

1 **Is there a moral obligation to conceive children under the best possible conditions?**  
2 **A preliminary framework for identifying the preconception responsibilities of**  
3 **potential parents**

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15

16 **Abstract**

17 **Background**

18 The preventative paradigm of preconception care is receiving increasing attention, yet its  
19 boundaries remain vague in three respects: temporally; agentially; and instrumentally.

20 Crucially, it remains unclear just who is to be considered a ‘potential parent’, how soon they  
21 should take up preconception responsibilities, and how weighty their responsibilities should  
22 be.

23 **Discussion**

24 In this paper, we argue that a normal potential parent of reasonable prudence has a moral  
25 duty to adequately optimize the conditions under which she or his reproductive partner will  
26 conceive, though a proportionality calculus calls for toleration of several forms of  
27 preconception behavior that are non-ideal from the perspective of reproductive risk. We  
28 distinguish between five categories of potential parents to which different duties of  
29 preconception care should be ascribed. This framework is advanced to assign preconception  
30 care responsibilities with more precision than is often done in the current debate on  
31 preconception care. We conclude by applying our theoretical framework to three types of  
32 preconception care interventions: consumption of folic acid; keeping one’s weight under  
33 control; and engaging in preconception genetic screening. Our analysis shows that the  
34 literature on preconception care often glosses over crucial distinctions between different  
35 types of potential parents and uses a notion of preconception beneficence that may be  
36 overly demanding. Nevertheless, preconception moral duties will often be weighty and  
37 reluctance to accept such duties on account of the burden they impose do not warrant  
38 preconception insouciance.

39 **Summary**

40 To avoid misplaced responsibility ascriptions in the growing field of preconception care,  
41 distinctions must be made between different types of potential parents to whom different  
42 degrees of preconception responsibility apply. We present such a preliminary framework  
43 and bring it to bear on the cases of folic acid consumption, obesity and genetic testing.

44

45 **Key words:** preconception care, beneficence, folic acid, obesity, genetic testing

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## 47 **1. Background**

48 According to the Health Council of The Netherlands, ‘preconception care’ (henceforth PCC)  
49 refers to the large cluster of interventions “aimed at ensuring that couples who wish to have  
50 children start a pregnancy under the best possible conditions” [1]. Though clearly  
51 demarcated at one end by the occurrence of conception, at the other end the boundaries of  
52 PCC can be vague in three respects: temporally; agentially; and instrumentally. Temporally,  
53 the concept of PCC can be understood to refer to all acts and omissions which might affect  
54 the good of future persons, which at the extreme include the acts and omissions of distant  
55 ancestors. Agentially, PCC can refer to a broad array of agents from ‘potential parents’ and  
56 all the subcategories thereof (see below) over myriad medical professionals to moral  
57 communities and political institutions. Instrumentally, the armoury of PCC can be stretched  
58 to include not only specific medical interventions and family planning but all kinds of acts  
59 and omissions that are instrumental in creating the best possible (or at least minimally  
60 decent) conditions in which to conceive future persons.

61 In this paper, we start by briefly sketching a variety of PCC measures that contemporary  
62 potential parents could engage in, thereby giving an idea of the large number of options  
63 currently available to conceive under optimal or minimally decent conditions. Second, we  
64 seek to provide a categorization of the ethically relevant types of ‘potential parents’. Third,  
65 we develop a normative argument about what the ethical principles of beneficence and  
66 nonmaleficence demand of potential parents. Finally, we apply the resulting general  
67 conception of potential parents’ preconception responsibilities to three cases: consumption  
68 of folic acid; avoidance of obesity; and undergoing screening for genetic risk.

## 69 **2. Discussion**

### 70 **What can potential parents do?**

71 The PCC-armoury available today contains a wide range of sufficiently effective, evidence-  
72 based interventions for potential parents to merit considering them [1]. For the purposes of  
73 this paper, it is sufficient to give an idea of the demands that a fully-fledged PCC regime  
74 would put on potential parents. They would be asked to: (1) follow a number of specific  
75 dietary prescriptions; (2) take specific supplements; (3) avoid obesity and anorexia; (4)

76 moderate or abstain from use of alcohol, tobacco, and various other recreational drugs; (5)  
77 avoid specific environmental exposures and chemicals; (6) avoid excessive psychological  
78 stress; (7) take specific precautionary measures in case of maternal health problems or when  
79 taking certain forms of medication prior to conception; (8) avoid consanguinity and (in case  
80 of suspected significant risk) undergo genetic screening and, if necessary, take appropriate  
81 measures, such as using assisted reproduction techniques, choosing a different reproductive  
82 partner or abstaining from reproduction; and last but not least (9) time conception at an  
83 'optimal age' via contraception and other means of family planning.

84 In regions with well developed health care systems, the incidence of many forms of adverse  
85 pregnancy outcomes has decreased dramatically throughout the 20th and early 21st  
86 Century. However, as the latest March of Dimes Global Report on Birth Defects shows, the  
87 incidence of birth defects remains considerable everywhere [2]. According to this report,  
88 worldwide, approximately 8 million children per year were born with a serious birth defect  
89 of genetic or partially genetic origin – i.e. 6 percent of all births. In France, the country for  
90 which the March of Dimes reported the smallest number of birth defects, there were still  
91 39.7 children per 1000 live births born with a serious congenital abnormality. Around the  
92 globe, human reproduction remains far from risk-free, and intensified PCC is one promising  
93 avenue to reduce human suffering. Moreover, the case for intensified PCC gains all the more  
94 urgency if one factors in the number of abortions which often entail psychological damage,  
95 physical pain, and also grave health risks to the mother when sub-optimally performed [3].  
96 Many of these risks could have been avoided by better access to and use of contraceptives  
97 or by the adoption of additional PCC measures to improve the timing of the pregnancy and  
98 the viability and health of the child [3].

