Convincing a sceptical public: The challenge for public health

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Abstract:

Public health communications are an everyday occurrence. Notwithstanding the frequency of these communications, compliance with them and the recommendations they contain is often limited. In this chapter, it is argued that one of the reasons for poor compliance is the failure on the part of experts to construct public health messages that accord with the rational resources of the public. For this to be achieved, experts must develop a better appreciation of the reasoning strategies that lay people use to assess risks to their health. This chapter presents an extended theoretical discussion of how one set of strategies in particular, a group of cognitive heuristics based on the informal fallacies, has the potential to facilitate decision-making about public health issues (Cummings, 2014a, 2015a).

Among the informal fallacies, the argument from ignorance plays a particularly central role in public health communication. A comparative analysis is undertaken of the use of this argument in the public health communications issued by the Department of Health in Hong Kong and Public Health England in the UK. It is argued that there are qualitative differences in the use of the argument from ignorance across these two contexts. These differences influence the way in which the argument is rationally evaluated in these two public health contexts. Specifically, the public in Hong Kong is encouraged to reflect on epistemic conditions that are integral to the rational warrant of this argument. These conditions are less often acknowledged by public health agencies in the UK. Greater rational evaluation of these conditions, it is argued, leads to better decision-making in matters relating to public health.

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Key words: argument from ignorance; cognitive heuristic; informal fallacy; public health communication; reasoning

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1. Introduction

Public health information pervades our environment. Every day of our lives, we are given advice on how to lead healthier lifestyles to prevent cancers, strokes and heart disease, reduce the risk of spreading and contracting infectious diseases, and avoid behaviours such as illicit drug use, smoking, and excessive alcohol consumption. Public health messages may be all around us. Yet, public compliance with the content of these messages continues to decline. This is reflected worldwide in growing obesity rates and rates of sexually transmitted infections and increasing levels of harm associated with alcohol and tobacco consumption despite sustained public health campaigns (Ng *et al.*, 2014; WHO, 2014; Newman *et al.*, 2015; Arroyo-Johnson and Mincey, 2016). There are many reasons for this lack of compliance with public health recommendations. Perceived failures on the part of public health agencies to contain infectious disease outbreaks (e.g. Ebola), and to offer consistent advice on the health risks associated with certain lifestyle choices (e.g. alcohol consumption) and types of foods (e.g. salmonella in eggs) have eroded public trust in these agencies (Cummings, 2014b) (see Ward (2017) for discussion of trust in public health). Another reason for poor compliance is the perception of commercial conflicts of interest on the part of public health agencies. These agencies, it is claimed, promote the widespread use of products such as vaccines that are produced by a pharmaceutical industry motivated by profit over the health of populations (Cummings, 2005; Lenzer, 2016).

In this chapter, I argue that there is a further, and possibly more fundamental, reason why members of the public display poor compliance with public health recommendations. That reason concerns a failure on the part of public health agencies to devise health messages that accord with the rational resources of the public. To address this issue, we must develop a better appreciation of the rational resources that members of the public use to assess risks to their health. For too long, there has been a widespread belief that these resources consist exclusively of some type of deductive or inductive logic, and that improved decision-making about health is only possible when the public is versed in principles of deduction and induction. That deduction and induction can seem like the only contenders in health reasoning is evident in comments by Mosley-Jensen and Panetta (2017). These authors state

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that “health professionals and the public puzzle through new or controversial issues by deploying patterns of reasoning that are found in a variety of social contexts”, but then go on to add that “deductive and inductive reasoning have been the most widely studied patterns in the disciplines of communication, philosophy, and psychology”. It is now urgent that we move beyond the dichotomy between deduction and induction in reasoning and begin to look to other forms of reasoning to explain the rational judgements that people make when they engage in deliberation about health (see Christakos *et al.* (2005) for the use of different modes of reasoning in public health).

To this end, I have argued for some time that there is a group of arguments known as the informal fallacies that may prove to be beneficial for our purposes (Cummings, 2010, 2015a). These arguments include some well-recognised names such as slippery slope argument, begging the question, and straw man argument as well as some lesser known examples like expert appeal and the argument from ignorance. The forms of reasoning that these arguments represent are, I believe, something of a hidden gem in logic. However, it should be emphasized that these arguments have not always been held in such high regard. Indeed, until the late 20th century, many philosophers and logicians viewed these arguments with disdain and contempt. The standard view was that begging the question or using a straw man argument were aberrations of logic that all ‘right-thinking men’ should be disposed to avoid. But a more positive conception of these arguments does exist (e.g. Walton, 2008) and will be developed in this chapter. Specifically, it will be contended that the informal fallacies are an unexplored rational resource that has the potential to reveal new modes of reasoning of relevance to health.

As the term ‘fallacy’ suggests, informal fallacies are typically characterized as bad, weak, or fallacious forms of reasoning or argument. The term ‘informal’ indicates that the flaw or error in each case cannot be characterised by means of formal or deductive logic. This latter point requires some expansion. When I reason that the radiator is leaking because water is on the floor, my reasoning is based on a deductively valid inference called *modus ponens*:

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Modus ponens inference:

PREMISE: If water is on the floor, then the radiator is leaking.

PREMISE: Water is on the floor.

CONCLUSION: The radiator is leaking.

If I then reason that because water is not on the floor, the radiator is not leaking, I have committed a logical flaw or error called *denying the antecedent*. The rules of formal (deductive) logic prohibit this form of reasoning, relegating it to the group of arguments logicians call 'formal' fallacies:

Denying the antecedent:

PREMISE: If water is on the floor, then the radiator is leaking.

PREMISE: Water is not on the floor.

CONCLUSION: The radiator is not leaking.

However, there are no rules or principles in deductive logic that prohibit a person from using the conclusion-to-be proved as a premise in argument (the flaw in begging the question) or using the negative consequences of an action to reject acceptance of a claim (the flaw in slippery slope argument). Because these purported errors of reasoning cannot be prohibited by the principles of *formal* logic, they are described as *informal* fallacies. But, as I will argue in this chapter, when viewed in their actual contexts of use, the informal fallacies are anything but fallacious. Instead, they are an effective rational resource that can confer many benefits on our thinking and reasoning. These contexts arise when there is a lack of knowledge or evidence on which to base a conclusion in reasoning. This is, in fact, the situation that confronts most members of the public when they are required to come to judgement on a complex health issue about which they lack knowledge.

