

# On the Spot Ethical Decision-Making in CBRN (Chemical, Biological, Radiological or Nuclear Event) Response

## Approaches to on the Spot Ethical Decision-Making for First Responders to Large-Scale Chemical Incidents

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**Abstract** First responders to chemical, biological, radiological, or nuclear (CBRN) events face decisions having significant human consequences. Some operational decisions are supported by standard operating procedures, yet these may not suffice for ethical decisions. Responders will be forced to weigh their options, factoring-in contextual peculiarities; they will require guidance on how they can approach novel (indeed unique) ethical problems: they need strategies for “on the spot” ethical decision making. The primary aim of this paper is to examine how first responders should approach on the spot ethical decision-making amid the stress and uncertainty of a CBRN event. Drawing on the long-term professional CBRN experience of one of the authors, this paper sets out a series of practical ethical dilemmas potentially arising in the context of a large-scale chemical incident. We propose a broadly consequentialist approach to on the spot ethical decision-making, but one which incorporates ethical values and rights as “side-constraints”.

**Keywords** Autonomy · CBRN · Chemical incident · Consequentialism · Decision-making · Ethics

### Introduction

The threat from weapons of mass destruction (WMDs) and chemical, biological, radiological, and nuclear (CBRN) agents and materials is a well-recognised feature

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of the contemporary security landscape.<sup>1</sup> This paper concerns some of the practical ethical dilemmas potentially facing first responders in one kind of CBRN event: a large-scale chemical incident.

The dilemmas to be considered are not drawn from historical cases, but have been devised based on the long-term professional CBRN experience of one of the authors. This takes the examples beyond pure philosophical thought-experiments, securing them a solid grounding in professional expertise. The basis in experience is important, for in this domain theory and practice should not be divorced: theoretical reflection on practice, and practical input to theory, are valuable and should be exploited. Future work should go further in this direction, including empirical research to reveal how on the spot ethical decisions have been taken in a wider range of past cases, if and how they are and have been supported by training, and how factors like stress, emotion, and time-pressure influence moral judgement in emergency situations.<sup>2</sup>

Since no actual case is involved, we cannot resolve any of the dilemmas we discuss. Every CBRN event is, so to speak, unhappy in its own way: unique contextual factors are inevitable, and their significance to moral reckoning—while not necessarily immense in each case—cannot be dismissed in advance. That there is a deep body of literature detailing the importance of (individual and organisational) creativity and improvisation in disaster response suggests that “solutions” proposed in the abstract are likely to be incomplete and to require case-specific supplement.<sup>3</sup> Planning, training, and technology can support improvisation; but specific improvisations and on the spot ethical decisions cannot be anticipated or taken in advance. Moreover, the dilemmas we address are acute (every plausible course of action has a serious negative consequence). A proponent of any contending decision could, in theory, mount a defence of their position to which even a staunch opponent would, being reasonable, concede some force (even if not enough to convince them).

In the cases described in the “[A CBRN Practitioner’s Perspective](#)” section, even a well-trained, experienced responder (a commander, responsible for tactical direction) is likely: (a) to be uncertain of the best course of action (since ethical dangers attach to them all); or (b) to be settled on a course of action, but to recognise that it requires the restriction of some people’s basic rights. They must do something—for this is a

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<sup>1</sup> The international community has sought to counter the proliferation and trafficking of WMDs and CBRN materials through measures such as United Nations Security Council Resolution 1540 (2004), reiterated in Resolutions 1673 (2006), 1810 (2008), and 1977 (2011).

<sup>2</sup> The literature on role improvisation (i.e. the way disaster and emergency responders improvise and innovate their roles in novel situations) gives empirically-based insight into decision-making processes for first responders facing extreme circumstances. See: Webb et al (1999), Webb (2004). Though the focus is not specifically on ethical decision-making, the taxonomy of role improvisations includes “normative order changes” (Webb 2004, 54–55), which include improvisations affecting fundamental rights (property seizure, restrictions on movement, etc.). Kowalski-Trakofler et al. (2003) examines the impact of stress on emergency managers’ decision-making capacities; their focus is more general than ethical decision-making alone, as is that of Cohn et al (1998) in their analysis of the role of emotion in emergency response. Examinations of stress, cognitive load, and time on specifically moral judgements include: Greene et al (2008), Suter and Hertwig (2011) and Starcke et al. (2012). These are not specifically addressed to disaster response. More general reviews of ethical issues in CBRN include Singer et al (2003), though this is not dedicated to on the spot decision-making.

<sup>3</sup> Cf. Kreps (1991), Mendonca et al. (2001), Kendra and Wachtendorf (2002), Kendra and Wachtendorf (2006), Webb (2004), Mendonca and Fiedrich (2006).

professional, legal, and moral duty—and they must decide fast. Some operational decisions (e.g. containing the scene of the incident) are supported by standard operating procedures (SOPs). But SOPs may not suffice for complex ethical decisions in which competing needs, interests, and rights must be weighed. The question is thus how to support ethical decision-making when, *ex hypothesi*, SOPs cannot be relied upon. The primary aim of this paper is to examine how first responders should approach on the spot ethical decision-making amid the stress and uncertainty of a large-scale chemical incident.

