Methods | This short commentary is the result of the authors’ work on methylation, imprinting, and metabolism in gametes and embryos integrated with the current literature on brain disease and gamete quality.

Results | Disturbances in DNA methylation can originate in the spermatozoon, linked to the age of the male progenitor, and this is expressed as deficiencies in epigenetic mechanisms. Sperm of older men have a higher level of DNA damage, due to a lower resistance to oxidative stress: offspring conceived by older men carrying a high level of sperm DNA fragmentation may escape miscarriage but may instead carry disorders originating from DNA damage that may lead to neuropsychiatric disturbance.

The oocyte expresses folic acid transporters to a high level, whereas cystathionine β-synthase is not expressed, while betaine homocysteine methyltransferase is only weakly expressed. In the absence of an adequate endogenous pool of folic acid in the oocyte, the early embryo’s ability to recycle homocysteine is handicapped (Figure). Intrafollicular homocysteine levels increase in assisted reproductive technologies; therefore, any deficiency in maternal folic acid supplies will affect methylation during very early preimplantation stages of embryo development. Prenatal folic acid supplements have been shown to partially protect against neurodevelopmental disorders in the offspring, as well as have a positive effect on the risk of neural tube defects. A wide range of disorders, including neuropsychiatric disorders, autism, and cognitive impairment, are associated with increased homocysteine levels in biological fluids.

Bisphenol A and other plastic-derived endocrine disruptors have the capacity to inhibit methylation and affect imprinting, inducing epigenetic transgenerational inheritance of metabolic and reproductive disorders, including sperm epimutations. Bisphenol A is a well-known inducer of oxidative stress, as is a high level of circulating glucose. It has been shown that maternal diabetes significantly increases the prevalence of autism in offspring.

Comment | There is therefore a link between methylation and oxidative stress in gametes and the first stages of embryonic development, which potentially affects epigenetic transgenerational transmission. The increase in autism spectrum diseases may also be linked to an increase in environmental endocrine disruptors, which increase oxidative stress and perturb methylation. This effect may manifest in the first 3 days postfertilization up to the blastocyst stage, the period when maintenance of methylation has a significant effect on the imprinting processes, or in the fetus, when imprinting is reset in the germ cells. The sex ratios observed in some disorders may be explained by the higher resistance of female embryos, linked to the XIAP gene expression. However, DNA methylation by definition differs between male and female genomes, whether or not it is linked to imprinting; a difference in the sex ratio with respect to autism might therefore be expected. These observations advocate treatment with nutritional supplements that support the 1-carbon cycle for older male and female patients, as well as for female diabetic patients who seek to achieve a pregnancy. The supplementation should include all of the cofactors that contribute to the 1-carbon cycle because, for example, vitamin B12 deficiency can induce adverse neurological problems.

Yves J. R. Menezo, PhD, DSc
Kay Elder, PhD, MD
Brian Dale, PhD, DSc

Author Affiliations: London Fertility Associates, London, England (Menezo); Bourn Hall Clinic, Cambridge, England (Elder); Centre for Assisted Fertilization, Naples, Italy (Dale).

Corresponding Author: Brian Dale, PhD, DSc, Centre for Assisted Fertilization, Via Tasso 480, Naples 80123, Italy (brian.dale@virgilio.it).


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Potential Utility of a Smart Thermometer to Predict and Avert Epidemics

Recent epidemics and fear of epidemic have increased the importance of passive surveillance of fever and symptoms at a population level. The Kinsa Smart Thermometer combines an interactive app and a US Food and Drug Administration-approved digital thermometer that connects to a user’s mobile device. Together, the hardware and software measure the user’s temperature as well as collect attendant symptoms. Data are uploaded to the cloud, and via geocoding, users will be able to see what other symptoms and fevers are present in their local area. Widespread uptake of such a technology would not only give individuals access to local data but, at a population level, could provide a way of tracking, predicting, and potentially preventing the spread of contagious illnesses, thereby mitigating epidemics. The purpose of this study was to describe usage and trends in fever and symptoms based on early data from Kinsa thermometer usage nationally.

Methods | This is a descriptive study intended as a proof of concept.
Results | Two thousand nine hundred eighty thermometers have been used at least once since September 2014. The average thermometer has been used approximately 7 times and 50% of these users also recorded symptoms with the app. Notably, there was a discernible spike in usage in the Dallas, Texas, area after the first patient was diagnosed with Ebola on September 30, 2014. Between September 1 and September 27, 2014, there were 5.6 readings per user and between November 1 and November 28, 2014, there were 10.6 readings per user (P < .01). Data on overall usage by month and symptoms reported are summarized in Figure 1 and Figure 2.

Conclusions | “Smart” thermometers have the potential to passively gather signs and symptoms of infection at a population level. Initial data suggest ecological sensitivity to contagion concerns. These data could help predict and prevent epidemics; however, greater market penetration will be needed to assess their utility.

Dimitri A. Christakis, MD, MPH

Author Affiliations: Seattle Children’s Hospital Research Institute, Center for Child Health, Behavior, and Development, Seattle, Washington; Associate Editor, JAMA Pediatrics.

Screening and Brief Alcohol Counseling of College Students and Persons Not in School

Associated with the top 3 causes of adolescent death (unintentional injuries, homicides, and suicides), underage drinking is annually responsible for 4000 to 5000 deaths and contributes to unprotected sex, social problems, and poor academic performance.1 A substantial body of experimental research indicates screening and brief intervention for risky alcohol use conducted in adult primary care settings is effective in reducing alcohol misuse and related problems.2 Evidence concerning effectiveness among young adults and adolescents is also accumulating.3,4 Unfortunately, screening and brief alcohol counseling for adolescents and college-aged emerging adults is not routine.5

College students more often drink 5 or more drinks on an occasion and drive under the influence of alcohol more than same-age, noncollege peers.4 Important unanswered questions are whether college students are (1) more or less likely than same-age peers to be asked about their substance use, (2) given advice about related health risks, and (3) encouraged to reduce or stop substance use.

Methods | The NEXT Generation Health Study used a 3-stage stratified design to select a sample representative of 10th graders enrolled in public, private, and parochial high schools in the United States. Details of the sample and data collection are provided in Hingson et al.5 The survey was conducted by the Eunice Kennedy Shriver National Institute of Child Health and Human Development, whose institutional review board reviewed and approved the protocol. Parents and/or participants provided written consent. Of the national sample of 2519 10th graders (average age 16 years) surveyed in school in 2009,5 2140 (84%) were resurveyed annually through 1 year past high school in 2012 and 2013. Respondents were asked if they had seen a physician in the past year and been asked and counseled about their drinking, smoking, and drug use.

Results | As detailed in the Table, of respondents, 42% were enrolled in a 4-year college, 25% in community college, and 33% were not enrolled. Four-year and community college students were more likely than those not enrolled to have seen a physician. Of them, three-quarters in each group were asked about drinking, smoking, and drug use. Less than half of college students (fewer than same-age peers) were advised about health risks linked to substance use, and significantly fewer college students, less than one-third who frequently drank, used drugs, or smoked, were advised to reduce or stop. Fewer received advice about substance use than exercise, diet, and risky sexual behavior.