This chapter will focus on one informal fallacy, the so-called argument from ignorance. This argument embodies the lack of knowledge that attends much health deliberation in that an arguer reasons from a lack of knowledge or evidence that *X* is true (false) to the conclusion

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that *X* is false (true). The logical and epistemic features of this argument are examined in two public health contexts. The contexts in question are the press releases of the Department of Health in Hong Kong and Public Health England in the UK. These releases are hosted on the websites of these agencies and were searched during October 2018 using the single search term 'no evidence'. The ten extracts from these releases examined in section 3 have been chosen to exemplify certain logical points and are not intended to fulfil sampling criteria. It will be argued that by variously emphasizing and suppressing logical and epistemic features of the argument from ignorance, these agencies can lead the public to engage in systematic versus heuristic reasoning about public health issues. Qualitative differences in the use of the argument from ignorance by these public health agencies reflect two distinct approaches to public health communication, and two opposing views of the role of the public in this communication. It is concluded that a form of public health communication that views the public as a rational agent is more likely to be met with compliance and improved public health outcomes.

2. Arguing from ignorance: logical and epistemic features

It might strike readers as strange, to say the least, that anyone should promote the use of ignorance in reasoning. After all, ignorance is something that we almost invariably characterize in negative terms and that we go to considerable lengths to avoid. But our dismissal of ignorance has also caused us to overlook the powerful contribution that this concept can make to cognitive deliberations such as reasoning. This is nowhere more clearly demonstrated than in the argument from ignorance. When we argue from ignorance, an absence of knowledge or evidence is used as grounds for accepting that a claim is true (or false). By way of illustration, consider the following argument from ignorance. It was used during the bovine spongiform encephalopathy (BSE) epidemic that devastated British cattle in the 1980s and 1990s (Cummings, 2010). 'Scrapie' in the premise of this argument is a brain disease in sheep:

There is *no evidence* that scrapie has transmitted to humans.

Therefore, scrapie has *not* transmitted to humans.

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This is a rationally warranted use of the argument from ignorance. What makes the *lack of evidence* that scrapie had transmitted to humans strong grounds on which to conclude that scrapie had *not* transmitted to humans? The rational warrant of this argument derives from its satisfaction of two epistemic conditions. The first condition is a *closed world assumption* (what Walton (1995), following de Cornulier (1988), calls *epistemic closure*). By the time BSE emerged in British cattle, there was already a well-developed knowledge base on scrapie, a transmissible spongiform encephalopathy (TSE) in sheep which early epidemiological studies suggested may be the cause of BSE in cattle. Public health officials were eager to use the fact that scrapie had never transmitted to humans as grounds for claiming that BSE posed no risk to human health – BSE, it was argued, would behave like scrapie and not transmit to humans. The reason that investigators could be confident that scrapie had not transmitted to humans (even if they could not be confident that BSE would behave similarly) was that extensive epidemiological investigation conducted over many years had failed to find any evidence that transmission had occurred. One study in particular, by Brown *et al.* (1987), had failed to find any evidence that scrapie had transmitted to humans. This epidemiological study investigated if there was a link between scrapie and Creutzfeldt-Jakob disease (CJD), a TSE in humans, over a 15-year period in France. British scientists also had extensive knowledge of scrapie which had been entering the human food chain in contaminated sheepmeat for some 250 years by the time BSE first emerged in cattle (BSE Inquiry Report, Volume 2, 2000). In short, scrapie and its possible transmission to humans had been so thoroughly investigated by 1987 that scientists could confidently claim that if transmission were occurring, then they would know about it. The closed world assumption was satisfied in this case:

Closed world assumption: All information that is relevant to a domain *D* of knowledge is present in a knowledge base *B*.

The knowledge base in this case was scrapie and what was known about its transmission to other species, most notably humans. But the closed world assumption on its own cannot ground the conclusion of an argument from ignorance. This assumption must work alongside

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another epistemic condition known as *exhaustive search*. This condition requires that an exhaustive search be conducted of all the contents of the knowledge base. When this search is perfomed in a comprehensive and systematic way by individuals who have expertise in the domain in question, then the exhaustive search condition is fulfilled. Alongside conducting a 15-year epidemiological study of scrapie and CJD in France, Brown and his colleagues also conducted a review of the world literature. This review was comprehensive and systematic in that all relevant epidemiological studies were scrutinised according to rigorous scientific criteria. The satisfaction of an exhaustive search condition gave scientists further grounds for claiming that scrapie had not transmitted to humans:

Exhaustive search: An exhaustive search is conducted of all information in a knowledge base *B*. The search is comprehensive in scope and is conducted in a systematic manner.

With both epistemic conditions fulfilled, there was every reason for scientists and others to conclude that scrapie had not transmitted to humans on the ground that there was no evidence of its transmission. A lack of knowledge of transmission was a rationally warranted basis on which to conclude that transmission does not occur. But not every use of the argument from ignorance during the BSE epidemic had the same claim to rational warrant. There were many other uses of the argument that were examples of bad or fallacious reasoning. A prominent instance in which the argument was used fallaciously is shown below:

There is *no evidence* that BSE is transmissible to humans.
Therefore, BSE is *not* transmissible to humans.

Although this argument has the same logical form as the scrapie argument before it, it is not a rationally warranted argument. To understand why this is the case, we need to consider the context in which it was used. Government ministers and public health officials made frequent use of the statement that forms the premise of this argument from the earliest months of the BSE epidemic (see Table 1.1). In fact, use of this statement was so widespread by those charged with protecting the public's health that it was described by Lord Phillips, the chairman

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of the public inquiry into BSE, as the 'mantra' of the BSE affair (Cummings, 2011). Officials and government ministers knew that by producing this statement, they could encourage members of the public to draw the conclusion that BSE is *not* transmissible to humans. This conclusion might then reassure the public that BSE would pose no risk to human health. But this 'reassuring' conclusion was also a rationally unwarranted one. In the weeks and months after BSE first appeared in British cattle, there were no grounds for believing that the knowledge base on BSE was closed. In fact, investigations into this new disease were just beginning, with everything from its causal pathogen to host range and routes of transmission still unknown. In the absence of a knowledge base on BSE, the first epistemic condition on the rationally warranted use of the argument from ignorance did not hold. There was no *closed world assumption* in relation to BSE. Also in the absence of a knowledge base on BSE, the second epistemic condition did not obtain. If there was no knowledge base on BSE, then *a fortiori* there could be no *exhaustive search* of this base. With neither epistemic condition in play, there were no rational grounds to support the above argument from ignorance.

