_Government_wants_manufacturers_to_add_folic_acid_to_flour_to_protect_babies/
- xvii Note: Pregnancy kits are the top selling item at Poundland stores; see: <http://www.mirror.co.uk/news/uk-news/revealed-top-1-seller-pregnancy-5156711>
- xviii On Vitamin D supplementation in Scotland, see: <http://www.gov.scot/resource/0038/00386784.pdf>
- xix For example, see: R. Heller, S. Cameron, A. Glasier, et al, *Postpartum contraception: a missed opportunity to prevent unintended pregnancy and short inter-pregnancy intervals* -- <http://jfprhc.bmj.com/content/early/2015/12/08/jfprhc-2014-101165.abstract>.
- xx World Health Organisation (Europe region, 2015), *Minsk Declaration: The Life Course Approach in the Context of Health 2020* -- http://www.euro.who.int/__data/assets/pdf_file/0009/289962/03_WHO-LCA-Declaration-ENG-Web-Pages.pdf?ua=1
- xxi For instance, in relation to dealing with the long-term consequences of Adverse Childhood Experiences (ACE), see: <https://acestoohigh.com/>; Also see, 2016 NHS Public Health Wales report (M Bellis, et al, *Adverse Childhood Experiences and their health-harming behaviours in the Welsh adult population*: <http://www.cph.org.uk/wp-content/uploads/2016/01/ACE-Report-FINAL-E.pdf>
- xxii BMA's 2016 report on preventing and managing fetal alcohol spectrum disorders: <http://www.bma.org.uk/working-for-change/improving-and-protecting-health/alcohol/alcohol-and-pregnancy>
- xxiii See, for example, John Frank, et al, *Prevention: A Critical Toolkit*, Oxford University Press. In press (2016). In addition, here are the links to four respected sources of relevant meta-analyses, systematic reviews and advice: <http://www.cochrane.org/>; <https://www.nice.org.uk/>; <http://www.sign.ac.uk/>; and, <http://www.uspreventiveservicestaskforce.org/>
- xxiv See the economic case for primary prevention is such key reports as: WHO Europe (2014), http://www.euro.who.int/__data/assets/pdf_file/0009/278073/Case-Investing-Public-Health.pdf?ua=1; Scottish Government (2016) *Public Health Review*, <http://www.gov.scot/Topics/Health/Healthy-Living/Public-Health-Review>; and, Christie Commission report (2011) on the *Future Delivery of Public Services*, <http://www.gov.scot/resource/doc/352649/0118638.pdf>



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