Influence and effects of weight stigmatisation in media: A systematic review

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Summary

Background The lack of a comprehensive understanding of the role of mass media in perpetuating weight stigma hinders policy formulation. We reviewed the influence of mass media on weight stigmatisation and the effectiveness of media-based interventions designed to prevent or reduce stigma.

Methods We conducted a systematic review across seven databases from inception to December 2021. Included studies assessed exposure to or impact of weight stigma in mass media or examined interventions to reduce stigma through media in populations 12+ years. We synthesised data narratively, categorising studies based on similarity in focus to produce a set of integrated findings. The systematic review is registered in PROSPERO (No. CRD42020176306).

Findings One-hundred-and-thirteen records were eligible for inclusion from 2402 identified; 95 examined the prevalence of stigmatising content in mass media and its impact on stigma. Weight stigma was prevalent across media types, with the dominant discourse viewing overweight and obesity as an individual responsibility and overlooking systemic factors. Exposure to stigmatising content was found to negatively influence attitudes towards people with overweight or obesity. Few studies considered methods of reducing stigma in the media, with only two testing media-based interventions; their results were promising but limited.

Interpretation Weight stigma in media content is prevalent and harmful, but there is little guidance on reducing it. Future research focus needs to shift from assessing prevalence and impacts to weight stigma interventions.

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Keywords: Weight stigma; Overweight and obesity; Mass media; Systematic review

Introduction People with overweight or obesity frequently encounter weight stigma — discrimination towards people based on their weight and body shape and size.7 Such stigma is known to cause psychological and physiological harms, including disordered eating, depression, and elevated stress levels.8 It has therefore become a major focus of research and practice in public health.3 Mass media, including news, entertainment, advertising, and social media, play a crucial role in the dissemination of health information and shape understandings of and attitudes towards public health issues, including weight.4–6 Exposure to weight biased media content, such as over-representing thin individuals, using weight-related humour, and spreading misinformation about causes of overweight and obesity, can reinforce negative attitudes.7 Public health mass media campaigns can also perpetuate stigmatisation and amplify the risks of unhealthy behaviours through the use of anti-fat rhetoric.7,8 Accordingly, the World Health Organization (WHO) and the subsequent joint consensus of 2020 World Obesity Day have called for research to identify and improve policies and legislation approaches to reduce weight stigma in mass media.1,7

The lack of understanding of the role of mass media in supporting and sanctioning weight stigmatisation hinders public policy formulation and action to address the problem.9,10 In a systematic review focusing on
Research in context

Evidence before this study
Previous research indicates that people with overweight and obesity frequently encounter weight stigma, including through mass media. However, how mass media might perpetuate or be used to combat weight stigma has not been comprehensively reviewed.

Added value of this study
To the best of our knowledge, this is the first dedicated review of the relationship between mass media and weight stigmatisation. The evidence we identified suggests that weight stigma is highly prevalent across a wide range of media and has a negative impact on attitudes towards people with overweight or obesity and the causes of overweight and obesity.

Implications of all evidence available
Policymakers, researchers, and those working in the development, implementation and/or evaluation of obesity-related campaigns should be aware that weight stigma is highly prevalent in media and it is harmful. While there is some guidance on producing content that minimises weight stigma, there is very little on specific media-based interventions for its prevention. More evaluations of media-based interventions are needed to inform prevention efforts, particularly ways to change the dominant discourse on media to one that recognises the complexity of overweight and obesity causation and the harmfulness of weight stigma.

Methods

Search strategy and selection criteria
Following PRISMA guidelines and a registered protocol with PROSPERO (No. CRD42021765306), we systematically searched seven electronic databases (PubMed, CINAHL, Scopus, Medline, Embase, PsycInfo, and Cochrane Databases of Systematic Reviews) from inception until 2 December 2021. We applied English search terms without restriction on language, study setting, study design, follow-up duration, or outcome measures (Supplementary 1). We considered studies eligible if: a) they were a published peer-reviewed journal article; b) the age of the stigmatised or sampled population included in the study was over 12 years; c) the authors defined exposure as stigmatisation/bias through mass media and/or included interventions to reduce stigmatisation/bias through mass media.