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Human health and *no evidence* statements

When BSE first emerged in British cattle in 1986, *no evidence* statements became the mainstay of repeated reassurances by government and health officials that the new disease posed no, or only a remote, risk to human health. Mr John Suich worked in the Animal Health Division of the Ministry of Agriculture, Fisheries and Food between 1986 and 1989. He was responsible for notifiable and other diseases. On 15 October 1987, Mr Suich circulated information in Question and Answer form to enable press officers and others to answer questions about BSE (BSE Inquiry Report, Volume 3, 2000: 123). On the central question of the risk that BSE might pose to human health, press officers were advised to respond as follows:

Q. Can it be transmitted to humans?
A. There is no evidence that it is transmissible to humans.

By issuing this *no evidence* response, press officers intended the public to draw the negative inference that BSE is *not* transmissible to humans. Clearly, many members of the public drew exactly this inference and were reassured by it. But this was a rationally unwarranted use of the argument from ignorance. BSE had only been formally identified 10 months earlier in December 1986 by the Central Veterinary Laboratory in the UK. The closed world assumption could not possibly be satisfied in such a short period of time.

Table 1.1: *No evidence* statements in the BSE epidemic

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It emerges that the argument from ignorance is not inherently fallacious, as traditional logicians and philosophers would have us believe (Locke, 1959 [1689]; Robinson, 1971). Rather, it can be more or less rationally warranted depending on whether the epistemic conditions described as *closed world assumption* and *exhaustive search* are fulfilled (Walton, 1995, 1999). That people are aware of these conditions and can make judgements about them is evident in at least two ways. First, a study of 879 members of the public showed that lay people are adept at evaluating the epistemic conditions associated with use of the argument from ignorance (Cummings, 2014a, 2015a, 2015b). When these conditions were not fulfilled or were fulfilled only partially, participants tended to reject arguments from ignorance that were based on them. They readily accepted these arguments when they believed that a knowledge base was closed and had been exhaustively searched. These evaluative judgements were not only evident in the quantitative performance of participants, but also in the qualitative comments that participants expressed in relation to the test scenarios in the study. Second, people can use, and understand the significance of, a range of linguistic markers that increase the salience of the epistemic conditions examined in this section. For example, expressions such as *at this stage*, *currently*, and *to date* remind us that a closed knowledge base is only ever closed at a certain point in time and may very quickly have to be reopened if new evidence emerges. The conclusion of an argument from ignorance is defeasible and may have to be overturned if circumstances change (Hinton, 2018). These linguistic markers are an important reminder of this fact. Their logical and epistemic character will be examined in the rest of this section.

One of the ways in which people can be hoodwinked into accepting the conclusions of weak arguments from ignorance is to downplay or suppress the two epistemic conditions that we have examined in this section. If the proponent of a weak argument from ignorance can encourage the recipient of the argument to overlook these conditions, then it is more likely that a weak argument will pass undetected and its conclusion will be accepted. Conversely, if these conditions are made more salient for the recipient through the use of linguistic markers, then we may expect these conditions to hold some logical sway in the recipent's decision to accept or reject the conclusion. When the BSE argument from ignorance was used extensively

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by government ministers and health officials in the wake of the emergence of BSE, it was asserted categorically with the aim that the public should conclude that BSE is *not* transmissible to humans. A multi-million pound beef and dairy industry was at serious peril if the public lost confidence in the safety of British beef products. Some form of immediate and definitive reassurance was needed to avoid this adverse outcome. A categorically asserted argument from ignorance appeared to fit the bill perfectly. Let us consider what this same argument might look like if it had been uttered by a different proponent. This proponent might be less concerned to protect commercial interests, and might be more interested in encouraging the public to participate in a rational evaluation of the potential risks of BSE to human health. To this end, a *no evidence* statement such as the following may be used:

There is *no evidence* currently that BSE is transmissible to humans.

The addition of the adverb *currently* in this statement is significant in the following respect. The inclusion of this linguistic marker has the effect of blocking the inference to the conclusion that BSE is *not* transmissible to humans. When presented with this statement, the public would rightly conclude that it was not possible to state if BSE is or is not transmissible to humans on the basis of the limited knowledge base on this new bovine disease that existed in the late 1980s. The closed world assumption that this marker made salient would be assessed by the public and would be found to be wanting. No conclusion about BSE's transmissibility to humans was possible given the incomplete state of knowledge of BSE that existed at this time. Clearly, this conclusion was neither politically expedient for government ministers or commercially desirable for the beef industry. However, it was a conclusion that would have reflected the public's engagement in a process of rational evaluation of the risks that BSE might pose to human health.

It emerges that linguistic markers can alter the salience of the epistemic conditions that are central to a rational evaluation of the argument from ignorance. Markers like *currently*, *at this stage*, and *to date* alert the recipient of the argument to the fact that a knowledge base may only be partially developed, or may be complete at a certain point in time but may have to be

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reopened as new findings and evidence emerge. In neither of these scenarios would a rational public be inclined to accept a claim about disease transmission or any other serious health issue on anything but a tentative basis. Still other markers can increase our confidence that a knowledge base is truly complete. If we learn that there has been *no evidence* that disease *X* in cattle has transmitted to humans *since 1970* when it first emerged, then we can be reasonably certain that the closed world assumption is satisfied in this case and that a claim based on this assumption is rationally warranted. The lapse of 50 years is sufficient time in which to establish transmission to humans. So if transmission were occurring through either direct contact with cattle or consumption of beef and other bovine products, then we would presumably know it. The knowledge base on *X* can be considered complete to all intents and purposes, so that any claim that is not part of this base may be judged to be false. The extensive time period represented by the linguistic marker *since 1970* is the warrant we need to treat the knowledge base as complete. In the next section, we will examine how linguistic markers are used in the *no evidence* claims of public health agencies in Hong Kong and the UK. It will be argued that significant differences in the use of these markers reflect two different conceptions of how public health communication should be conducted.

