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The themes covered in the section so far include dignity, naturalness, public interest, community, disability, autonomy, parity of reasoning, symbolic appeals, and toleration.

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### *A Paradox Out of Context: Harris and Holm on the Precautionary Principle*

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The precautionary principle is frequently referred to in various momentous decisions affecting human health and the environment. It has been invoked in contexts as diverse as chemicals regulation,<sup>1</sup> regulation of genetically modified organisms,<sup>2</sup> and research into life-extending therapies.<sup>3</sup> Precaution is not an unknown concept in medical contexts. One author even cites the Hippocratic Oath as a parallel to the precautionary principle.<sup>4</sup>

In a recent paper commenting on Walter Glannon’s view, John Harris and Søren Holm argued that the precautionary principle is incoherent and leads to paradox.<sup>5</sup> Their arguments are not aimed merely at Glannon’s standpoint, but are quite general. In this paper, I argue that their arguments are directed against interpretations of the precautionary principle that are taken out of context, and that their argu-

ments fail when the precautionary principle (or one or another version of it) is understood in context. The next section introduces the precautionary principle and presents two arguments that have been raised against it. Against the background of this, Harris and Holm’s critique is discussed in the third section. In the fourth section, the importance of their critique for proponents of the precautionary principle is acknowledged and commented on. Conclusions are offered in the last section.

#### **The Precautionary Principle**

Harris and Holm are well aware that there is no universally accepted canonical formulation of the precautionary principle. As has been noted, it may be misleading to talk about “the precautionary principle” with the definite

article,<sup>6</sup> as the phrase has several distinct uses. I will try to clarify the matter somewhat.

First, the phrase *the precautionary principle* may refer to one or another principle of national or international law. Various precautionary principles, to use the plural, have been included in several international legal documents. Second, the phrase *the precautionary principle* is used more broadly, referring to some principle that can or should be applied by decisionmakers and policymakers in general.<sup>7</sup> This is relevant also in medicine and healthcare. The distinction is important, for the following reason.

Consider a formulation of a rule or a principle, such as the prohibition of killing: "Killing is prohibited." Taken in isolation, it can be easily shown that such a principle leads to counterintuitive or at least problematic consequences. Is killing in self-defense always prohibited? Is it in every case prohibited to kill a dictator in order to save thousands of innocent lives? Or, to take an example from medicine, is it always wrong to kill someone who is suffering from terminal and painful illness, and who requests to be killed, a brand of killing usually termed euthanasia? (This is not to say that there are no proponents of an absolute prohibition on killing. There are. Neither would I argue that such a position is necessarily wrong. What I would argue, however, is that such an absolute prohibition to me, and many others, carries with it prima facie counterintuitive and problematic consequences, and hence cannot be accepted without convincing arguments. This is sufficient for the point I make here.)<sup>8</sup>

Of course such rules or principles very rarely occur in isolation. They occur in context, surrounded by a number of auxiliary principles, presuppositions, and limitations, implicit or explicit. This context might be reli-

gious, as in the case of "Thou shalt not kill," it might also be legal, as in the case of a paragraph prohibiting murder, or secularly philosophical.

The above holds also for the precautionary principle. If we by "the precautionary principle" mean a specific principle of national or international law, we have to consider it in that context. This is highly relevant for some of the arguments against the precautionary principle that have been discussed.<sup>9</sup> One such argument is that the precautionary principle is ill defined. That might be true, but interpretations of the precautionary principle are in fact emerging, albeit slowly. This is a task for policymakers, legislators, and courts. For instance, the recent EC communication,<sup>10</sup> the broad lines of which were endorsed by the European Council's meeting in Nice, December 2000,<sup>11</sup> is a modest step in this direction. The Commission notes that "it would be wrong to conclude that the absence of a definition has to lead to legal uncertainty" (p. 10), and that "[t]he Community authorities' practical experience with the precautionary principle and its judicial review make it possible to get an ever-better handle on the precautionary principle" (p. 10).