Consequentialism is the view that the right- or wrongness of an action is always and everywhere a function of its consequences. The moral course of action is that which maximises good consequences (e.g. *increasing happiness or reducing suffering*).<sup>4</sup> We will argue in the “[Consequentialism and on the Spot Decision-Making](#)” section that, faced with complex, time-pressured ethical decisions in the extraordinary circumstances of CBRN events, first responders should adopt a broadly consequentialist approach. That is, when rapidly evaluating courses of action, a responder could do worse than weigh up the foreseeable consequences of the options, and select whichever offers the best (or least bad) outcome with respect to a pre-selected criterion (e.g. the number of lives saved).

As set out above, consequentialism is an answer to one of the basic questions of moral philosophy: *in virtue of what is an action morally good or bad?* It is important to note that our position implies no particular stand on whether consequentialism is the correct answer to that question. We are not arguing that, *in general*, the rightness or wrongness of an act is determined by its consequences; nor are we arguing that, *in general*, ethical decision-making in disaster and emergency response should *always and everywhere* be guided by consideration of how many lives are saved. Our claim is significantly more modest: the consequentialist approach, as a decision-support heuristic in the class of cases at stake in this paper, is the responder’s best option for selecting, extremely rapidly, a course of action. It is quite consistent to hold that this approach could result in morally acceptable action, even if moral acceptability is not ultimately assessed in consequentialist terms.<sup>5</sup> (A full defence of this claim is beyond the scope of this paper).<sup>6</sup> Neither run of the mill ethical decisions in daily life, nor ethical decisions in other phases of disaster response (e.g. planning), are under discussion here.

Our position of course faces objections. These are considered in the “[Exploring the Alternatives: Incorporating Values](#)” section. They motivate modifications resulting in a consequentialist approach to on the spot ethical decision making which incorporates fundamental rights and ethical values as “side-constraints” (Nozick 1974).

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<sup>4</sup> There are many varieties of consequentialism. Here we generalise and simplify. See Sinnott-Armstrong (2011).

<sup>5</sup> And of course if consequentialism is true, then the chances are even higher.

<sup>6</sup> A key premise of that defence is that an act may be moral even if motivated by a false moral theory.

## A CBRN Practitioner's Perspective

The practical dilemmas presented in this section are based on the long-term professional CBRN experience of one of the present authors.<sup>7</sup> The range of ethical issues covered is limited to those affecting first responders in chemical events. These are likely to severely overstretch the capacities of responders in the field.<sup>8</sup> Large-scale chemical events, whether accidental like the 1984 Bhopal gas and chemical release, or deliberate like the 1995 *Aum Shinrikyo* Sarin attacks on the Tokyo subway, are among emergency responders' nightmare scenarios. The management of such incidents is complex in and of itself, but is dramatically further complicated by the need to manage public (and in some cases also responders') fears. Such scenarios evoke horrific images of chemical warfare from the First World War, of Nazi use of Cyclone B in the Second World War, and of the use of toxic gases during the Iran-Iraq War (consider also recent UN reports on the use of chemical weapons in Syria).<sup>9</sup> Non-experts are prone to the view that chemical incidents are extremely serious (true), lethal (sometimes true), and that little can be done to save those affected by toxic material (usually not true).

When a large-scale chemical release is declared, first responders have three main objectives (the order of activities may vary).

1. To contain the scene, secure a safety perimeter, prevent unauthorised crossing of the perimeter, and take actions to protect those inside it.
2. To rescue casualties from the scene, decontaminate them, classify their medical condition (triage), and treat and evacuate them.
3. To contain dispersal of the contaminant, neutralise it, and decontaminate the scene.

Decisions must be unambiguous and clearly communicated. Since the timeframe for many of them is mere minutes, they are often formulated as standard operating procedures (SOPs). These suggest to commanders what activities should be carried out and what decisions taken in order to achieve desired goals efficiently and effectively. SOPs make certain assumptions:

1. *The "greater good"*. The interests of the many outweigh those of an individual.
2. *Operational priorities*. The primary goal is to save lives, then to prevent long-term physical harm to humans, livestock, and the environment, and then to protect property.

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<sup>8</sup> Chemical incidents are likely to be marked by large numbers of victims over a very short period of time and in a defined territory. In a biological incident signs and symptoms will likely be delayed. In radiological incidents there will be no casualties on the scene suffering from acute radiation syndrome, but huge numbers of "worried well", which is a different type of problem.

<sup>9</sup> See the United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic, "Report on the Alleged Use of Chemical Weapons in the Ghouta Area of Damascus on 21 August 2013" ([http://www.un.org/disarmament/content/slideshow/Secretary\\_General\\_Report\\_of\\_CW\\_Investigation.pdf](http://www.un.org/disarmament/content/slideshow/Secretary_General_Report_of_CW_Investigation.pdf)).

3. *Operational hierarchy.* Response organisations' commanding personnel are assumed to know best how objectives should be achieved; their orders should be followed (by responders as well as by the public).<sup>10</sup>

With these overviews of responders' goals and SOPs in mind, we now outline eight practical ethical dilemmas that commanders could encounter in dealing with a major chemical incident.