### 99 **Who is a 'potential parent'?**

100 A contemporary potential parent may be confronted with her or his (alleged) PCC  
101 responsibilities by at least three groups:

- 102 a) public health and child care providers who seek to enlist potential parents in their  
103 respective projects, as well as personal health care providers who provide directive  
104 counselling;

- 105           b) private for-profit providers of PCC interventions, such as direct-to-consumer genetic  
106           screening and counselling companies who have a commercial interest in creating  
107           demand for their services; and
- 108           c) particular moral communities (e.g. anti-abortion activists) who hold moral views that  
109           prescribe duties of PCC to potential parents.

110   However, it is often unclear exactly who these groups are targeting. At times, only  
111   prospective parents are being addressed (e.g. as in the above characterization of PCC by the  
112   Health Council of The Netherlands). At other times, the category of addressees is expanded  
113   to include everyone who is (presumably) fertile or is nearing fertility (see for example the  
114   recent proposal by the UK Human Genetics Commission to offer genetic screening during the  
115   final years of secondary education [4]). This shows that many different types of ‘potential  
116   parent’ can be identified to which very different degrees of responsibility might apply. In this  
117   section, we outline a categorization of potential parents in which a balance has been struck  
118   between precision and practicability. Our categorization roughly follows the lines of  
119   probability and intention to conceive, where ‘probability’ includes (presumed) capacity as  
120   well as behaviour. Despite first appearances, it does not necessarily reflect a linear temporal  
121   order. We distinguish the following five categories:

- 122           1) Prepubertals nearing fertility (no capacity, no behaviour, no intention).
- 123           2) Fertile persons who are not sexually active (or only non-coitally) (capacity, no  
124           behaviour, no intention).
- 125           3) Sexually active persons with no intention to conceive in the foreseeable future  
126           (capacity, behaviour, no intention). This category also includes persons who are duly  
127           compliant in their use of contraceptives, but whose contraceptives are not fully  
128           reliable.
- 129           4) Sexually active persons with an unclear intention, who wilfully abstain from  
130           contraception and leave it to chance/nature whether conception will occur or not  
131           (capacity, behaviour, intention unclear).

132 5) Prospective parents: fertile , sexually active persons who intend to conceive in the  
133 foreseeable future (capacity, behaviour, intention). This category also includes  
134 persons using assisted reproductive technologies.

135 Bearing these distinctive categories of potential parents in mind will help to avoid making  
136 category mistakes such as lumping together too many different types of potential parents  
137 when ascribing preconception duties of care to them and expecting them to meet those  
138 duties (possibly backed up with sanctions if they do not). However, in some forms of PCC  
139 awareness-raising, there may be good reasons to lump all potential parents together. For  
140 instance, one powerful argument for a non-stop stance of PCC prudence (for all potential  
141 parents) is the high incidence of unintended and ill-planned pregnancies. On some  
142 estimates, unintended pregnancies alone amount to 41% of pregnancies worldwide and  
143 remain prevalent in developed regions [3]. Indeed, in the categorization outline above,  
144 unplanned or ill-planned conception might occur in all groups who have the capacity to  
145 conceive and are sexually active.

#### 146 **What should potential parents do?**

147 The question arises, however, as to what constitutes ‘good planning’, and to what extent  
148 and on which grounds this can be morally demanded of potential parents. One possible  
149 ground is a duty of beneficence, i.e. a duty to advance the good (of others), often by active  
150 intervention [5]. Such a duty can be said to hold if not generally, then at least for persons  
151 with specific relational roles, such as a parent towards his or her (future) child. Referring to  
152 the work of Derek Parfit, Savulescu and Kahane observe that “in selecting a more  
153 advantaged child we are also bringing a different person into existence.” This poses a ‘non-  
154 identity problem’ as to “what might ground a moral obligation or reason to select such a  
155 child” [9: 277]. As noted by Savulescu and Kahane: “PB is compatible with different accounts  
156 of reasons to select future children. It can take either a wide person-affecting form or an  
157 impersonal form. According to the wide person-affecting version, our reason to select the  
158 child with better prospects is that that child will benefit more than the other would by being  
159 caused to exist. According to the impersonal version, our reason is that selecting the most  
160 advantaged child would make the outcome better, even if it is not better for the child  
161 created. It is possible to support PB on either view. If by selecting a child with better

162 prospects we are also benefiting her, then this is a significant reason to make this choice. If  
163 we prefer not to speak of benefit in such cases, then we can say that there is a significant  
164 reason to select the more advantaged child simply because this will be the better outcome”  
165 [9: 277]. By way of illustration, with all other things being equal, if one can either put a  
166 ‘bundle of joy’ or a ‘bundle of suffering’ on the planet, there would be a strong moral  
167 obligation to conceive a joyous rather than a tormented child [9: 279].

168 Another possible ground is a duty of nonmaleficence, a duty not to harm others, often by  
169 passive abstention [5]. Nonmaleficence will often be less demanding than beneficence, but  
170 on the other hand it may be demanded of more persons, for instance universally and not  
171 only of those standing in some specific relational role. If some potential parent would only  
172 have to be nonmaleficent in relation to her potential future child, more leeway should be  
173 given to her own right to autonomy: she should then be free to live her life as she sees fit  
174 without being duty-bound to procure the good (for someone else). She should only refrain  
175 from harming others.