After removing duplicates, two reviewers independently screened each article for eligibility in a two-staged approach using Covidence (https://www.covidence.org/). The first stage comprised title/abstract screening. The second stage comprised a full-text review, with reviewers recording the reason(s) for exclusion. Disagreements were rare (84% agreement between reviewers) and resolved by referral to a third reviewer who independently reviewed the study. One article reviewed at the full text stage was in Spanish, for which we invited an external reviewer with proficiency in Spanish to perform the screening process. This article was excluded at the full-text stage.

Quality assessment and data extraction
Pairs of independent reviewers applied the Joanna Briggs Institute (JBI) critical appraisal instrument to assess methodological quality using the associated tools appropriate to quantitative, qualitative, mixed-method, and review studies across all included studies. The two reviewers were then unblinded and resolved any disagreements through discussion or referral to a third reviewer (BB) where reviewers could not agree. Each study was then given a rating of high, moderate, or low quality, as described in the study protocol and in line with Pieper, Koensgen and colleagues. No studies were excluded based on quality.

One reviewer extracted data from each study using an a priori pilot-tested standardised data extraction form in Microsoft Excel. Data comprised: country, study purpose, study design, study population or participants, stigma sources type, sample size, setting, communication platform(s), intervention, outcome measures, and key findings. We conducted data verification on a random sample of the included studies.

We synthesised data according to the convergent integrated approach of the JBI methodology for mixed-methods systematic reviews. We categorised studies based on similarity in focus to produce a set of integrated findings. Specifically, we grouped studies that provided information on:

- The presence of weight stigma in all types of media content, including public health messages and campaigns (Research Question (RQ) 1).
- The impact of stigmatising media content on attitudes, beliefs, and perceptions about weight and
behaviours towards people with overweight or obesity, including self-directed stigmatisation (RQ1), and
• Addressing or reducing weight stigma through media (RQ2).

Meta-analysis was not appropriate due to the high heterogeneity amongst the included studies in terms of exposures, samples, study methodology and outcomes. Therefore, we present an integrated narrative summary of the results.

Role of the funding source
There was no funding source for this study.

Results

Our search identified 2,402 potentially eligible studies, of which 113 were included in the review (Figure 1). Almost all (n = 95) of the included studies examined the presence and/or impact of weight stigma in media content, with the over half of those focusing on news media (n = 33) or entertainment (n = 18; Table 1 and Supplementary 2). Comparatively few studies examined social media (n = 9) or advertising (n = 3). Twenty-six studies provided insights into addressing or reducing weight stigma on or through mass media, with half relating to public health messages or campaigns (n = 13). Only four studies reported on mass media interventions specifically designed to address weight stigma.15-18

More than half of the included studies were from North America, with 63 from the USA, 16,18-80 and five from Canada.81-85 The remainder were from Australia (n = 16),17,86-100 the UK (n = 10),15,101-105 Sweden (n = 2),106,107 New Zealand (n = 2),9,112 and one each from Israel,113 Norway,114 the Netherlands,115 Germany,16 Ireland,117 Malaysia,118 South Korea,119 and Dominica.120 Five studies included a cross-national focus.121-124 Of the included studies, 48 were quantitative15-17,19-49,51,52,62,68,71,72,78,81,82,85,86,88,89,92-94,100,101,108,112,115,116,119,124 and 55 were qualitative.2,21,23,25,27-29,31,38,43,44,47,49,52,62,68,71,72,81,82,85,86,88,89,92-97,99-101,103-105,107-114,116-119,121-123 Of the remaining studies, nine were review articles6,9,13,16,50,53,55,79,91,115 and one was an expert consensus statement.7 Most studies were ranked as high quality (n = 91)15-27,31,32,34-37,40,41,44,47-49,52,54,56,58,59,62,64-66,71,72,81,82,84,86,87,91,100,101,103,108,112,115,116,119,121-123 and the remainder (n = 22) as moderate quality.15,21,25,31,32,40,41,44,47,56,58,59,62,64-66,71,72,84,86,87,91,100,101,103,108,112,115,116,119,121-123 For qualitative studies, the most common shortcomings related to consideration of the influence of the research on the researcher (and vice versa) and positioning the research culturally or theoretically. For quantitative studies, common weaknesses in the included studies were being unclear about the randomisation process (for randomised trials) and whether the characteristics of participants in the different groups were similar at baseline. Reviews lacked sufficient detail about their inclusion/exclusion criteria and the screening and extraction process.