**§1. The dilemma of forced participation** For many years CBRN response was largely limited to the armed forces. Within police and fire services, CBRN response was traditionally the task of elite volunteer units. Nowadays however, it is not only designated CBRN responders who should expect to be called upon to respond to major events. Ensuring the availability of sufficient numbers of response personnel is thus potentially a major practical difficulty; and the manner in which participation is encouraged—and possibly forced—in the midst of an ongoing event is a major ethical issue.<sup>11</sup> Many personnel dealing with a major chemical incidents will not be considered “public safety personnel”<sup>12</sup> (e.g. health care providers). In the Tokyo Sarin attack, about ten per cent of hospital personnel were treated for exposure to off-gassing from victims' clothes. Such exposure could have long-term health implications (potentially more serious for certain groups). Hence our first practical dilemma: given the risks, do commanders have the right to force responders to participate in CBRN response? One option is to have responders expressly volunteer. However this could delay the operation, and courts the risk of receiving fewer volunteers than required. Alternatively, certain groups—perhaps those especially vulnerable in some respect (e.g. pregnant women)—could be automatically excluded from these operations. Such a policy would have to ensure both that commanders have access to sufficient resources, and that equitable treatment of employees is not undermined.<sup>13</sup> For some chemical agents, medical prophylaxis is available. How should commanders deal with responders refusing prophylaxis (taking into consideration that this could be an elegant way of avoiding dangerous situations)? Can they be sent into contaminated areas, knowing that they are less protected? What would be a tolerable risk, and who is to decide?

**§2. The dilemma of forced restraint (i)** Cordoning off and preventing unauthorised entry to the incident site are key steps in minimising contamination of the public and public spaces. However these steps could be extremely difficult to apply. Should a chemical incident occur in, say, an elementary school, parents may wish to break the cordon to be with or retrieve their children. What degree of force

<sup>10</sup> This is not to say that the public should not have a say in disaster planning more generally.

<sup>11</sup> Methods of encouraging participation may range from an appeal to responders' vocational duty to care, to linking benefits to participation (financial incentives, holiday allowance, etc.), to explicit sanctions for non-participation (e.g. fines, disciplinary action, dismissal and, ultimately, legal measures). We will not discuss which measures are most effective or ethically acceptable.

<sup>12</sup> The question of which agencies' staff are “public safety personnel” (as opposed to, say, “civil servants”) is directly relevant to questions of acceptable exposure to risk, compensation for injury or death, and so on. The matter is complex and controversial.

<sup>13</sup> The working group on ethical issues arising from the 2003 SARS outbreak around Toronto reached no consensus on healthcare workers' obligations to risk their lives to deliver care (Singer et al. 2003).

should a commander authorise in order to prevent worried parents crossing the perimeter? Responders have *prima facie* reason to prevent parents from breaking the cordon, namely to protect them from contamination. But an argument could be made to the opposite conclusion, premised on the plausible claim that parents have the right to risk their own lives to save their children. How are such conflicts to be resolved?

**§3. The dilemma of forced restraint (ii)** A related problem concerns the walking wounded. These people are likely to be highly anxious; some may be unwilling to wait for onsite decontamination and attempt to leave the area (breaking the cordon) by their own means. Such people pose a potentially serious cross-contamination threat to others—a threat which responders have a duty to mitigate. When persuasion fails, to what extent can these victims be restrained against their will?

**§4. The dilemma of triage by “gross” criteria** The practical challenges of medical care in a large-scale chemical incident have serious ethical implications. Due to the large numbers of victims, as well as the time-dependent nature of treatment, fast decisions (e.g. on whom to decontaminate and treat first) are essential. These decisions will often be taken by responders using personal protective equipment (PPE) such as goggles, respirators, or full hazmat suits. PPE can seriously impair the capacity to examine victims and assess their vital signs. Decisions will tend to be based on “gross” criteria, such as whether the patient is moving. In normal circumstances, such criteria would be considered insufficient and likely to lead to mistakes (possibly resulting in denial or delay of treatment). Current SOPs for using PPE effectively institutionalise this increased risk of error. Should grave decisions be taken under this level of uncertainty, or should further steps be taken to enhance diagnoses and triage classifications?

**§5. The dilemma of assumed consent** PPE also impairs communication capabilities. This, combined with inevitable time-pressure, renders normal procedures for gathering “informed consent” impractical or impossible. Patients will receive treatment having received less information than would be provided in normal circumstances, and without having formally given consent. Auto-injectors (automatic syringes filled with medications, used mainly to treat victims of nerve agents) may also be used in large-scale chemical incidents. The associated anti-nerve agent drugs are not innocent, and may provoke notable side-effects.<sup>14</sup> As no time is allocated to interviewing, a certain percentage of patients suffering side-effects is considered an “acceptable risk”.<sup>15</sup> To what extent can victims’ consent to different forms of treatment be assumed in such cases?

<sup>14</sup> Such as hallucinations or increased heart rate or blood pressure.

<sup>15</sup> A further issue is that, in many countries, the kinds of drugs used in auto-injectors only have approval for use in military settings. Since large-scale nerve agent intoxications are extremely rare, the pharmaceutical industry does not invest in the trials required to secure approval for civilian use. An incident commander may therefore encounter a situation where lifesaving drugs are available, but not officially authorised for use. This is even more problematic in countries where those drugs are authorised for civilians members of response forces, but not the general public (e.g. in most US states auto-injectors are authorised as “self-treatment” for responders and military personnel, but are not to be used on the general public). On what basis should commanders decide whether to use these measures?

**§6. The dilemma of forced decontamination** Decontamination is the processes whereby contamination is removed from a victim's skin. It can be performed onsite in a designated decontamination area or outside hospitals (e.g. by setting up a water-curtain or by hosing down non-ambulant patients). Decontamination is clearly in the public interest, yet it is ethically sensitive. Before decontamination, clothes must be removed (and replaced by a clean set afterwards). Such procedures could be perceived as a dramatic violation of bodily integrity. Can commanders force decontamination on reluctant individuals? If so, how can that situation be handled sensitively?