#### *Arguments from Absolutism and Risk Trade-Off*

Similar remarks apply to another objection to the precautionary principle that has been termed *the argument from absolutism*. The argument from absolutism says that the precautionary principle, at least some versions of it taken literally, will prohibit *every* action, and thus offer no action guidance whatsoever. Consider the following hypothetical and obviously absolutist version of the precautionary principle:

If an action might lead to severe damage, then the action must be avoided.

Of course, every activity is associated with some risk of severe damage. My writing this paper might, for instance, through an extremely complex causal chain, result in the end of the world. Fortunately, it is not at all probable, but it is not impossible. In this way, an absolutist interpretation of the precautionary principle would prohibit, in principle, every action. Because any action might have unforeseen catastrophic consequences, the action of carrying it out will be prohibited, and so will the action of *not* carrying it out. Thus, the precautionary principle is not coherent. The argument from absolutism is not at all uncommon in the debate around the precautionary principle.<sup>12</sup>

A related but less radical objection to the precautionary principle is *the argument from risk trade-off*. The phenomenon of risk trade-off is the following: If I do something to reduce a risk, as when I take prophylactic medication to reduce the risk of catching malaria, my risk-reducing action might have the consequence of increasing another risk, such as the risk of nausea or worse side effects of the medication.<sup>13</sup>

The relation between the argument from absolutism and the argument from risk trade-off is the following: The argument from absolutism says that the precautionary principle is incoherent, for logical reasons, as it would prescribe that an action should be carried out and that the very same action should not be carried out. The argument from risk trade-off says that concrete applications of risk reduction measures—not only the precautionary principle—will (or at least may) lead to worse consequences or larger risks than would abstaining from these measures. This may come about directly when risk reduction measures themselves impose new risks or indirectly when risk reduction measures are so costly that the resultant loss of wealth

imposes risks.<sup>14</sup> According to the argument from risk trade-off, principles prescribing such measures are not necessarily incoherent, but merely irrational or counterproductive.

### *Types of Precautionary Principles*

Despite the plethora of formulations of the precautionary principle, there are nevertheless at least two distinct types.<sup>15</sup> The first type contains the *argumentative* versions of the precautionary principle. These versions are not action prescribing, but principles for what reasons or arguments are valid. The most prominent example is the version of the precautionary principle found in Principle 15 of the Rio Declaration.<sup>16</sup> This version, which is included almost verbatim also in several other documents, requires that “lack of full scientific certainty shall not be used as a *reason* for postponing cost-effective measures to prevent environmental degradation” (my italics). Argumentative versions of the precautionary principle do not seem very demanding. They say little more than that arguments from ignorance should not be used. Argumentative versions, are thus, if not unproblematic, at least less problematic than the second type of version of the precautionary principle: *prescriptive versions*. Prescriptive, as opposed to argumentative, versions prescribe actions. They say that, under certain conditions, precautionary measures are prescribed (in a sense to be discussed later). A typical prescriptive version of the precautionary principle is the formulation of the Wingspread Statement of 1998:

When an activity raises threats to the environment or human health, precautionary measures should be taken, even if some cause-and-effect relationships are not fully established scientifically.<sup>17</sup>

Prescriptive versions of the precautionary principle share some common elements and a common structure.<sup>18</sup> They can be recast into the following if-clause:

If there is (1) a threat, which is (2) uncertain, *then* (3) some kind of action (4) is mandatory.

Here, (1) and (2) together indicate when precautionary measures are applicable, (3) states what kind of action is prescribed, and (4) states the way in which the action is prescribed. We may call (1) the threat dimension, (2) the uncertainty dimension, (3) the action dimension, and (4) the prescription dimension. Of course, the phrases in the dimensions vary greatly between different formulations. For example, in the threat dimension, we find phrases like “activities raising threats to the environment or human health,” and in the action dimension we find phrases like “regulatory measures” or “action to protect the environment.”<sup>19</sup> Obviously, prescriptive versions of the precautionary principle vary greatly in stringency depending on the content of these dimensions. However, the elements (1)–(4) and the overall structure is common to most existing prescriptive versions of the precautionary principle.