#### 176 **Preconception beneficence - Above all, do good towards one’s potential child?**

177 Many contemporary ethicists would argue that the prime focus of reproductive decision  
178 making should be the wellbeing of the resultant child. To engage in PCC from the motive of  
179 unburdening or strengthening society or of satisfying the parents’ instrumental plans with  
180 regard to the child would be open to the same criticisms that have profoundly discredited  
181 the eugenic reproductive schemes prevalent from the end of the 19th Century up to the late  
182 mid-20th Century [6, 7].

183 Having regard to prioritizing the child’s wellbeing, Savulescu and Kahane defend the  
184 following ‘principle of procreative beneficence’ (PB, first coined in [8]):

185       If couples (or single reproducers) have decided to have a child, and selection is  
186       possible, then they have a significant moral reason to select the child, of the possible  
187       children they could have, whose life can be expected, in light of the relevant available  
188       information, to go best or at least not worse than any of the others. [9: 274]

189 Although the use of the phrase ‘procreative beneficence’ seems to suggest a principle  
190 relevant to all procreative issues, Savulescu and Kahane formulate the principle in a highly

191 targeted way. For instance, they note that: “PB is silent on a number of further questions in  
192 procreative ethics[. For instance it] assumes that a decision to have a child has been taken.”  
193 [9: 274, footnote 3]. Their discussion is also focused on settings involving selection, in which  
194 one can make a choice between different gametes or embryos. Within the bounds of these  
195 constraints, Savulescu and Kahane have made a forceful argument that PB has the force of a  
196 primary moral principle which will often override other principles in play such as procreative  
197 autonomy. In brief, they argue that procreative autonomy allows for parents to intentionally  
198 create a child who, for example, “will live a brief life of misery and torment” [9: 279] even  
199 when they could have alternatively created a child in good health. Savulescu and Kahane  
200 find such parental autonomy *morally* unacceptable as well as in violation of much common  
201 sense *morality*. That said, they do allow for parental autonomy to possibly remain a primary  
202 *legal* right. Moreover, they hold that, other things being equal, PB entails maximizing  
203 parental commitment to provide the best chance for the best possible life. Less far-reaching  
204 aims such as a ‘life worth living’ or a ‘disease and handicap-free life’ will not do.

205 In this article, we will not contest Savulescu and Kahane’s formulation of the principle, nor  
206 their application of it. Rather, we will take their principle as-is but remove the restriction of  
207 its application to prospective parents so as to find out what it would imply if applied in the  
208 preceding domains of preconception care. Rather than taking on board the additional  
209 question of ‘enhancement’ as Savulescu and Kahane do, in order to retain focus, we will not  
210 contest the conventional ethico-medical standard that the best condition to provide for  
211 future children does not go beyond a ‘normal’ state of disease- and handicap-free existence.  
212 As we do not provide a justification for a principle of PB, those who deny the existence of  
213 such a principle may also find our extension of that principle unconvincing. Alternatively, our  
214 extension of the PB principle may make the account offered by Savulescu and Kahane more  
215 compelling for some.

216 Interestingly, preconception care advocacy often (implicitly) appeals to PB, and this may  
217 corroborate Savulescu and Kahane’s assertion that PB has substantial commonsensical  
218 appeal. Nevertheless, we will argue that, in the domain of PCC, PB runs up against  
219 formidable competing concerns. This may be sufficient to cast significant doubt on the thesis  
220 that PB can play the role of ‘first principle’ in PCC. If this holds, contemporary PCC advocacy



221 may need to fundamentally rethink certain awareness-raising campaigns and PCC  
222 counsellors their counselling practice.

223 To apply Savulescu and Kahane's PB in the field of PCC, it would need to be rephrased along  
224 the following lines to constitute a 'principle of preconception beneficence':

225       If one can take/refrain from action prior to conception to, in light of the relevant  
226       available information, significantly increase the likelihood that if one conceives it will  
227       be of a child whose life can be expected to go best or at least not worse than the lives  
228       of any of the other children one may otherwise conceive, then one has a significant  
229       moral reason to take/refrain from such action.

230 If this would be the moral standard prescribed for all potential parents, they would have to  
231 face up to a long and taxing PCC checklist that will only lengthen as science and technology  
232 increase the range of preconception options that may serve to optimize reproductive  
233 outcomes. Moreover, persons at an ever-widening distance (in time or in intent) from  
234 conception may find themselves being drawn into the expanding sphere of PCC  
235 responsibility. Given that for instance the California Preconception Initiative advocates that  
236 women be made aware of PCC at every medical visit throughout the health care system,  
237 following the dictum "every woman, every time" [9], they might have to answer at every  
238 turn why they are not doing all they can, as soon as they can, to ensure that, should there be  
239 any future pregnancy, it will be a "pregnancy under the best possible conditions" [1].

240 The practical burden of long-term compliance with a complex set of prescriptions to ensure  
241 a good that may be very distant and/or improbable, is not to be underestimated. As Singh  
242 and colleagues write on the specific topic of contraceptive use:

243       By the time she is in her mid-40s, a woman with two children will have spent, on  
244       average, only five years trying to become pregnant, actually being pregnant and not  
245       being at risk for another pregnancy for a few months following a birth. To  
246       successfully avoid becoming pregnant before, after or between those two births,  
247       either she will have had to refrain from having sex, or she or her partner will have  
248       had to practice contraception effectively for an average of about 25 years—a hard

249 standard of behavior to live up to, even for the most disciplined and highly motivated  
250 individuals. [3]

251 Although the use of contraceptives has by now (in the developed world at least) become a  
252 more or less accepted responsibility for the majority of sexually active persons, for all its  
253 blessings the effort of maintaining adequate compliance remains a substantial burden. To  
254 this burden, the PCC armoury invites us to add staying informed and up-to-date about the  
255 state-of-the-PCC-art, maintaining dietary and physical exercise routines, avoiding certain  
256 environments and toxins, undertaking medical screenings and check-ups, securing adequate  
257 rearing-resources (not only financial and material but also psychological, pedagogical, social  
258 and cultural) prior to conception, etc.