**§7. The dilemma of dignity undermined** Dedicated mobile decontamination facilities provide privacy to victims. However not all authorities have invested in these facilities and, anyway, private cabins are not always provided (hence a degree of public nudity may still be required). Privacy and dignity are thus major concerns here (as elsewhere in CBRN response)—particularly considering the ubiquity of smartphones, cameras, and the like. To what extent can such rights be derogated in chemical events?

**§8. The dilemma of assumed contamination** Technology does not yet allow testing every single person for contamination. The decision to decontaminate people may be based merely on their having been in the vicinity of the contaminated area (as some chemicals have delayed effects, even the asymptomatic will be required to undergo decontamination). Is an assumption—based solely on the subject's bad luck to have been in the wrong place at the wrong time—a sufficiently strong justification for forcing them to undergo decontamination procedures that could (cf. §7) be considered as invasive and humiliating?

### Consequentialism and on the Spot Decision-Making

In the situations described above, commanders must decide, very rapidly, among competing courses of action, none of which is without negative consequences. Our question is of how such decisions can best be approached. In each case, one could put forward a *prima facie* plausible argument in favour of one course of action over another. Yet it is unlikely that that argument would be immune to a contextually-specific “defeating factor”. Since such factors cannot be predicted in advance, responders must have the wherewithal to handle them.<sup>16</sup> Planning, training, and technology support and promote creativity and improvisation in operational decision-making (Kreps 1991; Kreps and Bosworth 1993; Mendonca and Wallace 2004; Mendonca et al. 2001; Mendonca et al. 2006). Support to ethical decision-making may be required too. Responders will be forced to weigh their options, factoring-in contextual peculiarities; they will require guidance on how—in the heat

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<sup>16</sup> Perhaps ideally responders would simply *know* (in some sense of that word)—or *see* (if that is different)—the right thing to do; and perhaps “ethical training” could promote this. But it is plausible that, in at least some situations, at least two courses of action have a plausible claim to be the (or a) right thing to do.

of the moment—they can approach novel (indeed unique) ethical problems; they need strategies for “on the spot” ethical decision making.

A strategy for approaching on the spot ethical decision making would be, in broad terms, a framework for weighing competing courses of action, in order that a rationally justifiable decision can be made.<sup>17</sup> The chosen course of action may not ultimately be the best possible—nothing determines that the strategy must be infallible (it will almost certainly not be). But decisions taken on the basis of the framework will be defensible regardless.<sup>18</sup> When the decision is less than optimal, this ought to be attributable to the (understandable and excusable) shortcomings of the decision-maker, or to a dearth of relevant information, not to the decision-making framework itself.

Responder SOPs generally assume that the interests of the many outweigh those of the few, and that, in prioritising activities, the imperative to save lives trumps all others. This, along with the need to account for contextually specific factors, indicates a strong strain of consequentialist thinking. Singer (1993, 3) writes:

Consequentialists start not with moral rules but with goals. They assess actions by the extent to which they further these goals [...]. The consequences of an action vary according to the circumstances in which it is performed. Hence a [consequentialist] can never properly be accused of a lack of realism, or of a rigid adherence to ideals in defiance of practical experience.

Stress, increased cognitive load, and time-pressure all influence the forming of moral judgements (Kowalski-Trakofler et al. 2003; Starcke et al. 2011, 2012; Youssef et al. 2012; Greene et al. 2008; Suter and Hertwig 2011). Psychological factors can enhance or hinder rapid decision-making in disaster response (Cohn et al. 1998); and there is, in principle, no reason why this should not apply also to ethical decision-making. In order to minimise the negative impacts of such situational and psychological factors, a consequentialist approach—whereby the responder compares projected consequences to identify the course of action in which most lives are saved—appears promising (*prima facie* at least).<sup>19</sup> Within the scope of “dual process” theories of cognition (Kahneman 2003; Greene et al. 2004), research has indicated connections between, on the one hand, non-consequentialist moral judgement and automatic, effortless, emotional responses (“System 1” operations), and on the other, consequentialist moral judgement and slower, controlled, effortful cognition (“System 2” operations) (Greene et al. 2001; Greene 2008; see also Sunstein 2007). Since we assume that, in the cases under consideration, unique context-specific factors may be of importance (thereby demanding attention), the consequentialist approach arguably offers an attractive combination of controlled, reflective deliberation, with a relatively simple (and correspondingly rapid) decision procedure. Moreover, it give responders a clear

<sup>17</sup> What counts as a “rational” justification is open to debate (a debate we will not join here).

<sup>18</sup> The complete framework for such decisions will clearly be more encompassing than only those aspects discussed in this paper. It will include all other implicit and explicit supports and constraints to decision-making (e.g. technological decision support systems, extant organisational SOPs and heuristics, codes of conduct, guidelines, legal requirements, hierarchical command structures, and so forth).

<sup>19</sup> Cf. Eyal and Firth (2012, 3).



objective (saving lives) to take as the end towards which their ethical decision-making should tend. Clarity of focus is highly desirable in crisis situations (Kowalski-Trakofler et al. 2003). (Alternative approaches arguably fare less well in this respect. A more deontological approach, that requires responders to weigh up the ethical principles or values grounding competing courses of action, appears time-consuming and complex by comparison.<sup>20</sup>).