3. Arguments from ignorance in public health

The *no evidence* statements that form the premise of an argument from ignorance are used extensively in public health. It is not difficult to see why this is the case. When they assess health risks and recommend protective actions, public health agencies are guided by the best available evidence. Quite often, the best available evidence indicates that a statement or claim is either true or false. So it is true that HIV is a viral infection that can be transmitted through sexual intercourse. But let us imagine it is June 1981 and we are reading the first report of what were later known to be cases of AIDS in the *Morbidity and Mortality Weekly Report* (Centers for Disease Control, 1981). The new disease that is described in this report has no identifiable causal pathogen. Under these circumstances, only an imprudent scientist with disregard for evidence would state that the new disease is a viral infection. A more cautious approach would be to state that there is currently *no evidence* that the new disease is a viral infection. Appeals to *no evidence* are a scientifically responsible way of framing claims

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when there is insufficient evidence to settle a matter one way or the other. But there is another context in which *no evidence* statements are used in public health. This context arises when an investigation or an inquiry has been conducted and a statement is produced that summarizes its findings. In this scenario, a large amount of evidence is available and is systematically examined. A statement of *no evidence* then leads us to conclude that a particular claim is false. It is this second use of *no evidence* statements that is most closely associated with the argument from ignorance. Examples of this second type of *no evidence* statement are shown below. They are taken from the press releases of the Department of Health in Hong Kong and Public Health England in the UK:

(A)

Title	Investigation into unsatisfactory water samples from aircraft completed
Source	Press release, Department of Health, Hong Kong, 6 July 2015
"The investigation of this incident has been completed. There is **no evidence** to suggest a contaminated water source at the water filling points of the airport. However, the trace amount of coliform bacteria detected earlier in the two water samples from water tankers of Hong Kong Aircraft Engineering Company Limited and Pan Asia Pacific Aviation Services Limited suggested a suboptimal standard of water quality, which may likely be related to the hygienic conditions of the water tankers. No pathogen or coliform bacteria were detected in the post-disinfection water samples from these two tankers", the spokesman said."	

(B)

Title	Bacillus cereus infections: 1 July 2014
Source	Press release, Public Health England, UK, 1 July 2014
"Gerald Heddell, the Medicines and Healthcare products Regulatory Agency's Director of Inspection, Enforcement and Standards, said: "There is **no evidence** to suggest that individual ingredients, components or materials used for the manufacture of Total Parenteral Nutrition (TPN) on 27 May 2014 were the cause of the contamination. However, what we do know from our investigation is that the strain of Bacillus cereus which infected the babies has also been identified at ITH Pharma's manufacturing facility and within some of the unopened TPN supplies manufactured on the 27 May 2014.""	

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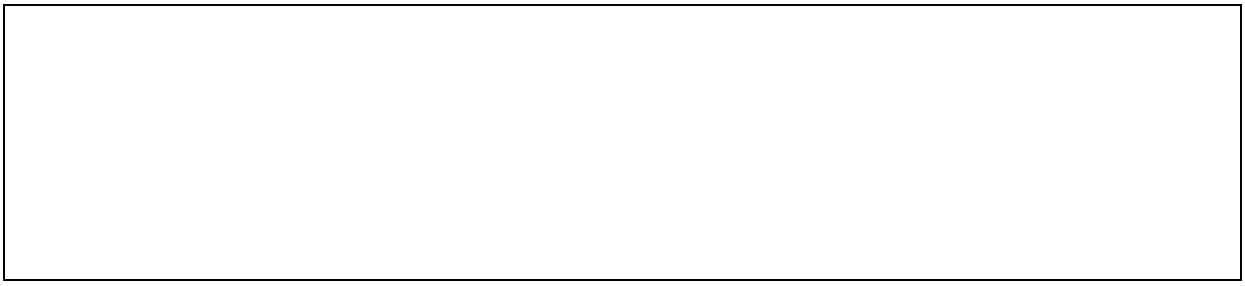

The *no evidence* statements in these press releases constitute the conclusions of two public health investigations, one (A) into water quality in aircraft at Hong Kong International Airport, and the other (B) into the source of contamination of Total Parenteral Nutrition (TPN) for babies. These investigations were comprehensive and systematic in that they reviewed all available evidence relating to water quality and the source of TPN contamination. The two epistemic conditions that must obtain for an argument from ignorance to be rationally warranted – closed world assumption and exhaustive search – are both satisfied by the investigations conducted by these public health agencies. The conclusions of the following arguments from ignorance are therefore rationally warranted:

(A_1)

There is *no evidence* that the water filling points at the airport were contaminated.

Therefore, the water filling points at the airport were *not* contaminated.

(B_1)

There is *no evidence* that individual TPN ingredients, components or materials were contaminated.

Therefore, individual TPN ingredients, components or materials were *not* contaminated.

In the absence of linguistic markers, the inference to a negative conclusion from the *no evidence* premise in each of these arguments is effectively automatic. There is a default inference in operation in the absence of these markers – if the closed world assumption and exhaustive search conditions are satisfied, then it can be automatically inferred that *X* is *not*

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the case. In order to override this default inference, one or more linguistic markers must be used. The effect of these markers is to make the closed world assumption and exhaustive search conditions highly salient so that they become the focus of greater critical scrutiny than might otherwise be the case. Under these circumstances, an incomplete knowledge base or a knowledge base that has only been partially searched is more likely to be discovered and exposed. When this occurs, the inference to a negative conclusion is blocked. To illustrate, consider the following extract from a press release from Hong Kong's Department of Health:

(C)

Title	Control of infectious diseases in prisons satisfactory
Source	Press release, Department of Health, Hong Kong, 21 April 2008
"In response to media enquiries, the Department of Health reiterates it, together with the Correctional Services Department, achieve satisfactory control of tuberculosis (TB), human immunodeficiency virus (HIV), and other infectious diseases in prisons […] The apparently excess prevalence of TB and HIV among prisoners as compared with the general population in Hong Kong is attributable to major high-risk groups that contribute the prison population, e.g., illegal immigrants and drug addicts. It is not due to transmission of these infections in the prison. There is **no evidence** from available records to indicate there has been any outbreak of TB and HIV in the prison affecting multiple persons."	

The linguistic marker *from available records* in the *no evidence* statement in this extract has the effect of making the closed world assumption particularly salient. We are forced to consider if the knowledge base on outbreaks of TB and HIV in Hong Kong's prisons is complete. We may decide that record-keeping and infectious disease monitoring are conducted in a robust fashion in the prison system in Hong Kong and that the available records are likely to be complete. In this case, we may reason in accordance with (C_1) below. But we may also judge that this linguistic marker introduces sufficient uncertainty about the completeness of this knowledge base that we are inclined to reject the conclusion of (C_1) – the inference to this negative conclusion is blocked:

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(C_1)

There is *no evidence* from available records that there have been outbreaks of TB and HIV in Hong Kong's prisons.