259 The mere (potential) availability of some effective PCC intervention is sufficient to impel a  
260 person to justify (if not to others, then at least to herself) why she would not make use of it.  
261 This can be experienced as a 'technological imperative', or more generally, as a 'capability  
262 imperative': as soon as some newfound mode of intervention is made available, one's  
263 sphere of possible agency is expanded, and one inescapably finds oneself at liberty to  
264 influence states of affairs where one used to be factually impotent to do so. Any newfound  
265 power thus puts us at liberty to either use or not use it, thereby literally forcing a new  
266 responsibility on us.

267 As PCC advocates now call for pervasive and perpetual awareness-raising programs aimed at  
268 all potential parents [10], the risk arises that an increasing number of people become  
269 susceptible to criticism of being or having been a 'failing potential parent'. Moreover, as the  
270 armoury of PCC and its availability expand, people become susceptible to such criticism to an  
271 increasing degree.

272 From the vantage point of preventative health care, there are good reasons to start  
273 assuming responsibilities of PCC as soon as one nears reproductive age. For instance, many  
274 of the effective PCC interventions are lifestyle and work environment changes, and such  
275 changes are only likely to have sufficient effect by the time conception occurs if they take  
276 place well before conception [1]. In a similar vein, lifestyle habits engaged in during one's  
277 twenties are likely to become entrenched ways of living for the rest of one's life, and altering  
278 one's habits in later years is likely to require greater effort. Thus, as many may fail to muster

279 sufficient intrinsic motivation to develop healthy habits and make healthy choices because  
280 the (moral) gratification is too uncertain and/or too remote, they may need to be prodded  
281 and incentivized by others in sufficiently early, constant and intensive ways.

282 A telling example of such a hands-on incentivizing campaign is the ‘Don’t U Dare’ PCC  
283 promotional video of the March of Dimes foundation [11]. In this promotional video in the  
284 scripted reality format, a PCC coach closely monitors a ‘merely fertile’ woman (category 3)  
285 and (cheerily) chides her for every suboptimal move she makes. Despite its superficial  
286 comedy, this awareness-raising material seems saturated in an emotionally manipulative  
287 discourse of shaming and blaming and may therefore amount to a form of PCC counselling  
288 that is highly directive. Much the same seems to hold for the nation-wide ‘Show Your Love’  
289 campaign of the US Preconception Health and Health Care Initiative and the California  
290 Preconception Initiative, which suggests to potential parents that if one does not engage in  
291 PCC, one may be lacking basic parental love [12].

292 In a more comprehensive analysis of PCC, as opposed to the preliminary assessment we are  
293 offering here, one should also scrutinize the extent to which today’s PCC awareness-raising  
294 campaigns may be (co-opted as) modern-day heirs to entrenched community traditions in  
295 which a girl’s identity is narrowly scripted as ‘future mother’ – a script of social expectation  
296 and obligation that can be enforced by playing to fears that if a girl or woman engages in  
297 athletic pursuits, takes on stressful studies or employment, for example, she might be  
298 endangering her central *raison d’être*: that of being a responsible ‘future mother’. To be fair,  
299 men are also being asked to engage in certain forms of PCC to optimize semen quality or to  
300 aid and support (and, perhaps, to coax and keep compliant) their female reproductive  
301 partner [13], yet overall their potential PCC responsibilities pale in comparison to those  
302 ascribed to women. PCC advocate Merry-K. Moos has engaged with the worry that PCC  
303 might “frame women as nothing more than vessels for growing healthy offspring” [9], and  
304 largely dismisses it. Commentators such as Rebecca Kukla, on the other hand, discuss the  
305 increasing and unreasonable burdens women are expected to accept on their way to  
306 becoming a mother.[14] In a similar vein, PCC is at risk of being co-opted in dubious practices  
307 of “hyperparenting”, where competitive, perfectionist and over-anxious parents seek to  
308 control and plan ahead the lives of their (future) children to an ever increasing extent.[15]

309 Messages entailing a substantial responsibility expansion for potential parents can also come  
310 from the very different corner of for-profit health care providers. For-profit entrepreneurs  
311 have a marked commercial interest in inflating notions of individual responsibility and  
312 fanning the flames of hyper-parenting: the more that potential parents believe themselves  
313 to be inadequate, and the more that people consider themselves to be potential parents,  
314 the greater the demand for the services of such entrepreneurs. In the world of direct-to-  
315 consumer genetic testing companies such as Counsyl and 23andMe, marketing techniques of  
316 commercial demand creation in the guise of public-spirited ‘awareness-raising’ seem to be  
317 standard fare [16, 17, 18].