We will presently apply the consequentialist approach to some of the dilemmas of the “[A CBRN Practitioner’s Perspective](#)” section. For simplicity we will focus on problems concerning autonomy. Autonomy is a central concept in moral and political philosophy, a central protagonist in philosophical accounts of personhood, moral agency, human dignity and rights. For present purposes, we may take autonomy to be the capacity of a person to decide, for themselves, upon a course of action, and to follow it through.<sup>21</sup> In normal circumstances, deliberate curtailment of another person’s autonomy is morally unacceptable. In exceptional circumstances curtailments may be justifiable—but then justification should be given.

Autonomy is a recurrent theme across the dilemmas. In §1, commanders contemplate measures to motivate and possibly *force* responders to participate in CBRN response. In §2 and §3, responders must decide whether to prevent parents and the walking wounded from breaking the cordon containing the incident. Similarly in §§6–8, responders contemplate imposing decontamination upon victims against their will—forcing them into situations threatening to their privacy or dignity, or imposing decontamination on the basis of what would, in less urgent circumstances, be considered insufficient warrant. This latter case crosses over into a second related theme—evident in §§4–5—concerning the necessity of taking grave decisions in the absence of either the usual standards of informed consent or the usual criteria for reliable diagnosis.

Consider the situations described in §2 and §3. According to the consequentialist approach to on the spot decision-making, the commander should reason as follows: if more lives will be saved by allowing the person to cross the perimeter than by preventing them, it is better to allow them to cross (and vice versa).<sup>22</sup> More broadly, faced with competing actions *A* and *B*, the basic decision-making procedure runs thus:

- C1. Determine how many lives ( $=x$ ) would be lost by performing *A*.
- C2. Determine how many lives ( $=y$ ) would be lost by performing *B*.
- C3. If  $x$  is greater than  $y$ , perform *B*.
- C4. If  $y$  is greater than  $x$ , perform *A*.

<sup>20</sup> We do not assume that predicting and evaluating the consequences of actions is simple, but do contend that identifying and balancing the ethical principles and values motivating an action is harder.

<sup>21</sup> “Autonomy” is not univocal. Its use in, say, Kant’s moral philosophy (roughly, the capacity of an agent to be subject to a moral law she herself prescribes) differs from its use in contemporary bioethics (where it is bound up with decisional capacity and consent). It can make sense to distinguish autonomy from the related concept *freedom*: autonomy concerns the ability to choose one’s goals or actions, freedom the ability to practically pursue them. This distinction appeals to the difference between an action and the maxim motivating it; yet accounts of autonomy rarely make fully clear the line between the two.

<sup>22</sup> Recall that we are not advocating any particular course of action in the dilemmas.

Of course this procedure raises difficulties. Some of these stem from familiar objections to consequentialist ethics. One might insist on there simply being more to moral decision-making than calculating the number of lives saved (Taurek 1977). Or one might argue that the decision facing the responder is not most accurately described in terms of doing *A* or *B*, but in terms of doing or not-doing *A*—i.e. in terms of the distinction between *doing* and *letting happen*. This distinction is important in “trolley cases” (Foot 1967; Thomson 1985) and, it could be argued, is significant here too: actively restricting a parent or victim’s autonomy by preventing them from breaking the cordon is, all else equal, worse than letting them have their way.

To the extent that these objections target consequentialism in general, they can be passed over (we will return to them in the “Exploring the Alternatives: Incorporating Values” section).<sup>23</sup> A consequentialist decision-making process could deliver morally acceptable decisions even though the moral status of the actions it entails is not ultimately explained in consequentialist terms (Smart and Williams 1973).<sup>24</sup>

One objection to consequentialism in general does translate into an objection to consequentialist decision-making in the extraordinary circumstances imagined in this paper. Lines C1 and C2 require the responder to predict the consequences of actions *A* and *B*. But calculating consequences is far from straightforward, particularly in the midst of a large-scale chemical incident.<sup>25</sup> Hence one problem is that responders may not be able to know what is the optimal course of action.<sup>26</sup>

This problem could play out in a number of ways. It could happen that consequences cannot be estimated to a tolerable level of (epistemic) certainty. The task could simply be too difficult (e.g. if many variables are involved).<sup>27</sup> Moreover, the concept of tolerability raises several questions.<sup>28</sup> How should we decide what is tolerable? Who should decide? Tolerable to whom? Does a tolerable level of certainty correlate with a tolerable level of risk? Alternatively, it could happen that the variables influencing possible outcomes are themselves ethically charged. For example, the assumption that every life has the same value in such calculations is

<sup>23</sup> See also Parfit (1978) for response.

<sup>24</sup> As non-committally as possible: rather than proposing an account of what (ultimately) is the moral course of action, we are proposing an account of how best to arrive at a course of action consistent with morality’s demands. A non-consequentialist could entertain our position *if* willing to accept that an act may be moral even though motivated by a false moral theory (a claim we cannot defend here). A related complication concerns the ethical significance of the interrelations—whatever they may be—between motivation, decision, and action.

<sup>25</sup> Stress impedes competence in judgement and decision-making (Kowalski-Trakofler et al. 2003).

<sup>26</sup> Morton (2007) offers insightful related discussion of difficulties in ranking risks and “choosing how to choose”.

<sup>27</sup> An important issue—into which we cannot enter here—concerns “moral framing”. The way in which courses of action are evaluated will very often vary with the way in which they are presented. In particular, since people tend to be loss averse, framing choices in terms of “lives saved” or “lives lost” is likely to be extremely significant (Sunstein 2007).

