COMMENT

Fighting science denial

Critical Point Fighting science denial

Ahead of this autumn's US presidential election, **Robert P Crease** proposes five ways to encourage a responsible discussion of scientific issues

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At peril Climate change, food technology, health and energy are four areas affected by science denial.

Fidel Castro – that acerbic critic of anything American – once said that he liked the movie *Jaws* because it shows the inevitable consequences of the corruptions of capitalism. The former Cuban president was surely thinking of the scene in the film where oceanographer Matt Hooper, played by the nerdy Richard Dreyfus, realizes that a mangled woman's body is evidence of a shark prowling the waters and tries to persuade the local mayor to close the beaches. The mayor, however, insists the beaches must stay open because shutting them will be expensive, and the mangled body is probably a boating accident. We know what happens next.

The scene is frightening – I find it more terrifying than the gory bits with sharks – because it shows that science denial is not the product of irrationality or scientific illiteracy. The mayor, a town native, knows full well what sharks do, but wants to protect the financial interests of the citizens who voted for him and so uses the boating-accident scenario as justification.

I am aware that "science denial" is a loaded and politicized term because it doesn't refer to the outright rejection of all science, but only certain areas where political, economic and religious interests come into play, notably climate change, energy, food technology and health. But this is Castro's point: when the going gets tough, capitalists turn into self-interested opportunists.

Until recently, most scientists I know viewed science denial like crime: it's an unfortunate side of modern life, but one that's tolerable at low levels. Things have changed though. It's not just about disease-healing amulets and character-predicting zodiac signs any more. Here in the US, science denial has entered federal and state policy-making in ways that threaten public safety.

In 2012, for instance, the North Carolina legislature passed House Bill 819 – a law prohibiting the use of models of sea-level rise to protect people living near the coast from flooding. Formulated in response to a report by the science panel of the state's coastal-resources commission, which predicted a substantial sea-level rise by the end of the century, the law reflected fears that the report would harm tourism and property values. Bills have also been introduced in the US Congress to stop politicians from using science produced by the Department of Energy in policies – evidently to avoid admitting the reality of climate change (so far these bills have failed).

In 2012, meanwhile, Congressman Paul Broun of Georgia, who is a medic by training, said that evolution, embryology and the Big Bang theory are "lies straight from the pit of hell", adding that he believed the world was about 9000 years old. Broun was not only re-elected after making these remarks, but also retained on the House committee on science, space and technology, where he made decisions on non-defence R&D affecting his Georgia constituents as well as millions of other US citizens.

So is science denial really the inevitable by-product of capitalism? As the US gears up for the forthcoming presidential election, it seems that many US politicians from all sides of the political spectrum are determined to prove the former Cuban leader right. To deal with the problem of science denial, I believe that we need both long-term solutions and short-term strategies. And as science denial affects issues that are dire and immediate, I have drawn up five short-term strategies that should immediately be put into effect.

1. Force commitment

During the last US presidential election, I discussed the fashion for candidates to sign pledges to show their commitment to specific positions on abortion, taxes and gay marriage (January 2012 p19). My first anti-science-denial strategy is to adopt and extend that idea.

Take evolution denial. The president of my university, who is an epidemiologist, likes to say that microbes and viruses are "evolution in motion". Outbreaks of new plagues and viruses mean that a legislator's belief in evolution, and thus in the value of studying it, is a public-health issue. At debates and press conferences, evolution-denying politicians should therefore be asked to sign (or explain why they will not sign) an anti-evolution pledge: "I pledge that I will not use, nor let my constituents use, any medication whose development depended on evolution or evolutionary theory."

Similar pledges can be crafted to test the sincerity of other science-denying politicians, including anti-vaccination activists and climate-change deniers. The latter should be required to sign (or explain why they will not sign) a pledge to take no action to protect their or their constituents' properties against rising sea levels and other effects of climate change. Donald Trump, for instance, has said that climate change is "bullshit", "pseudoscience" and "a total

hoax". Yet, as *Politico* reported, he has applied for permission to erect a sea wall to protect one of his golf courses in Ireland from rising seas due to "global warming and its effects". Such a pledge would expose that action not as a mere business decision but as a betrayal of his would-be constituents.

2. Expose values

Civilizations have long used scientific methods to understand our world and discover tools to ward off threats, be they vaccinations to tackle disease or foodstuffs to prevent hunger. Whether and how to use these tools is a legitimate topic of political discussion, but politicians who try to stop ordinary citizens from having such tools at all are behaving, in a way, like people who don't think citizens have the right to defend themselves. Many science deniers in the US also happen to believe that the right to use weapons in self-defence is a fundamental American value. So in seeking to prevent citizens from using scientific methods to protect themselves, many science deniers in the US are, perversely, betraying their own values.