Therefore, there have *not* been outbreaks of TB and HIV in Hong Kong's prisons.

It is noteworthy that the Department of Health in Hong Kong makes extensive use in its press releases of arguments from ignorance in which default inferences to a negative conclusion are blocked by linguistic markers. These arguments occur only rarely in the press releases of public health agencies in the UK. Consider the *no evidence* statements in the press releases in (D) to (J) below:

(D)

Title	Update of influenza situation
Source	Press release, Department of Health, Hong Kong, 23 April 2008
"The Centre for Health Protection (CHP) of the Department of Health received two reports of outbreaks of influenza-like illness today involving a primary school and a residential home for the disabled, affecting a total of 10 people […] An eleven-year-old boy passed away in Prince of Wales Hospital this morning. A spokesman for the CHP said the boy was admitted to the hospital on April 17 because of convulsion and fever. Preliminary examination of the boy's respiratory sample yielded negative results for Influenza A and B, parainfluenza, adenovirus and respiratory syncytial virus. "There is **no evidence** at the present stage suggesting the boy has contracted influenza. He had no history of recent travel. Further investigation is ongoing and the case has been submitted to Coroner's Court for investigation", the spokesman said."	

(E)

Title	Interdepartmental task force closely monitors development of Streptococcus suis infection
Source	Press release, Department of Health, Hong Kong, 31 July 2005

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"The interdepartmental task force of the Health, Welfare and Food Bureau today continues to closely monitor the latest development with respect to the Streptococcus suis infection in Sichuan. A spokesman for the task force said at this moment, there was **no evidence** to suggest that Hong Kong had a risk of outbreak."

(F)

Title	Serious influenza response stands down
Source	Press release, Department of Health, Hong Kong, 8 April 2015

"A spokesman for the Centre for Health Protection of the Department of Health said that the "Alert" response level was activated in view of the ongoing activity of highly pathogenic avian influenza among poultry outside Hong Kong. "We will continue to closely monitor the global situation of avian influenza. So far, there is **no evidence** of efficient human-to-human transmission", the spokesman added."

(G)

Title	Briefing for financial sector on flu pandemic
Source	Press release, Department of Health, Hong Kong, 7 November 2005

"Medical professionals from the Centre for Health Protection (CHP) of the Department of Health today briefed about 250 representatives from the financial sector on the latest situation of avian influenza and advised them in formulating their own preparedness plans for influenza pandemic.

Acting Controller of the CHP, Dr Regina Ching said at the briefing that the Government had been working closely with the World Health Organization (WHO) as well as the Mainland and overseas counterparts in monitoring the situation.

"Hong Kong is now at the Alert Response Level, in accordance with the Framework of Government's Preparedness Plan for Influenza Pandemic. We acknowledged that the threat of avian flu has raised international concern but there is no cause for panic as **no evidence** to date suggests that the virus had mutated to human-to-human transmission", she said."

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(H)

Title	Avian flu in China: Guidance for health professionals
Source	Press release, Public Health England, UK, 18 April 2013
"Over 1,000 close contacts of confirmed cases of A/(H7N9) bird flu have been followed up and there is **no evidence** of person-to-person spread."	

(I)

Title	Low risk of infection with mycobacterium bovis in the UK – 1 July 2013
Source	Press release, Public Health England, UK, 1 July 2013
"Dr John Watson, head of respiratory diseases at Public Health England, said: "On the basis of the recent epidemiology of Mycobacterium bovis infections in the human population in the UK, there is **no evidence** of a significant public health problem associated with the consumption of meat. The risk to humans remains very low.""	

(J)

Title	Middle East respiratory syndrome coronavirus (MERS-CoV): Update
Source	Press release, Public Health England, UK, 30 May 2013
"Public Health England remains vigilant to the developments in the Middle East and in the rest of the world where new cases have emerged and continue to liaise closely with our international colleagues to assess whether our recommendations need to change. Although some person-to person transmission has been reported, there remains **no evidence** of sustained person-to-person transmission."	

The press releases in (D) and (E) concern, respectively, an unexplained illness and subsequent death of an 11-year-old boy, and an outbreak of a potentially fatal bacterial infection, *Streptococcus suis*, in people with occupational exposure to infected pigs in Sichuan province in Mainland China. In both press releases, *no evidence* statements would ordinarily lead to

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the negative conclusions that the 11-year-old boy did *not* contract influenza, and that Hong Kong was *not* at risk of an outbreak of *S. suis* infection. But the default inferences to these negative conclusions are effectively blocked by two linguistic markers. These markers – *at the present stage* and *at this moment* – force further consideration of the knowledge bases upon which these negative conclusions are based. To the extent that these bases appear to be complete only to a certain point in time, we may consider the closed world assumption in these cases to be weakly warranted at best. *A fortiori*, the negative conclusions that are based on this assumption are also weakly warranted. No-one would be surprised to discover that the *no evidence* statements in these press releases lead nowhere in logical terms – most rational observers would not be inclined to base negative conclusions on these statements.

The extracts in (F) and (G) are taken from press releases that are spaced 10 years apart. Yet, they both express very similar concerns about the human health risks associated with avian influenza. The extracts address the possibility that the viral pathogen in avian influenza may mutate, permitting human-to-human transmission to occur. The linguistic markers *so far* in (F) and *to date* in (G) raise the salience of the closed world assumption. These markers serve to remind us that the current knowledge base on this pathogen may be incomplete in an essential respect. Although evidence *so far* and *to date* strongly suggests that human-to-human transmission does *not* occur, we may quickly need to revisit this claim and the knowledge base on which it is based should the virus mutate. Once again, linguistic markers function by blocking a negative conclusion – human-to-human transmission does *not* occur – that we might otherwise be inclined to accept.