### Harris and Holm’s Objections

Let us now turn to Harris and Holm’s critique of the precautionary principle. Their “initial approximation to the core content of [the precautionary principle]”<sup>20</sup> fits the structure just described, as does their modified version (PP1).<sup>21</sup> They did not discuss the distinction between argumentative and prescriptive versions of the precautionary principle. Instead, they distinguished, first, between the precautionary principle as an epistemic rule (E-PP) and as a rule of choice (C-PP). Second, they distin-

guished between C-PP as a principle of rational choice and as a moral principle.

### Epistemic Precaution

By the E-PP, they meant a principle that requires that evidence suggesting a causal link between an activity and possible harm should be given greater weight than it would in other circumstances. They rejected such principles, for the reason that “systematic discounting of evidence would systematically distort our beliefs about the world, and would necessarily, over time, lead us to include a large number of false beliefs in our belief system.”<sup>22</sup> That may well be true, even if it is not obvious that this makes the principle invalid, as Harris and Holm claimed. It is not only the number of correct beliefs in a belief system that counts. Suppose that we have exactly three possible epistemic principles, P1, P2, and P3. P1 leads us to include a large number of false beliefs about mostly irrelevant matters (the exact number of grains of sand in Iraq, what Caesar had for dinner three days before his death, etc.) in our belief system, but it also leads us to the correct answer to the question of what substance would cure AIDS. P2 does not lead us to include any false beliefs, but true beliefs about irrelevant matters (Caesar’s dinner, etc.). P3 does not lead us to include any beliefs at all. In this case, the reasons for rejecting P1 are indeed weak. Harris and Holm’s argument apply at best *ceteris paribus*. However, there is a more down-to-earth problem with this argument. It is that the E-PP, as Harris and Holm presented it, is something of a straw man. The argument is not relevant to existing versions of the precautionary principle. The following extremely simplified example may illustrate the point: Suppose that we have scientific evidence concerning the toxicity of a

chemical substance *S*. Moderately credible evidence is pointing in the direction that *S* is toxic, and equally credible evidence is pointing in the opposite direction, that it is nontoxic. The E-PP, as Harris and Holm interpreted it, would prescribe "Believe that *S* is toxic" or perhaps "Believe that the proposition '*S* is toxic' is  $x\%$  more probable than the proposition '*S* is nontoxic'" (add technicalities to taste). This is the only reasonable way of making sense of the argument that E-PP will lead us to include a large number of false beliefs in our belief system. However, this is not what existing versions of the precautionary principle require us to do. It is a different sense of "giving weight to evidence" that is at play here. It is not about which proposition is to be believed, but which is to be acted upon. Harris and Holm admitted that it may be rational to have epistemic rules that "instruct us always to resolve ties in justification in a specific way."<sup>23</sup> As an example, they mentioned court cases. But in court cases, epistemic rules are to be acted upon. A typical example is the rule that a suspect is presumed innocent until it can be shown beyond reasonable doubt that he is guilty. Those who have argued in favor of evidence-weighting or burden-of-proof versions of the precautionary principle rather have this in mind. In fact, I have not encountered any formulation of the precautionary principle that is like Harris and Holm's E-PP, either in the original or the weakened version. I will therefore not dwell further on the refutation of the E-PP and instead turn to the C-PP, that is, the precautionary principle as a rule of choice.

*The Precautionary Principle  
as a Rule of Choice*

As we saw, the C-PP may be interpreted both as a principle of rational-

ity and as a principle of morals. Both as principles of rational choice and as moral principles, the versions of the precautionary principle they discussed are prescriptive and fit well into the structure described above. Principles of rationality and moral principles can both be prescriptive. (The distinction between rationality and morals is traditional and not unquestionable, but I will not pursue the matter here.)

The difference in the case of the precautionary principle is to be found in the prescription dimension. If we take the precautionary principle to be a moral principle, we would insert a phrase like "is morally right" or "is morally permissible" in the prescription dimension. If we take it to be a principle of rational choice, we would use a phrase like "is rational." Of course, a neutral phrase may also be used, such as "should be taken," where it is implicit whether the "should" is a moral term or a rationality term.