<sup>28</sup> These important philosophical and ethical matters are discussed, in different ways, in the papers collected in Lewens (2007).

ethically significant, yet questionable. For even leaving aside the thorny issue of prioritising those with whom one shares a relationship (Taurek 1977),<sup>29</sup> it is certainly true that in other aspects of CBRN response, some people's wellbeing is prioritised, to the inevitable detriment of others. Proponents of the "fair innings" argument advocate the prioritisation of younger people in allocating limited healthcare resources<sup>30</sup>; many organisations advocate prioritisation of healthcare workers and others in critical roles (cf. World Health Organization 2007); and triage involves categorisation, prioritisation, and the possibility of withholding or withdrawing treatment from severely injured victims (Eyal and Firth 2012; Iserson and Moskop 2007a, b). A further, potentially more debilitating possibility, is that responders fail to arrive at *any* decision at all. It could happen that, although consequences can be calculated to a tolerable level of certainty, they turn out to be so similar (i.e. the same number of lives are at stake) that the question of what to do cannot be answered in those terms alone.<sup>31</sup>

The objection can hardly be avoided (though its force is debatable). But in the end, the question is not so much whether it renders the consequentialist approach unworkable in principle, as whether it renders it less workable than any alternative. We will approach the alternatives via the objections we passed over a few paragraphs above. These both turn on the plausible suggestion that there is simply more to ethics than consequences alone.

### Exploring the Alternatives: Incorporating Values

There is, on the face of it, tension between the consequentialist commitment to the primacy of a *single* objective (saving lives) and the evident importance of other ethical values (such as autonomy). Saving lives is obviously important; yet that the dilemmas strike us as such shows that other values vie for consideration. To the extent that the consequentialist approach thinks only in terms of number of lives saved, to the relative exclusion of values such as autonomy, it misunderstands the nature of the dilemmas. To feel the true force of those dilemmas is to acknowledge that no *simplistic* consequentialist approach can suffice: other values demand recognition.

A deontological approach will require responders to explicitly focus on competing values when assessing candidate courses of action.<sup>32</sup> It might represent

<sup>29</sup> Or whether one person (as opposed to any other) could have "agent relative" (Parfit 1984) reasons for acting.

<sup>30</sup> The argument is controversial (cf. Williams 1997; Rivlin 2000; Farrant 2009).

<sup>31</sup> Necessitating a secondary (... *n*-ary) criterion, beyond saving lives.

<sup>32</sup> Though we do not discuss them here, alternative forms of deontological approach could be suggested. Kant's categorical imperative could be formulated as a deliberative decisional procedure (cf. Cranor 2007, 42f), for example. Alternatively, it might be suggested that a deontological approach which takes the principle "save as many lives as possible" as outranking all others is equivalent to the consequentialist approach. The two would likely result in similar decisions in similar circumstances. Consider however that, to the extent that the deontological version adopts "save lives" as an *ethical* principle outranking all others, it is (a) implausible and (b) differs from the consequentialist view in the way it motivates action. If both views motivate an action *A*, the deontological view advocates it on the grounds that *A* is, in and of itself, "maximally life-saving"; the consequentialist view advocates *A* only

the first steps of a responder's decision-making procedure, for a choice of actions *A* or *B*, as follows:

- D1. Determine what values and rights are at stake in performing *A*.
- D2. Determine what values and rights are at stake in performing *B*.

Further steps will depend on the outcomes of D1 and D2.

The deontological approach appears complex; it is no simple task to identify relevant values and rights, determine their respective weights, and balance them. We have focused only on autonomy, but other values are also at stake. The task is rendered more difficult by the acute circumstances of a chemical incident—circumstances a complex ethical decision-making procedure could feasibly aggravate by distracting from other tasks. Moreover, it is arguably unfair to expect responders, operating in extreme circumstances, to accurately and rapidly balance competing values—a task that troubles scholars operating from the comfort of the library. The literature on balancing values and rights is large, sometimes complex, and boasts no widespread consensus. Disagreement persists on what values or rights outrank, or balance, others; on how that balance is best conceptualised; and even on whether the metaphor of *balance* is apt at all. Ronald Dworkin (2002) notes that, where rights are concerned, the appropriate theoretical framework is not *balance* but *justice*; and the same is presumably true of values. Rights and values as “trumps” (Dworkin 1977) effectively shut down the balance metaphor (Waldron 2003), precisely in virtue of *being* rights and values.

If rights and values are trumps, and if at least some of them are genuinely inviolable (*dignity* for instance), then there is a possibility that D1 and D2 will result in the categorical ruling out of *A* and *B* as justifiable courses of action. When fast decisions are needed, this sort of disabling indecision could cost lives.<sup>33</sup> An approach to on the spot ethical decision-making in extreme circumstance ought to meet at least the following two requirements: it should reliably provide, amid the urgencies of the scene, a workable heuristic for comparing competing courses of action; and decisions made with its support should be open to rational justification.<sup>34</sup> We've seen that, in placing a heavy burden on responders, the deontological approach arguably fails to satisfy the first requirement. It now appears to be struggling to meet the second. There is no guarantee that it will, in each application, result in an actionable decision (even if it does yield principled objections to each course of action).<sup>35</sup>

If this is right, the consequentialist approach is the only game in town. But this is now problematic, for we noted above that the ethical dilemmas of the “A CBRN

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Footnote 32 continued

insofar as it *results* in the most lives saved. Whereas, to the extent that the deontological version adopts the “save lives” principle as an *expedient*, it is (a) not genuinely deontological and thus (b) collapses into its rival.