The effect of these markers can be clearly illustrated by comparing these cases to the extracts from press releases issued by Public Health England in (H) to (J). The extract in (H) also addresses avian flu and the risk that human-to-human transmission may occur. The *no evidence* statement in this extract is much more likely to generate an inference to a negative conclusion – person-to-person spread of A/(H7N9) bird flu does *not* occur – in the absence of qualification from linguistic markers. That readers are encouraged to draw such a conclusion is confirmed by the fact that the press release also states that over 1,000 close contacts of

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confirmed cases of bird flu have been investigated with no evidence of human-to-human transmission. Public Health England is strongly implying that the knowledge base is complete in this case and that human-to-human transmission of avian flu does *not* occur. Mycobacterium bovis is the causative agent of bovine tuberculosis. It is also responsible for some cases of tuberculosis in human beings. Although it has been recognized for over a century, this form of human tuberculosis is still poorly understood, including transmission between people, and between infected cattle and humans (Grange, 2001). The extract in (I) addresses the human health risks associated with the consumption of meat. Once again, an unqualified *no evidence* statement leads readers to draw the inference that there is *not* a significant public health problem associated with the consumption of meat. Finally, in the absence of linguistic markers, the *no evidence* statement in the extract in (J) triggers a default inference to the negative conclusion that sustained person-to-person transmission of Middle East Respiratory Syndrome (MERS) does *not* occur. This difference in the use of *no evidence* statements by public health agencies in Hong Kong and the UK is significant for what it can tell us about the approaches of these agencies to public health communication. This point is developed in the following sections.

4. No evidence and systematic versus heuristic reasoning

It was argued in the previous section that public health agencies can promote two different modes of reasoning based on *no evidence* statements by means of their use or omission of linguistic markers in press releases to the public. In one mode of reasoning, *no evidence* statements are used in the absence of linguistic markers. In the absence of these markers, a default inference is generated from the claim of *no evidence* to a negative conclusion that *X* is *not* the case. This inference is triggered by the apparent satisfaction of the epistemic conditions referred to in this chapter as *closed world assumption* and *exhaustive search*. These conditions may ultimately be found not be adequately satisfied, and the negative conclusion may have to be rejected. But the inference has still enabled a public health agency to communicate a negative claim by merely issuing a *no evidence* statement. There are many circumstances where this mode of reasoning may be rationally warranted. Scientists who believe and who want the public to believe that the MMR vaccine does *not* cause autism, are

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nonetheless compelled to produce cautiously worded statements to the effect that there is *no evidence* that MMR vaccine causes autism. These statements afford protection to scientists should they later be found to be incorrect – scientists can deflect the charge of error by claiming that they only stated that there was *no evidence* that *X* is the case. At the same time, these statements enable a negative conclusion (e.g. MMR vaccine does *not* cause autism) to take root in the public's consciousness. Unqualified *no evidence* statements encourage little interrogation of the closed world assumption and exhaustive search conditions – if these conditions *appear* to be satisfied, the inference proceeds automatically.

Figure 1.1: Both sides in the vaccine safety controversy can use *no evidence* statements to imply or suggest claims (reproduced courtesy of Naturalnews.com, 2013)

In their press releases to the public, public health agencies also make use of a second mode of reasoning based on *no evidence* statements. This occurs when *no evidence* statements are used alongside linguistic markers such as *at the present stage* and *from the available evidence*. The effect of these markers is to increase the salience of the closed world assumption and exhaustive search conditions. The purpose of these markers is to encourage the public to undertake a systematic examination of these epistemic conditions with a view to determining

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the extent to which they are satisfied. If the public suspects that a knowledge base is incomplete in some respect, then it is unlikely to draw a negative conclusion from the fact that a proposition or claim is absent from the base. The inference from the *no evidence* statement to the conclusion that *X* is *not* the case is effectively blocked. Where the first mode of reasoning based on a *no evidence* statement involves an automatic inference to a negative conclusion, this second mode of reasoning encourages an extended process of deliberation that can overturn a negative conclusion. The distinction between these two modes of reasoning reflects another, well-known distinction in the psychology and philosophy of reasoning, namely, that between heuristic and systematic reasoning. Heuristic reasoning embodies speed and automaticity. It involves default inferences to conclusions. These inferences are rapid, take shortcuts through complex domains, and make limited use of cognitive resources (Gigerenzer, 2008; Gigerenzer and Brighton, 2009). They are in stark contrast to the inferences in systematic reasoning which is a slow, deliberative process that is resource intensive. This is how one informal logician, Douglas Walton, characterizes these different approaches to reasoning:

> "In recent years there has been great interest in so-called dual-process theories of reasoning and cognition. According to dual process theories in cognitive science, there are two distinct cognitive systems underlying human reasoning. One is an evolutionarily old system that is associative, automatic, unconscious, parallel, and fast. It instinctively jumps to a conclusion. In this system, innate thinking processes have evolved to solve specific adaptive problems. The other is a system that is rule-based, controlled, conscious, serial, and slow. In this cognitive system, processes are learned slowly and consciously, but at the same time need to be flexible and responsive." (2010: 161)

It is the contention of this chapter that public health agencies can directly influence how the public processes *no evidence* statements in its press releases through the inclusion or omission of linguistic markers. By omitting these markers, these agencies can encourage the public to engage in heuristic processing of *no evidence* statements. A default inference from a *no evidence* statement to a negative conclusion is automatically generated. This achieves

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speed of processing by circumventing an extended examination of the two epistemic conditions on the rationally warranted use of the argument from ignorance, namely, the closed world assumption and exhaustive search condition. By introducing one or more linguistic markers into *no evidence* statements, public health agencies can encourage the public to engage in systematic processing of these statements. This slower, deliberative process of reasoning exposes the closed world assumption and the exhaustive search condition to extensive critical scrutiny. The outcome of this scrutiny may be that it is decided that these conditions are not fulfilled in a certain case. The default inference that takes us from a *no evidence* statement to a negative conclusion is then overridden. The view that health messages can be manipulated to encourage heuristic versus systematic reasoning is not without precedent. There is clear evidence that message framing can influence the processing of health and other messages (Meyers-Levy and Maheswaran, 2004; Smith and Petty, 1996; Yan, 2015). But where the argument of this chapter is novel is in its claim that an informal fallacy can be an effective rational resource under conditions of both heuristic and systematic processing.