Harris and Holm rejected the precautionary principle as a rule of choice. Their argument is in essence identical to the argument from absolutism. Using the example of GM plants, Harris and Holm talked of an "infinite regress of precaution,"<sup>24</sup> and, commenting on Glannon's paper on research into life-extending therapies,<sup>25</sup> they termed this "the paradox of precaution." Another way in which they put it is that the precautionary principle "requires us to use an infinite safety factor." They are right in their claim that this would be irrational, but wrong in that the precautionary principle requires us to do so. The problem with their argument is that they took the precautionary principle out of context.

Prescriptive versions of the precautionary principle prescribe that precautionary measures should be taken. What, then, is a precautionary measure? In the everyday sense of the term, a precautionary measure is

roughly an action that is intended to prevent an undesirable outcome that is possible but not certain to occur. There is more to it than that, but this definition is sufficient for the purposes of the present paper.<sup>26</sup> What must be noted is that precautionary measures are precautionary *with respect to* something undesirable. Suppose that you are a doctor performing an operation to fixate a femur fracture. There is a slight possibility that there will be an infection in the wound, and as a precautionary measure, the patient is given prophylactic antibiotics treatment. In this case, the antibiotics treatment is precautionary with respect to a certain undesirable outcome (the infection). It is not precautionary with respect to other undesirable outcomes. For instance, it is not precautionary with respect to evolution of bacteria that are resistant to antibiotics.

The argument from absolutism obviously bites if the precautionary principle is thought of as prescribing measures that are precautionary with respect to *everything*. But this is not the case. If the precautionary principle is interpreted as a principle of national or international law, it is implicitly or explicitly stated to what threats it is supposed to apply. In the case of the Rio Declaration cited above,<sup>27</sup> we are clearly in the context of environmental degradation. In that context, precaution is not necessarily thought to apply to every other possible threat as well.

Furthermore, many prescriptive versions of the precautionary principle require that actions be taken when there is lack of full scientific certainty. (In fact, uncertainty is a prerequisite for precaution. We do not take precautions against things we expect to happen.) But this does not mean that precautionary measures are required by the precautionary principle when there is no particular evidence, scien-

tific or other, of the presence of a threat. This is recognized in increasing degree in several documents. For instance, in some documents it is explicitly required that the possibility of harm should at least be identified. One example is found in the conclusions of the European Council Meeting in Nice in December 2000.<sup>28</sup> I do not believe that any proponent of the precautionary principle would actually demand precaution with respect to everything, and nothing in texts I have encountered so far indicates that they would.

Well, it might be objected: It is perhaps the case that proponents of the precautionary principle did not intend to be precautionary with respect to everything. But this is what follows from their principle, whether they intended it or not, and it leads to unreasonable consequences, for instance in the form of “the precautionary paradox.” They do not seem to have realized this.

To this I reply: Well yes, it follows—but only if the precautionary principle is taken out of context. To do so is unreasonable. Indeed, the argument from absolutism points at such a glaring problem that it is highly improbable that anyone would propose a principle that is vulnerable to it. Instead of concluding that the proponents of the precautionary principle have not realized the consequences of their position, one may suspect that this objection, like Harris and Holm’s earlier rejection of the E-PP discussed above, is directed against something of a straw man.

### Importance of the Objections

Even if Harris and Holm’s objections might be directed at something of a straw man, they are not without importance for proponents of the precautionary principle, whatever version of it is intended, and in whatever area it