Presence of weight stigma in media content

Review papers and prevalence studies noted the presence of stigmatising content across a wide range of media.6,26,36,53,75,77 On the one hand, people with overweight or obesity were underrepresented in the media, compared to the prevalence of overweight and obesity in the general population.20,43,48 On the other, where people with overweight or obesity were included, it was typically in ways that could contribute to stigma.22,23,38,49,51,122 Backstrom7 argued that the negative representation of overweight and obesity has a long history dating back to so-called “freak shows” and has not changed substantially in more recent times. Studies of imagery of people with overweight or obesity found that their bodies were frequently criticised, and depicted as headless, from behind, or in other unflattering ways, such as with negative facial expressions, poorly fitting clothes, eating unhealthy foods, or while sedentary.48,49,51,62,101,121 Gender differences were noted across media types, with a study of news media finding that images of people with overweight or obesity were more frequently women and women with overweight or obesity were more likely to be the subject of abuse in social media comments,23,111 while studies of television shows and YouTube videos found that men were more likely to be depicted in stigmatising ways.32,36 Additionally, pregnant and postpartum women reported expectations around body shape and size created by media content were frequently stigmatising.25 There were also some studies that examined differences by race or ethnicity, but findings were inconsistent. For example, one study noted that actors of colour with overweight or obesity were less likely to be represented in media than white people,46 while another found Latinos were more likely to be praised in celebrity gossip magazines than other racial groups.49 Similarly, Sievert, Lobstein and colleagues21 found differences between countries, with online media in Japan, Brazil, and New Zealand showing a higher proportion of positive images of people with overweight and obesity, while Italy, Hong Kong, and South Africa showed a higher proportion of negative images. The authors did not explain why these differences might exist. Another study also showed that negative depictions had declined over time in two news outlets in the US.43

Overt or covert discourses in news media, social media, and public health campaigns included depiction of people with overweight or obesity as being lazy, greedy, undisciplined, unhappy, unattractive, and
Entertainment media similarly presented people with overweight or obesity as subjects of humour and ridicule, and as deserving of harsh treatment.21,39,44 Previte and Gurrieri99 argued that people with overweight or obesity in the media were pathologised, gazed upon, marginalised, controlled, and gendered. These discourses generate and reinforce a view of overweight and obesity as an individual responsibility, assigning blame and shame to the individual. Simultaneously, they normalise and idealise thinness, and ignore or downplay systemic and biological factors that contribute to overweight and obesity.9,96,106,114 Other studies noted that anti-fat rhetoric was used to ‘frighten’ women into losing weight118 and to overemphasise the benefits of bariatric surgery.82,105,112 Five studies served to highlight the role of social media and public commentary on news articles, arguing that their anonymous nature facilitates stigmatising comments from the public,9,81,101,117 especially when journalists had made stigmatising remarks about a person’s weight in the associated content.9,109 Lessard and Puhl76 also found increased exposure to stigmatising social media content during the Covid-19 pandemic amongst US adolescents.

Impact of stigma exposure on attitudes, beliefs, intentions, and behaviours
Many studies assessed the impact of various types of mass media portrayal of overweight and obesity on observers’ weight-related attitudes and beliefs. Some of these studies used ‘real world’ media examples, while others created their own content. Studies compared the impact of positively and negatively framed content, either in comparison to controls or within participants before and after exposure. There were two main areas of interest: the impact of stigmatising content on beliefs and attitudes to overweight and obesity as an issue; and the impact of stigmatising content on beliefs and attitudes about people with overweight or obesity, or about one’s own appearance or body satisfaction. Some studies also assessed whether any media exposure was linked to stigmatising attitudes and beliefs.28,46