Thus far, it has been argued that *no evidence* statements in the press releases of public health agencies undertake considerable logical work. Under certain epistemic conditions, these statements permit the public to infer that claim *X* is false (true) because there is *no evidence* that *X* is true (false). It has also been argued that public health agencies can exercise control over the type of processing – heuristic versus systematic processing – that the public undertakes when it uses *no evidence* statements in its reasoning. This latter point raises the issue of when it might be beneficial for these agencies to encourage the public to undertake heuristic versus systematic processing of *no evidence* statements. With its emphasis on quick, automatic inferences and bypassing of information, heuristic processing encourages the public to come to a rapid judgement about a claim. This can be advantageous when a public health problem (e.g. an infectious disease outbreak) requires urgent action by the public. Under these circumstances, a protracted examination of the closed world assumption and exhaustive search conditions is discouraged. The public is encouraged to place its trust in the public health agency that produces the *no evidence* statement and defer to the greater

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expertise of the agency. Trust is ultimately founded on the assumption that the agency has undertaken the more extensive deliberations that it is urging the public to suspend. To the extent that this assumption is correct, a strong steer to the public to accept a certain claim is warranted. The stance of the public health agency can be captured as follows: *When we state that there is 'no evidence' that X is true, you can confidently conclude that X is false.* On this view, the public is led in judgement-making by the public health agency and is encouraged to accept its pronouncements with little in the way of rational reflection.

Public health agencies can also steer the public towards systematic reasoning using *no evidence* statements. Through the inclusion of linguistic markers such as *from the available evidence* and *at the present stage*, public health agencies can increase the salience of the closed world assumption and exhaustive search conditions. These conditions are emphasized as worthy of the public's rational scrutiny and examination. Where we might overlook these conditions, or simply give them a cursory glance in heuristic reasoning, our sustained attention is directed towards them in systematic reasoning. The public is encouraged to interrogate these conditions and consider what, if any, rational warrant they provide for the claims that are based on them. Public health agencies may consider it beneficial to steer the public towards systematic reasoning when deliberation can proceed in the absence of time constraints and when the public is viewed as competent to assess an issue. The relationship between the public and the public health agency that promotes systematic reasoning is one of equal participation in a shared rational enterprise. The agency does not presume to possess all the expertise in the relationship which is then bestowed on an inexpert public. The agency is also not alone in possessing a rational competence which only it can exercise. Instead, the public is viewed as a rational agent that can be trusted to undertake an independent, rational assessment of public health issues. The stance of the public health agency that promotes systematic reasoning can be captured as follows: *When we state that there is no evidence that X is true, you should determine if that means X is false*. On this view, the public is urged to be a proactive, rational actor alongside the public health agency.

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It emerges that public health agencies that promote heuristic processing versus systematic processing of *no evidence* statements possess two different conceptions of the public as a rational actor. The public health agency that promotes heuristic processing of these statements does not prioritise rational engagement with the public. Instead, the agency aims to secure the public's acceptance of a conclusion based on trust and its presumed expertise. There is relatively little attempt to foster independent rational competence on the part of the public. Instead, the public is expected to follow the strong logical steer of the public health agency. A very different rational stance towards the public is taken by the public health agency that promotes systematic processing of *no evidence* statements. The public is entrusted by the agency to arrive at rational judgements of the logical significance of these statements based on an evaluation of the closed world assumption and exhaustive search conditions. Indeed, such an evaluation is encouraged through the agency's use of linguistic markers that make these conditions salient for the public. The agency fosters the development of an independent rational competence on the part of the public. The rational attitudes associated with these two approaches to the processing of *no evidence* statements are displayed in Table 1.2. In the final section, we discuss these approaches further in the context of public health agencies in Hong Kong and the UK. These agencies do not promote heuristic and systematic processing of *no evidence* statements to equal extents. The differences, it is argued, reflect a more fundamental divergence in the conduct of public health communication.

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No evidence statements	
Heuristic reasoning	**Systematic reasoning**
• *No evidence* statements used without linguistic markers	• *No evidence* statements used with linguistic markers
• Public health agency provides strong logical steer to the public to accept a claim	• Public health agency encourages the public to assess a claim independently
• Public is perceived to be reliant on the expertise of the public health agency in forming rational judgements	• Public is perceived to be competent in exercising its own rational judgements apart from the public health agency
• The public places trust in the public health agency	• The public health agency places trust in the public
• The public and public health agency are unequal rational partners in public health	• The public and public health agency are equal rational partners in public health

Table 1.2: Rational attitudes associated with heuristic and systematic reasoning

5. The 'public' in public health communication

The ten *no evidence* statements that were examined in section 3 were taken from the press releases of just two public health agencies, namely, the Department of Health in Hong Kong and Public Health England in the UK. Clearly, claims based on only ten *no evidence* statements across two public health agencies must be treated with caution. But they do suggest a tendency or pattern that is consistent with other research findings (Cummings, 2010, 2015a, 2020). The pattern is one in which public health authorities in the UK use *no evidence* statements in press releases with the intention of strongly encouraging the public to accept

a certain claim. On this view, the public is not an autonomous rational agent, and must be logically led to the conclusion that it is in its best interests to accept. This type of public health communication is strongly paternalistic in nature (Bernhardt, 2004; Guttman, 2000; Grill, 2013). One of its most striking manifestations in the UK was the public health response to the emergence of BSE in British cattle. The official communication strategy – to the extent that there was a strategy – involved repeated reassurances by public health officials, including the Chief Medical Officer, that beef was safe to eat. These reassurances were based on the claim that there was *no evidence* that BSE had transmitted to humans. That these reassurances lulled the British public into a false sense of security that BSE would pose no risk to human health was amply demonstrated by the sense of betrayal the public felt when the Government announced to British Parliament on 20 March 1996 that BSE had transmitted to humans (BSE Inquiry Report, Volume 1, 2000: xviii). The public had diligently followed the strong logical steer of public health officials, only for that steer to be shown to be catastrophically flawed.