318 Thus, for example, Counsyl, the for-profit provider of a highly media-hyped ‘Universal Test’  
319 for genetic risk, highlights on its website the following quote of Professor Patrizio, director of  
320 the Yale Fertility Centre: “Every adult of reproductive age should consider the Counsyl test  
321 before pregnancy.” As Counsyl-CEO Srinivasan likes to envision it, his company’s test should  
322 not only be ‘universal’ in its testing capacity but also in its use: “one of our goals is to make  
323 this like the home pregnancy test” [19]. Occasionally such messages are taken to hyperbolic  
324 extremes. For instance, the director of the for-profit Centre for Surrogate Parenting and  
325 leading US radio host Bill Handel has opined that conceiving of a child via coitus has today  
326 become offensively irresponsible: “I always get astounded and offended when people  
327 actually have sex to have kids. I don’t understand that. They shouldn’t do that. You can  
328 always use some high-tech form of reproduction.” [20]

329 Not only do such for-profit actors often severely overstate the moral obligation of potential  
330 parents to become PCC customers, they also tend to severely overstate the effectiveness of  
331 the services they market. Without proper policies to mitigate misinformation and  
332 manipulative ‘demand creation’, the general public will often not be able to distinguish  
333 between bona fide and not-so-bona fide players in the PCC field [16]. As a result, they are at  
334 risk of lumping all these responsabilizing messages together, thus creating a sense of PCC  
335 responsibility that is needlessly cumbersome.

336 Nevertheless, though Handel’s suggestion is grossly excessive given today’s state of the art,  
337 Savulescu and Kahane have argued that “[a]s means of selection become safer and our  
338 ability to use them to select non-disease characteristics increases, we believe that PB

339 [procreative beneficence] will require most reproducers to select the most advantaged child  
340 unless doing so is predicted to lead to a very significant loss of well-being to existing people.”  
341 [9:281] This implies that, if assisted reproductive technologies would ever turn into full-  
342 blooded alternatives that are significantly less risky than natural reproduction, anyone who  
343 has access to such technologies would have significant moral reason to relinquish natural  
344 procreation altogether in order to reproduce in the safer, artificial way. Whether or not one  
345 objects to this specific example, the general point remains that simply by upholding the very  
346 same moral standard that governs today’s use of PCC, potential parents may find themselves  
347 morally obliged to engage in quite unsettling acts and omissions as PCC capabilities expand.

#### 348 **Preconception nonmaleficence and the autonomy of potential parents**

349 We now turn to some arguments which seem to provide legitimate, principled objections to  
350 the primacy of preconception beneficence. If these objections hold, they would relax the  
351 taxing demands of preconception beneficence discussed earlier.

352 Insofar as a ‘potential parent’ falls beneath certain thresholds of intent to cause conception  
353 and/or probability to cause conception, it becomes problematic if not outright incoherent to  
354 expect such a person to take up certain presumed role responsibilities of a parent. Since she  
355 would not fit the description of a parent or procreator, it would make little sense to ask her  
356 to fulfil particular parental or procreative duties. Indeed, to the extent that potential parents  
357 would not be parents, other principles can assert themselves, most importantly the principle  
358 of individual autonomy. In principle, such ‘non-parents’ should be free to lead their lives  
359 without being excessively constrained by concerns about the wellbeing of unintended and  
360 merely potential children.

361 This is not to say, of course, that non-parents would thereby be relieved of the general  
362 responsibility to avoid inflicting harm upon others, a duty that stems from the general  
363 principle of nonmaleficence [5]. This universal duty to do no harm, which is codified in some  
364 form in virtually all established moral theories as well as in civil law, applies to non-parents  
365 and parents alike. However, this universal duty of nonmaleficence obviously needs curbing,  
366 lest one is (absurdly) held responsible for all possible harm (no matter how minute) to  
367 anyone (no matter how remote). In order to properly apply the principle of nonmaleficence

368 and to discern whether the corresponding duty is at play in a given situation, further stock  
369 concepts from moral philosophy and law need to be brought in [21].

370 For our purposes, it is sufficient to invoke the concepts of reasonable foreseeability,  
371 adequate control, adequately proximate causes, proportionality, and reasonable prudence:

- 372 1. Foreseeability (requiring adequate cognizance by the wrongdoer of the  
373 consequences of his act or omission);
- 374 2. Control (requiring adequate control by the wrongdoer over the events in which he  
375 was implicated);
- 376 3. Proximate causes (requiring that the act or omission of the wrongdoer was an  
377 adequately proximate cause of the adverse turn of events);
- 378 4. Proportionality (requiring that the benefits of the intervention are in proportion to  
379 the effort that must be invested to avoid the wrong). We will consider proportionality  
380 in relation to the standard of a 'normal person of reasonable prudence':  
381 preconception acts and abstentions that are disproportionately burdensome to such  
382 a person will not be morally required. Normally proportionality is calculated as  
383 follows: probability of an affliction in a future child x gravity of the affliction / cost of  
384 precaution. With regard to PCC, however, this calculus – already difficult to apply in a  
385 sufficiently precise and methodologically satisfactory way – is further complicated by  
386 the fact that the calculus must be made prior to conception, which can add great  
387 uncertainty and because one has to factor in the probability of conception, which is  
388 highly unclear in most cases. Thus, the calculus to be applied with regard to PCC  
389 takes the following form: probability of conception x probability of affliction x gravity  
390 of affliction / cost of precaution. This added complexity alone has caused certain  
391 judges to declare preconception torts inadmissible [21].

## 392 **Applications: folic acid, obesity, genetic testing**

393 In order to more precisely assess the responsibilities of potential parents in specific cases of  
394 PCC, the general conception of preconception responsibility outlined in the previous section  
395 ('Principles') needs to be applied to specific PCC interventions and specific types of potential  
396 parents. In this section we will provide three brief casuistic illustrations to put our general  
397 conception of preconception responsibility to work: folic acid, obesity, and genetic

398 screening. We will highlight where and why preconception responsibilities significantly  
399 increase or decrease between different types of potential parents.