is to be applied. The objections are important because they point at areas in which clarification is needed. Also in this case, context is of vital importance. In particular, certain implicit assumptions should be made explicit. For instance, as we saw that precautionary measures cannot be precautionary with respect to everything—this is the lesson learned from the argument from absolutism—it should be explicitly and precisely stated with respect to what a proposed precautionary measure is meant to be precautionary.<sup>29</sup> This is not least important in risk communication. There is a reason why Harris and Holm, and quite a few other critics, have interpreted the precautionary principle in the context-free way described above. (Harris and Holm are not the only authors who have argued that the precautionary principle will lead to paralysis in decision-making, and their claim that “the fundamental threat that the increasing popularity of the [precautionary principle] poses for scientific advance and technological progress” has been “almost unnoticed”<sup>30</sup> is exaggerated.) The reason is that appeal to the precautionary principle has not always been made in the precise and structured way it should be. This is also indicated by the fact that the principle has been criticized for being vague and ill defined.<sup>31</sup> Harris and Holm’s arguments thus pinpoint areas where increased specification is needed.

Thus far, I have argued that the precautionary principle should be specified in the threat dimension. It should also be specified in at least two other respects.

The first is already hinted at and concerns the uncertainty dimension. In the uncertainty dimension, it is stated at what level of uncertainty precautionary measures are applicable. Here is room for further specification as to what level of evidence is re-

quired to trigger precaution. This is, as we have seen, a way around the argument from absolutism. For instance, future formulations of the precautionary principle could be made to include more precise statements as to the nature of the suspicions required to trigger precaution, something which has hitherto been lacking. It might be objected that a phrase requiring, for example, “reasonable scientific foundation” of a suspicion to trigger precautionary measures is not very precise. But it is not obviously less precise than many other phrases that legislators and policymakers leave to courts and other authorities to interpret. (It is not even clear that it is more difficult to interpret than phrases such as “scientific proof” or “scientific certainty.”)

The second respect does not concern any of the dimensions (1)–(4) mentioned above. Instead, it concerns time. Precaution is warranted only when information about the possible threat is lacking. When something undesirable is highly probable to occur, measures to prevent it are not usually said to be precautionary. We do not sterilize surgical instruments as a precautionary measure, as we know that an infection is rather probable if we use unclean instruments. But information changes over time. Let me take an example that has been cited as an instance of an early use of the precautionary principle.<sup>32</sup> I do not think it is correct to call it an application of the precautionary principle, for the reason that no principle seems to have been referred to. However it is an obvious instance of precaution. In an 1854 London cholera epidemic, Dr. John Snow recommended that the handle of the Broad Street water pump be removed in order to stop the spreading of cholera. At the time, the mode of communication of cholera through contaminated water was not evident, though Snow himself

seems to have had such suspicions.<sup>33</sup> Snow's recommendation was thus an example of precaution. Today, however, the closing (or perhaps chlorinating) of a cholera-infested source of drinking water would not be merely precautionary. We know that things are likely to turn out badly otherwise. The opposite situation is, of course, also possible, where a precautionary measure is discovered to be unnecessary as new information becomes available. One example might be the downgrading of diethylhexylphthalate, DEHP, from "possibly carcinogenic to humans" to "not classifiable as to its carcinogenicity to humans" by one of the working groups of the International Agency for Research on Cancer.<sup>34</sup>

These examples both illustrate the relevance of the time factor for the precautionary principle. Precautionary measures cannot be taken once and for all, but must be subject to review as new information accrues. Consequently, the precautionary principle needs to be specified as to how often the measures should be reviewed. This need is acknowledged in, for instance, the communication on the precautionary principle from the Commission of the European Communities.<sup>35</sup>

## Conclusion

In this paper, I have argued that Harris and Holm's rejection of the precautionary principle is unwarranted. Their rejection of what they termed the "epistemic" version of the precautionary principle (E-PP) is based on a formulation of the principle that is at odds with most existing formulations. Their rejection of the precautionary principle as a rule of choice (C-PP) consisted primarily of delivering an argument that has not been uncommon in the debate on the precaution-

ary principle: the argument from absolutism. In both cases, their rejection was based on a narrow conception of the precautionary principle that ignores context. The objections delivered by Harris and Holm, however, pinpoint important areas—not all such areas, of course—in which clarification is needed. Thus, their objections might in the end be quite useful for proponents of the precautionary principle. We should thank them for that.<sup>36</sup>

## Notes

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