Public health authorities in Hong Kong also make extensive use of *no evidence* statements in their press releases to the public. But these authorities have a different type of rational engagement with the public they serve. Specifically, public health agencies in Hong Kong avoid strongly steering the public towards acceptance of a certain claim. Instead, the public is encouraged by these agencies to reflect on the epistemic conditions that a rational actor should prioritize in public health reasoning. As far as *no evidence* statements are concerned, these conditions are the closed world assumption and exhaustive search conditions that have been examined throughout this chapter. The salience of these conditions is increased through the inclusion of linguistic markers in the press releases issued by these public health agencies. Unlike their counterparts in the UK, public health agencies in Hong Kong view the public as an autonomous actor that *can* exercise rational choices in relation to its health even if there are circumstances in which this does not occur. The decision to accept or reject a claim based on a *no evidence* statement is one such choice. On this view, the public should not be compelled to make decisions or take courses of action as strong paternalism would have it. Rather, the public can be 'nudged' in the direction of more rational choices in relation to its health. It is the function of linguistic markers in *no evidence* statements to nudge the public towards these

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choices. The term 'nudge' is borrowed from Thaler and Sunstein (2008). These theorists propose a much gentler paternalism than that which forcefully directs us to accept certain conclusions or claims. So-called libertarian paternalism recognises that people want to exercise freedom in the choices that they make, but that they should be gently nudged in directions that will improve their lives:

> "Libertarian paternalism is a relatively weak, soft, and nonintrusive type of paternalism because choices are not blocked, fenced off, or significantly burdened. If people want to smoke cigarettes, to eat a lot of candy, to choose an unsuitable health care plan, or fail to save for retirement – libertarian paternalists will not force then to do otherwise – or even make things hard for them. Still, the approach we recommend does count as paternalistic, because private and public choice architects are not merely trying to track or to implement people's anticipated choices. Rather, they are self-consciously attempting to move people in directions that will make their lives better. They nudge." (Thaler and Sunstein, 2008: 5-6)

Public health agencies in Hong Kong are a type of 'public choice architect'. A choice architect has responsibility for organizing the context in which people make decisions. In its press releases to the public, the Department of Health in Hong Kong elected to include linguistic markers in its *no evidence* statements that public health agencies in the UK opted to omit. These markers do not constrain the decisions that the Hong Kong public makes in relation to its health – the public is at liberty to disregard these markers and to draw whatever implications it wants from *no evidence* statements, or equally to draw no implications at all. Instead, these markers gently nudge the public in a direction that will improve its decision-making ability in relation to health. By raising the salience of the epistemic conditions under which *no evidence* statements are a rationally warranted basis on which to accept claims about health, the Department of Health in Hong Kong is organizing the context in which health decisions are made. It is an effective choice architect. An analogy with Thaler and Sunstein's example of encouraging healthy food choices in students seems pertinent at this point. Thaler and Sunstein argue that students can be encouraged to select a healthy food option over junk

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food by placing fruit at eye level in the cafeteria. Food layout, in which healthy options are displayed prominently and are easily accessible, serves to organize the context in such a way that students are nudged in the direction of making healthy choices. In much the same way, public health agencies such as the Department of Health in Hong Kong can place conditions for rational decision-making about health at 'eye level' through its use of linguistic markers. The public's freedom of choice is not constrained by these markers. But they do serve to nudge us in the direction of better health decision-making.

It emerges that public health authorities in the UK exercise a strong paternalism in which the public is compelled to accept a claim that is judged to be in its best interests. The public is discouraged from exercising its own rational judgements about health risks. Instead, it is forcefully steered towards acceptance of a claim that a more expert authority has deemed is the most rationally warranted position for the public to hold. Public health authorities in Hong Kong exercise a quite different form of paternalism during public health communication. The public is gently nudged in the direction of making better choices in relation to its health. The libertarian paternalism that is practiced by these authorities does not seek to constrain the public's choices – the public can choose to reject a health risk and continue to practice risk-taking behaviours. That these two forms of paternalism should be played out in public health communication is unremarkable. Paternalism has, after all, a long history in the public health arena (Schramme, 2015). But what is remarkable is that it should shape the logical structures and rational processes by means of which public health communication is conducted. The paternalistic stance of a public health agency was enacted through the agency's promotion of either heuristic reasoning or systematic reasoning on the part of the public. When a public health agency exercised strong paternalism, the public was encouraged to suspend its own assessment of a health risk, and draw a quick, automatic inference to a conclusion. When a public health agency practiced libertarian paternalism, the public was nudged in the direction of making rational choices about its health and undertaking a systematic evaluation of risk. Paternalism profoundly shaped the type of reasoning promoted by a public health agency.

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In summary, it has been argued in this chapter that the argument from ignorance is a powerful rational resource in public health reasoning. This resource has been overlooked amidst the largely negative logical characterizations of this argument as a fallacy. In some contexts, the title of 'fallacy' is warranted – examples of the abuse and misuse of this argument are not difficult to find in public health and elsewhere. But even in public health we must acknowledge the many rationally warranted uses of this argument. Instances of the fallacious and rationally warranted use of the argument from ignorance are commonly found in public health communication. The single premise of this argument is a *no evidence* statement. These statements were examined in the press releases of two public health agencies, namely, Public Health England in the UK and the Department of Health in Hong Kong. These agencies both made extensive use of *no evidence* statements to characterize potential risks to human health. However, they differed in whether these statements were qualified by linguistic markers. These markers, it was argued, served the purpose of raising the salience of two epistemic conditions – the closed world assumption and exhaustive search condition – that must be satisfied for an argument from ignorance to be rationally warranted. The omission and inclusion of these markers by public health authorities in the UK and Hong Kong, respectively, revealed two different modes of reasoning using *no evidence* statements. Where UK public health authorities promoted heuristic reasoning based on these statements, public health authorities in Hong Kong promoted the public's use of systematic reasoning. These modes of reasoning, it was argued, reflected different paternalistic stances on the part of these public health agencies.

6. A final note for public health professionals

The discussion in this chapter is particularly relevant to the professionals who are charged with protecting the health of populations. Central to this effort is effective public health communication. It has been argued in this chapter that the way in which this communication is conducted can directly affect the public's compliance with health recommendations. When the public is strongly steered by public health agencies to suspend judgement and follow the recommendations of authorities 'who know best', the type of quick, reflexive thinking that ensues is not always conducive to rational decision-making. In fact, it may even be strongly

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counter-productive to achieving the aims of a public health agency if the public feels coerced by the type of health communication employed and develops a stance of resistance as a result. It is much better to view the public in health communication as a cooperative partner which is striving to make most effective use of its rational resources in decision-making related to health. These decisions can be helpfully guided by a public health agency through the provision of key supports (e.g. accessible health literature). Through gentle nudges, the public can be directed towards courses of action that protect health without instilling a strong stance of resistance and mistrust. This chapter illustrated the way in which these nudges may be achieved in the type of linguistic communication that is employed. It is hoped that these simple linguistic strategies may be more directly integrated into future efforts at public health communication.

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