Here's an even more incendiary comparison: US politicians who attack science are like so-called Islamic State militants who bulldoze archaeological treasures and smash statues. I'm deliberately being over the top – but by how much? Science is a cornerstone of Western culture, not only to ward off threats but also to achieve social goals. In seeking to destroy those tools, science deniers are like ISIS militants in that they are motivated by higher authority, believe mainstream culture threatens their beliefs, and want to damage the means by which that mainstream culture survives and flourishes.

If anything, ISIS militants are more honest because they openly admit that their motive is faith and ideology, while Washington's cultural vandals do not. It's disingenuous, prevents honest discussion of the issues, and falsely discredits and damages American institutions. At debates and press conferences, I think such politicians should be asked: "Explain the moral difference between ISIS militants who attack cultural treasures and politicians who attack the scientific process." How they respond will reveal much about their values and integrity.

3. Engage in comedy and ridicule

The magician James Randi once exposed a popular televangelist by playing recordings of secret transmissions between an audience plant and the televangelist; the televangelist declared bankruptcy the next year. The incriminating evidence against science denial is rarely as direct and dramatic because science deniers muddy the waters with cherry-picked data, fake experts and uncertainty. But comedy is often as effective in revealing the dynamics.

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A *Doonesbury* cartoon strip, for instance, once featured an "honest" science denier interviewed on a radio talk show. "I don't oppose sound climate policy because it's flawed," he says. "I oppose it because I care much more about my short-term economic interests than the future of the damn planet. *Hello?*" Comedy's ability to be transparent and say unpleasant truths invites trust – one reason why a Pew Research poll of public trust of news sources ranked TV's the *Daily Show* higher than the *Economist*. Comedy can also expose opportunism masked as sceptical science.

4. Proliferate parables

A fourth strategy is to tell parables involving science denial. A parable, like an Aesop's fable, is a real or fictional story with a built-in moral that can easily be grasped. It is an effective teaching approach. After all, most people learn more easily through stories than data. *Jaws* is a famous modern example. Another is Henrik Ibsen's play *Enemy of the People*, in which the doctor of a small town whose livelihood depends on its spa discovers that waste from a local tannery is injecting deadly bacteria into the spa's waters. Yet the doctor can't even make himself heard at a town meeting he arranges and is libelled, accused of conspiracy and fired. These powerful parables expose the all-too-rational calculus of science denial. We need 21st-century Aesops to tell more memorable stories of what happens when we wish away sharks.

5. Initiate prosecution

A final strategy is to prosecute science deniers. Last year, US senator Sheldon Whitehouse of Rhode Island proposed that organizations bankrolling campaigns of climate-science disinformation should be investigated for possible violation of federal law. The law in question prohibits "racketeering" – a type of fraudulent business activity that includes conspiracy to deceive the public about such things as risk. Such laws have, for example, been successfully used to prosecute tobacco companies for misleading the public about the hazards of smoking.

I think that the proposal is a great idea. What's the difference between endangering the public by hiding evidence that smoking is hazardous and endangering the public by concealing evidence of climate change? The crime is like shouting "Stay put! Everything's OK!" in a burning store so that people carry on shopping. Some might say that prosecuting science deniers is censorship and a denial of free speech, but if being misleading and deceptive about serious hazards isn't a crime, it should be.

We should legally target those who seek to block scientific information from being used to protect life and property. With the displacement of people due to global warming already starting, we need to prosecute people who disrupt our ability to use the knowledge we have to develop solutions. They should be forced to pay for the damages, both personal and financial.

The critical point

Science denial, I think, is one of the most important issues of the current US presidential campaign. I rank it even higher than key social issues such as gay marriage and transgender bathrooms; anyway, the former is settled and the latter on the way. Science denial is more important even than energy and foreign policy, because poor choices will inevitably be made if scientific information is not incorporated into such decisions.

These five strategies involve taking more aggressive steps than scientists are used to. But explaining yet again the importance of science in addressing crises has not been sufficient. Fighting science denial is not just for scientists and educators, but for lawyers, comedians, storytellers and other citizens. We need to call people out – for irresponsibility and for betraying values, and even for the legality of their behaviour. These five strategies will not eradicate science denial. But doing all of them all of the time might help to prevent politicians who practise it from getting elected.

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