Exposure to stigmatising content consistently affected attitudes towards weight and people with overweight or obesity. Exposure to content that disparaged or negatively framed people with overweight or obesity was associated with stronger beliefs in the health risk of overweight and obesity and personal responsibility for overweight and obesity and increased dislike for people.
with overweight or obesity. Similarly, framing obesity as a ‘public health crisis’ in news reporting increased anti-fat attitudes, while exposure to fat-positive frames generally shifted anti-fat attitudes and beliefs related to overweight and obesity-causation in a positive direction more than exposure to fat-negative frames.

Actual or perceived size of the observer appeared to influence anti-fat attitudes, with thinner people and people who were not trying to lose weight especially likely to increase their anti-fat attitudes after exposure to weight-loss shows like The Biggest Loser, and those who self-identified as not overweight being more likely to socially exclude people who are overweight after exposure to stigmatising content. Conversely, people with overweight or obesity felt excluded from and ridiculed by news media because their bodies defy social norms. Personal beliefs were also noted as potentially mediating the effects of stigmatising content. For example, one study showed that participants’ anti-fat attitudes measured after exposure to stigmatising content were mediated by their body satisfaction and another showed that those with a higher perceived pressure to be thin were more likely to express body dissatisfaction after reading an anti-obesity article. Covid-19 pandemic-related increases in body dissatisfaction were also noted amongst adolescents, especially those of higher weight, following exposure to stigmatising social media content, although a review noted that there was still insufficient evidence to fully understand the impact of weight stigma during the pandemic.

Several studies considered whether mass media and social marketing campaigns designed to address weight-related behaviours or other anti-obesity messages contribute to stigmatisation. Most of these studies concluded that such interventions might contribute to stigmatising attitudes, but this was often based on author critique and not empirical tests. Of those that did test it empirically, the evidence was mixed. One study found no evidence that a graphic mass media campaign had increased weight stigma, while others found stigmatising campaigns were associated with lower self-efficacy for behaviour change and an experimental study found that the imagery used can influence stigma-related attitudes.

| Study characteristics                              | Presence of weight stigma in media content | Impact of stigma exposure on attitudes, beliefs, intentions, and behaviours | Addressing weight stigma in the media |
|---------------------------------------------------|------------------------------------------|----------------------------------------------------------------------|----------------------------------------|
| Study type                                        | Quantitative studies                     | Qualitative studies                                                 | Other study type                       |
| Presence of weight stigma in media content        | Advertising                              | Entertainment                                                       | Images                                 |
| Public health messaging or campaigns              | News media                               | Images                                                              | News media                            |
| Social media                                      | Multiple media                           | Public health messaging or campaigns                                 | Social media                           |
| Impact of stigma exposure on attitudes, beliefs, intentions, and behaviours | Advertising                              | Entertainment                                                       | Images                                 |
| Addressing weight stigma in the media            | Entertainment                            | Images                                                              | News media                            |
| Public health messaging or campaigns              | Social media                             | Public health messaging or campaigns                                 | Social media                           |
| Multiple media                                    |                                          |                                                                     | Multiple media                         |

Table 1: Summary of study characteristics.
While exposure to stigmatising content was found in general to increase stigmatising beliefs and attitudes, some counterintuitive findings were also noted. One study, for instance, found that people who identified as overweight were more likely to express body satisfaction when exposed to stigmatising content and increase their positive treatment of other people who are overweight, compared to when exposed to neutral media. Further, Lin and McFerran found that positive portrayals of larger body types can have unintended consequences such as a reduction in motivation to improve health, greater consumption of unhealthy food items, and creation of meals with higher calories.