#### 400 **Folic acid**

401 The potential suffering brought on by neural tube defects such as the gravely adverse  
402 condition of spina bifida is significant and the chance of such defects occurring is 1/1000 for  
403 American procreators [22]. A strong evidence base has been established, indicating that the  
404 consumption of folic acid supplements, for a period of about three months prior to  
405 conception, reduces by two thirds the risk of neural tube defects [1].

406 Given the framework of preconception responsibility outlined above, does this make it  
407 morally required for any normal, reasonably prudent potential parent to begin taking folic  
408 acid in due time?

409 Cognizance. One needs to be aware of the importance and possibility of achieving an  
410 optimal folic acid intake in order to be able to do so in a timely fashion. This requires  
411 education via awareness-raising campaigns, timely advice from GPs, obstetricians, etc.  
412 Unfortunately, even in countries such as The Netherlands, where efforts at widespread  
413 informational campaigns on folic acid have been made, many women remain unaware about  
414 the existence and importance of folic acid [1]. As things stand, this can hardly be blamed on  
415 a failure of these women to have solicited proper and timely advice on preconception care.  
416 This may surely change, however, once folic acid intake becomes a standard fixture within  
417 public health education.

418 Control. Provided that one has ready access to folic acid (financial, logistic and otherwise;  
419 conditions that may again not be met in many situations), the intake of this supplement is  
420 quite feasible and does not seem to be very demanding, neither as regards expenditure of  
421 money, time, or effort, nor endurance of side-effects (optimizing folic acid levels does not  
422 produce any negative side-effects for the mother-to-be).

423 Causation. Should one forego folic acid intake, this omission would become an important co-  
424 cause of (the higher probability of) eventual neural tube defects in future offspring.

425 Proportionality. A normal prospective mother of reasonable prudence can reasonably be  
426 expected to shoulder the very minor burden of taking folic acid tablets, and reproductive

427 partners can equally be expected to support and stimulate their child-bearing reproductive  
428 partners to do so [13]. Even in the presence of multiple other demands and given the daily  
429 hustle and bustle of everyday life which can complicate proper compliance with prescribed  
430 medical routines, this does not impose an unreasonable or disproportionate burden.

431 Beneficence, non-maleficence and autonomy. Given that prospective parents are already  
432 explicitly assuming a parental role identity, they have special duties of procreative  
433 beneficence towards their future child and should first optimize their folic acid levels.  
434 Potential parents of category 4 – sexually active but leaving possible conception up to  
435 chance – also have an elevated moral duty. They should either start using contraceptives or  
436 else optimize their folic acid levels. Concerning potential parents who use contraception,  
437 some PCC advocates argue that the packages of birth control pills should advise that upon  
438 stopping with birth control pills in order to try to conceive, one should immediately switch to  
439 folic acid supplements [1]. On our analysis, such initiatives are warranted. Moreover, this  
440 advice could be broadened to include the information that, given the high incidence rates of  
441 unplanned pregnancy, any (presumably) fertile and sexually active woman (i.e. not only  
442 those in category 5 but also those in categories 4 and 3) should consider optimizing her folic  
443 acid level to decrease the risk of neural tube defects. Persons in the other categories are so  
444 far removed from a potential conception that they have no duty of preconception  
445 beneficence. They are free to decide for themselves whether or not they take folic acid.

#### 446 **Obesity**

447 The potential adverse pregnancy outcomes brought on by conception and gestation in an  
448 overweight body can be severe (increasingly so as one moves towards actual (morbid)  
449 obesity). Paraphrasing the synopsis of several systematic reviews provided by the Health  
450 Council of The Netherlands [1], compared to women of normal weight (BMI between 20 and  
451 25), for obese women (BMI 30<) the risk of diabetes is increased by a factor of 1.4 to 20, the  
452 risk of hypertension by 2.2 to 21.4, and the risk of pre-eclampsia by 1.2 to 9.7. These factors  
453 increase the risk of harming the foetus, making the incidence of neural tube defects rise by a  
454 factor of 1.5 to 3.0 times in children of obese mothers and the risk of stillbirth by a factor of  
455 2.5 to 3.4. These risks are also elevated, albeit to a lesser degree, for overweight persons



456 (BMI 25-30). A clear solution to reduce these risks would be the timely optimization of one's  
457 body weight.

458 Given the framework of preconception responsibility outlined above, should any normal,  
459 reasonably prudent potential parent normalize her body weight before attempting  
460 pregnancy or if there is a risk of an unplanned pregnancy?

461 Cognizance. In contrast to public knowledge on folic acid, it is widely known that abnormally  
462 high body weight is related to a host of health problems. However, the link between body  
463 weight and health problems of potential future offspring is likely to be substantially less well-  
464 known. For instance, without scientific knowledge on the issue, some might even speculate  
465 that being overweight may provide a better, more nurturing conceptive and gestational  
466 environment.

467 Control. Reducing and/or substantially changing the nature of one's food intake can be very  
468 demanding to many people, for reasons of individual psychology, group psychology,  
469 (financial) access to healthy food, etc. It will often require a trying expenditure of time, effort  
470 and possibly money. In some cases, problematic body weight is not (or not primarily) the  
471 result of one's behaviour, but a largely inescapable outcome of a genetic constitution, a  
472 medical condition, or a medication regime. Case by case, and risk group by risk group, these  
473 factors should be taken into account in the calculus of personal responsibility. That said,  
474 many overweight persons are in a position to optimize their body weight.