<sup>33</sup> This is obviously to beg the question, for we assume that a life lost is worse than an (almost certainly temporary) affront to dignity. It seems a reasonable assumption though.

<sup>34</sup> As mentioned in the “Consequentialism and on the Spot Decision-Making” section, decisions may not always be the best possible; but the approach should provide a defensible rationale for any decision taken.

<sup>35</sup> A response to this objection is discussed below.

Practitioner’s Perspective” section are premised on the assumption that the saving of lives—whether or not it is *prime*—is not the only relevant value. How are other values to be incorporated into the consequentialist approach?

Rights and values cannot be incorporated into the consequentialist approach as goals or objectives, for this would invite the objections undermining the deontological approach. They can, however, be incorporated as “side constraints” (Nozick 1974).<sup>36</sup> On this modified position, courses of action are still not assessed for the extent to which they respect rights or values, but those rights and values nevertheless establish standards for minimally acceptable courses of action. As Nozick (1974, 29) puts it, “A goal-directed view with constraints added would be: among those acts available to you that don’t violate constraints *C*, act so as to maximize goal *G*”.

The modified consequentialist decision-making procedure will now include a preliminary step, screening courses of action for compliance with constraints:

- C1. Confirm that *A* and *B* are not in breach of relevant constraints (discard if they are).
- C2. (Assuming *A* compliant with constraints): determine how many lives ( $=x$ ) would be lost by performing *A*.
- C3. (Assuming *B* compliant with constraints): determine how many lives ( $=y$ ) would be lost by performing *B*.
- C4. If  $x$  is greater than  $y$ , perform *B*.
- C5. If  $y$  is greater than  $x$ , perform *A*.

As with the deontological approach, the possibility arises that if *A* and *B* are in breach of side-constraints, no actionable decision will be possible. Now as a matter of fact, the deontological approach potentially has a response here. The deontological approach could be taken as endorsing the claim that the consequences of a given action are good or bad, better or worse, in proportion to their tendency to respect or violate certain “core values”<sup>37</sup> or “core rights”.<sup>38</sup> So interpreted, a space opens up in which an individual’s core rights could be violated for the sake of the greater good (e.g. overall respect for core values in society at large). Expounded thus, the deontological approach is distinguished from the modified consequentialist approach, since the latter:

forbids you to violate [core] moral constraints in the pursuit of your goals; whereas the [former] view, whose objective is to minimize the violation of these rights, allows you to violate the rights (the constraints) in order to lessen their total violation in the society. (Nozick 1974, 29)<sup>39</sup>

The problem for a responder employing the deontological approach is that it remains far more complicated than the alternative. Admittedly, it might be made

<sup>36</sup> Kinslaw et al. (2009) make a similar proposal—utilitarianism tempered by other ethical principles as side-constraints—in the related field of pandemic influenza planning.

<sup>37</sup> The phrase “core values” is from Baldwin (1997), who uses it in a slightly different context.

<sup>38</sup> That the deontological approach *could* be so taken does not imply that it *should* be so taken.

<sup>39</sup> Punctuation modified.

simpler by incorporating SOPs for rapidly quantifying and prioritising values. But given the difficulty of arriving at a reasoned prioritisation of core values (let alone consensus), and also considering that this leaves the problem of factoring-in contextual peculiarities entirely untouched, the development of any such SOPs is likely to be of significant difficulty and limited effectiveness. Probably the best one could hope to achieve is to identify a set of core values and rights and a set of absolute minimum standards beyond which any violation is to be deemed utterly unacceptable. But in the end, that is precisely what we are proposing with the modified consequentialist approach. Those core values, rights, and minimum standards should serve as side-constraints, alongside the relatively simple consequentialist decision-making heuristic for on the spot ethical decision-making in extreme circumstances.

## Conclusion

A simple consequentialist approach to on the spot ethical decision-making in extreme circumstances—an approach focussing solely on saving lives (which is a primary assumption underwriting responder SOPs)—provides a goal-oriented heuristic, which responders can be reasonably expected to be able to carry through in stressful conditions. However, the simple consequentialist approach does not adequately reflect the importance of core ethical values and rights (the importance of which is implicit in the fact that the dilemmas of the “[A CBRN Practitioner’s Perspective](#)” section strikes us as quite so difficult). The deontological approach recognises the importance of core values and rights, but abandons responders to unreasonably complex analyses. A workable compromise, we suggested, is offered by the modified consequentialist approach, which factors-in core rights and values as side-constraints. On this proposal, side-constraints set minimum standards beyond which any violation of core rights and values is unacceptable.

It is important to reiterate that what we are proposing here is an approach to handling ethical dilemmas under extreme pressures of circumstance and time. The pressures of CBRN events necessitate fast decisions. Responders are duty-bound to take decisions and to act. To not act at all would be a dereliction of duty. This is why guidance and support on how novel (indeed unique) ethical problems can be broached is essential.

The decision-making procedure we have proposed is far from perfect. We have here sought to motivate it rather than expound it in full detail—future work should address this task. Recognising that a course of action would violate a side-constraint may not be simple; and it is certainly no simple task to attempt to predict the outcomes of courses of action. However these difficulties are probably inevitable in the kinds of circumstances we have described. And on the other hand, the approach offers several advantages.