475 Causation. Being overweight prior to conception can causally contribute to several forms of  
476 adverse pregnancy outcomes [1]. To the extent that it is the overweight persons' acts and/or  
477 omissions that causally brought about their risk-increasing body weight, they open  
478 themselves up to being held morally accountable for exposing their potential child to the  
479 attendant risks. However, considerations of proportionality might substantially relax, if not  
480 absolve them of, such moral accountability.

481 Proportionality. For several reasons, it would be problematic to make the moral demand on  
482 overweight potential parents to suspend all attempts at conception until they have  
483 successfully optimized their weight. For instance, the weight-optimizing enterprise might  
484 take so much time for certain persons that, by the time they reach an optimal weight, other

485 obstacles have come into play (e.g. maternal age over 35, loss of a willing reproductive  
486 partner, etc.). Moreover, persons burdened by a relative lack of financial resources or by  
487 certain genetic or medical conditions may find it virtually impossible to optimize their body  
488 weight, or doing so may be disproportionately difficult for them. Therefore, it would be  
489 problematic to demand compliance. Rather, only a proportionate, sustained effort to  
490 optimize one's weight can reasonably be demanded [23]. Although fertile persons with  
491 weight problems could disregard all directive messages and simply go ahead and conceive,  
492 that would constitute a (legally permissible yet) morally tainted exercise of their  
493 reproductive liberty.

494 Beneficence, non-maleficence and autonomy. Prospective parents, already having a future  
495 child in view, would also need to invest such effort out of their duty of procreative  
496 beneficence. For potential parents of category 4, who are leaving it up to chance if they get  
497 pregnant/impregnate, a heightened moral imperative to keep their body weight under  
498 control also holds. Considering the fact that tackling overweight will often be a much more  
499 demanding task than taking folic acid, other types of potential parents – who have only a  
500 lesser or no duty of beneficence – should only be non-directively informed about the risks to  
501 future children of preconception overweight, for, in view of the demandingness, the  
502 proportionality calculus would allow more leeway to the potential parents' lifestyle choices  
503 or habits over their duty of non-maleficence.

#### 504 **Genetic screening**

505 A great number of diseases and handicaps are rooted in one's genetic make-up, which in  
506 most cases comes from one's genetic parents. Increasingly, potential parents can find out  
507 whether they are carriers of genetic factors that significantly increase the probability of  
508 adverse pregnancy outcomes, most commonly for autosomal dominant or autosomal  
509 recessive disorders, for which there is, respectively, a  $\frac{1}{2}$  or  $\frac{1}{4}$  chance of producing the  
510 disorder in one's offspring.

511 Given the framework of preconception responsibility outlined above, should any normal,  
512 reasonably prudent potential parent undergo genetic screening before attempting to  
513 conceive?

514 Cognizance. Basic knowledge about genetic risks clearly remains an issue about which more  
515 public health education is needed [24]. The same holds a fortiori for the additional  
516 awareness that genetic screening prior to conception is available and might be helpful.  
517 However, public knowledge levels on these issues seem likely to increase given the  
518 emergence of public campaigns on PCC and on genetic literacy, as well as the publicity  
519 campaigns by commercial (quasi-)direct-to-consumer genetic testing companies.

520 Control. The Health Council of The Netherlands argues that “the scenario must be avoided in  
521 which a decision not to make use of a service such as preconceptional carrier screening is  
522 regarded as irresponsible”, based in part on the consideration that one’s genetic constitution  
523 is not a ‘controllable’ factor in the sense that for instance one’s overweight or one’s folic  
524 acid level are ‘controllable’ [1]. However, even though one cannot exercise any meaningful  
525 control over one’s genetic constitution, in many cases one can exercise meaningful control  
526 over how one will expose one’s future offspring to risks stemming from it.

527 Causation. Though one is not oneself the cause of one’s genetic constitution and thus must  
528 surely not be blamed or in any way judged for it, one can become the cause of an adverse  
529 condition in one’s offspring due to one’s unwillingness to undertake genetic screening.

530 Proportionality. How should we map the benefit/burden calculus for genetic screening? On  
531 the benefit side, the amount of suffering one can avoid is significant, as shown for instance  
532 by the Cypriot campaign against beta-thalassemia [25]. Equally, the degree of certainty that  
533 one will effectively avoid significant suffering can often be high, for instance when one has  
534 been diagnosed with a dominant or recessive autosomal disorder, or when one is a member  
535 of a population with an elevated risk, e.g. 1 in 30 Dutch persons is a carrier of cystic fibrosis  
536 [1]. On the burden side, undergoing genetic carrier screening demands very little of a  
537 potential parent: providing a blood or sputum sample or even only a buccal swab. The  
538 burdens rather lie in handling knowledge regarding one’s genetic status (which may reveal  
539 much more than just the risks for one’s future offspring, namely risks to oneself and to one’s  
540 genetic relatives). To avoid such burdens, one may want to invoke a ‘right not to know’.  
541 Another set of substantial burdens pertains to the affliction-avoiding interventions one may  
542 have to engage in when a substantial genetic risk has been found (e.g. the strains of  
543 undergoing IVF/PGD cycles). Moreover, in regions without publicly subsidized health care for

544 these purposes, both the testing itself and the ensuing interventions can be extremely costly  
545 for potential parents. Then again, when one takes into account the potentially astronomical  
546 costs to a person of living with a severe affliction, plus the costs of (lifelong) care for severely  
547 afflicted persons, even high costs of tests and interventions may nonetheless be relatively  
548 proportionate. A normal and reasonably prudent prospective parent (i.e. category 5), who  
549 has good reason to assume that he/she belongs to a group with an elevated genetic risk of  
550 severely afflicting future offspring, would be acting morally irresponsibly if he/she knowingly  
551 foregoes genetic carrier screening.