Firstly, it is decisive: once the initial hurdle of arriving at constraint-compliant courses of action is overcome, the heuristic can be reasonably expected to result in a decision. The approach courts less chance of indecisiveness and inaction than its deontological alternative. Secondly, it is relatively simple in at least the following

sense: values and rights are factored-in at a different level (that of side-constraints) to that at which the judgment of likely consequences is made. This renders the judgement less complex than would otherwise be the case. Thirdly, the approach is flexible in the sense that it could, in theory, be adapted to whatever combination of values the responder organisation deemed most important. We have focused on saving lives as the prime objective, with autonomy and the like functioning as side-constraints. Yet organisations with different priorities could still apply the general approach.

This last point is important because it means that, to some extent at least, training procedures for ethical issues could be fruitfully compared across organisations. The kind of decision-making approach we have outlined could provide a useful framework for carrying out and shaping training activities.<sup>40</sup> Values grounding side-constraints must be decided in advance, but once decided they can be incorporated into SOPs (or new SOPs developed). Ethical training focussed on the operational level can incorporate strategies for identifying actual and potential violations of side-constraints (these are likely to be contextually specific). As far as possible, they might also include strategies for assessing likely consequences of action.

In focussing only on chemical events in the “[A CBRN Practitioner’s Perspective](#)” section, we sidestepped a number of different issues arising in relation to biological and radiological/nuclear events. Indeed even in chemical events, various further dilemmas (not necessarily primarily concerning autonomy) arise—the following, for instance.

**§9. The dilemma of competing ambitions** In the first phase of an incident, different ambitions compete. In order to increase the chances for survival, one should ventilate the affected area as fast as possible. This will increase the dispersal of toxic material. Imagine a chemical incident in a confined environment like a theatre. It is possible to dramatically reduce the level of contamination inside the theatre by using the air-conditioning system to pump fresh air in and suction contaminated air out. However this may result in casualties outside the theatre, as people who would have been unaffected are exposed to contaminated air. On the other hand, shutting down the air-conditioning will contain the incident indoors, protecting people outside, but at a greater risk to those inside. The decision whether to use the air-conditioning system to ventilate, or to shut it down to contain the contamination, has to be taken in the very first moments of the incident, when information is scarce, in many cases conflicting, and the capacity to conduct a thorough risk assessment basically does not exist. Interestingly, many SOPs recommend containing the incident in a smaller area (thus shutting down the air-conditioning in the theatre scenario). Nonetheless the question remains: to ventilate or to contain the contamination?

**§10. The dilemma of full disclosure** Chemical incidents, accidental or malicious, are commonly perceived by the general public as “doomsday scenarios”, associated with dread and mass anxiety. In order to avoid panic, strategic level decision-makers

<sup>40</sup> It would be interesting to investigate whether the training methods and technological decision support systems designed to encourage and improve creativity, flexibility, and improvisation in operational aspects of disaster and emergency response can be straightforwardly adapted to improve ethical decision-making.

may choose to avoid releasing certain information until sufficient scientific evidence (e.g. identification of the substance/agent) is available. The fact that a chemical attack has occurred will have major political implications. Communication strategies needs must, therefore, be an integral part of CBRN planning. How are the strategic and political objectives of commanders and their superiors to be balanced with the basic needs and expectations of citizens to be informed about major events affecting their lives?

Developing strategies for responding to these kinds of problems will involve expanding and deepening the approach we have sketched above.<sup>41</sup> This exploratory paper has appealed to the expertise of an experienced CBRN professional. But future work should seek to expand the empirical base, taking in psychological research into decision-making under stress and time-pressure, cognitive studies of moral judgement, survey-based studies of ethical issues and decision-making in disaster management, analyses of training methods, and of course, ethico-philosophical investigation.

It does not follow from any of this that “ethical experts”—however one might decide who these are—should be involved in the management of the actual response operation. But, as a large-scale chemical incident is one of the more traumatic events a society can suffer, and will be associated with high rates of mortality and morbidity, a thorough discussion of ethical issues in advance of their arising can serve at least the following goals: first, to promote the inclusion of ethical considerations alongside technical requirements and priorities; and second, to support emergency responders in ethical decision-making. An optimal strategy will depend on interdisciplinary work and collaboration between theorists and practitioners. This paper is a contribution to that effort. As ever, more work is required.

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<sup>41</sup> Further study is required to begin to understand how the heuristical approaches discussed in this paper can be aligned with the recognised need for creativity and innovation. Sunstein (2007) suggests that heuristical moral judgements about risks are often questionable. Can such judgements be conceived of as failures of creativity? In disaster response, failures of creativity can result in responders forcing unique situations into forms with which they are more comfortable, but which simplify and blunt sharp details (Mendonca et al. 2001; Weick 1993). Discussing risk, Morton (2007) argues for the importance of certain—frequently underrated—creative virtues implicated in our capacities to judge well: “we often frame questions about decision-making as if people were faced with a set of options, over whose composition they have no control, from which they must choose. But in fact we *search* for options, digging out facts and using our imaginations” (p. 97). This is highly resonant with the disaster management literature on creativity, innovation, and role improvisation (Kreps 1991; Mendonca et al. 2001; Kendra and Wachtendorf 2002, 2006; Webb et al. 1999; Webb 2004; Mendonca and Fiedrich 2006). Morton (2007, p. 97) continues: “The main focus of advice concerning risk should be not how to compare the options that you have but what sorts of options to search out before comparing them.” A question to be addressed is whether this is feasible amid the extreme urgency of disaster situations.



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