552 Beneficence, non-maleficence and autonomy. In Cyprus, persons who want to marry before  
553 the Cypriot Orthodox Church (and who can be reasonably expected to try to bear children)  
554 are obliged to first have their carrier status for beta-thalassemia checked [25]. On our  
555 analysis, such a scheme seems to be based on a proper conception of preconception  
556 beneficence. All prospective parents (i.e. those in category 5) whose genetic predicament is  
557 known to be analogous to that of the Cypriots can reasonably be expected to engage in  
558 genetic screening for their respective risk factors. In another scheme proposed by the UK  
559 Human Genetics Commission, population-wide genetic screening for a variety of genetic  
560 risks would be organized during the final years of the secondary education system [4].  
561 According to this proposal, adolescents should be merely informed in an entirely non-  
562 directive way of the possibility of being screened and about what screening can achieve,.  
563 One might argue that a large-scale implementation of genetic screening would inadvertently  
564 give rise to some implicit directivity. Yet on our analysis, within proper bounds, such  
565 awareness-raising concerning the preconception responsibilities of potential parents in  
566 categories 1, 2, 3, and certainly 4, may be justified. For instance, to those in categories 1 and  
567 2, one could already mention the moral importance of avoiding severe afflictions in one's  
568 future children, and leave it to their own discretion to think about the (dis)proportionality of  
569 preemptively investigating their genetic risk factors. For potential parents in category 3 and  
570 certainly to those in category 4, one could both heighten awareness of the likelihood of  
571 unplanned pregnancy and signal the importance (made more acute in view of their coital  
572 activity) of getting to know their genetic risk profiles. A similar conclusion can be reached  
573 starting from a discussion of reproductive autonomy [26]. It must be noted, however, that

574 none of this would compromise the right of a potential parent to conscientiously object,  
575 their right to exercise the right not to know, or their right to reproduce.

### 576 **3. Summary**

577 We began this paper by briefly sketching the state of the art and the state of the debate  
578 regarding PCC. We explained how the PCC paradigm can enlist all sorts of ‘potential parents’  
579 in its preventative project by imposing some form of preconception responsibility upon all of  
580 them. This identification of large swathes of society as some kind of potential parent seems  
581 to entail a real risk of a ‘responsibility explosion’. If one maps these categories out on the  
582 lifespan of a single person, most people would have to assume at least some minimal form  
583 of PCC responsibility during their entire period of fertility. This situation seems to be further  
584 aggravated by the increasing number of PCC measures that are becoming available and by  
585 the ‘capability imperative’ they inevitably bring about. Given these substantial burdens, we  
586 have attempted to develop a preliminary framework of preconception responsibility that  
587 identifies preconception responsibilities in a sufficiently specific way. To that end, we have  
588 applied a theory of moral responsibility, involving principles of (preconception) beneficence,  
589 (preconception) non-maleficence and individual autonomy, to the cases of folic acid, obesity  
590 and genetic screening.

591 Our discussion of PCC has been primarily restricted to potential parents. Further work,  
592 seeking to develop a comprehensive rather than a preliminary ethical framing of PCC such as  
593 the one offered here, needs to take into account much broader socio-political realities and  
594 normative frameworks. Indeed, an in-depth analysis would also need to investigate the PCC  
595 responsibilities of medical professionals, health care institutions, the potential parent’s  
596 government, employer, and cultural, social and family communities. Our focus on potential  
597 parents is by no means intended to detract from the responsibilities of the other actors and  
598 institutions in the field of PCC.

599 We have argued that prospective parents as well as several other categories of potential  
600 parents have at least a minimal moral duty to *sufficiently try to optimize* the circumstances  
601 of conception. Although we have sought to apply only a ‘minimal’ standard (i.e. one that  
602 prescribes a ‘moral minimum’), circumstances may conspire to make the commitment to  
603 only ‘minimal’ duties of PCC overly burdensome nonetheless. That would be a sufficient

604 reason to reject even some of such ‘minimal’ duties. It would certainly be absurd to argue  
605 that an agent X has a duty Y, if X is irremediably incapable of meeting duty Y, just as it would  
606 be unreasonable to expect from potential parents that they perform supererogatory acts of  
607 PCC.

608 There are many cases in which realizing one’s basic moral duties in no more than a minimally  
609 sufficient way may in practice require sustained attentiveness over a long period of time, as  
610 well as intensive effort and substantial sacrifice of self-centred activity. The current armoury  
611 of PCC has not yet amassed to such a dramatic extent that the default, responsible way to  
612 procreate would require the use of artificial reproductive technologies as Bill Handel would  
613 have it – indeed it seems highly doubtful that such a scenario would ever come about.  
614 Nevertheless, it will probably already be hard for many people today to adequately  
615 discharge themselves of the minimal PCC duties advocated here. The strains involved will  
616 only increase as new effective means of PCC interventions are made available. The strains  
617 themselves, however, should not be invoked as an argument against PCC, as long as a  
618 normal potential parent of reasonable prudence can be expected to bear such strains in  
619 order to reduce the likelihood of serious adverse pregnancy outcomes.

620

#### 621 **List of abbreviations**

622 PCC: preconception care

623 PB: procreative beneficence

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629

630

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