Studies investigated whether portrayals of overweight and obesity in media influenced people’s intentions and behaviours. One study found that people’s intention to diet if they gained weight was higher with negatively framed ‘obesity crisis’ news reports but not positively framed reports. Other studies found that exposure to stigmatising media content may lead to weight gain and undermine efforts to lose weight, and may interact with the experience of stigma not only to increase exercise intentions, motivation and behaviour, but also to increase a desire for thinness. This may have negative consequences as it centres on weight loss, not health. Additionally, adolescents with experience of weight stigma were found to use strategies to hide their weight status on social media. Some differential effects by gender were evident, with Eisenberg, Ward and colleagues finding that body satisfaction was lower amongst girls (but not boys) who had higher exposure to weight and shape-related teasing in TV shows than girls with lower exposure.

Addressing weight stigma in the media

Some studies explored public support for policy options to reduce stigmatising media content. Interviews with people with overweight or obesity found views both in favour and opposed to whether media guidelines to reduce stigmatisation or to control the portrayal of overweight and obesity should be considered as a policy option, while USA parents supported policies to address weight stigmatisation of children in media. Some authors argued that the stigmatising discourse of individual responsibility evident in the media might undermine support for effective policy solutions. However, there was some evidence that framing of messages in the media had limited impact on support for public policies.

A few studies sought to identify characteristics of media that may minimise or avoid weight stigma. Images and messages that were less likely to be stigmatising were focused on healthy behaviour changes, included people with similar physical characteristics to message recipients, used non-stereotypical images and text, and did not mention the term ‘obesity’. There was also some preliminary evidence that testimonial-style messages, messages that address myths and misunderstandings, and a mixture of biomedical and biopsychosocial frames may be effective in reducing stigma. Some authors emphasised a need for media-based interventions that recognise the wider influences on weight-related behaviours.

Clark, Lee and colleagues argued that social media platforms should change their terms of use to explicitly include policies against weight stigma and ensure that their algorithms avoid privileging stigmatising materials over positive material and voices. The few studies that considered terminology were consistent in concluding that the terms ‘obese’ and ‘obesity’ should be avoided in media, but recognised that there is otherwise considerable variation in opinions on alternatives, depending on the characteristics (e.g. race/ethnicity, gender, or weight status) of the person asked and the context within which the terms might be used. For example, ‘fat’ was considered stigmatising in certain contexts but not others. An experimental study of anti-stigma messaging to address workplace discrimination and anti-fat attitudes found positive effects from fat-positive reporting. Diedrichs, Puhl and colleagues noted that public health strategies designed to promote physical activity and nutrition messages without focusing on weight are viewed more positively and are more likely to motivate behaviour change.

Studies of media interventions to reduce stigmatisation of people with overweight or obesity were rare but we identified an educational film targeting trainee health professionals and a video campaign aimed at reducing weight-based stigma towards children with overweight or obesity. These studies provide preliminary evidence that media interventions have the potential to address weight-based stigma, with one study noting improvements in explicit but not implicit weight bias. Variations in effects by gender and weight status were observed in the other study, with participants who were overweight and/or female being more likely to reduce weight-based stigma compared with those who were thin and male. Additionally, Rathbone, Crawls and colleagues tested public health messages and found that those that challenge weight stigma and promote body positivity had positive effects on some psychological indicators of health and well-being for people of all body sizes. Body positive commercial advertising campaigns, however, were not found to improve weight stigma attitudes.

Discussion

Our review found that stigmatising presentations of people with overweight or obesity are highly prevalent in mass media and that media discourses contribute negatively to the social construction of the ‘obesity problem’; that is, that fatness is inherently bad, should be avoided at all costs, and that individuals have complete control over, and therefore responsibility for, their weight. Taken together, these factors contribute to and
reinforce anti-fat attitudes, beliefs, and perceptions, as well as encourage stigmatising behaviours towards people with overweight or obesity and reduce the likelihood of effective policy action. Critically, though, we also found limited evidence on how to minimise or prevent stigmatising media content and even less on specifically addressing weight stigma through media interventions. Our review highlights the complex issues that must be considered in developing policy and practice responses to stigma in mass media.

As found in other reviews, the included studies demonstrate unequivocally that stigmatising content is present across all media types, including news, entertainment, advertising, and social media. This occurs through dehumanising imagery, depicting stereotypical behaviours, and other negative representations. Moreover, experimental studies showed that, in general, individuals held more stigmatising views after exposure to stigmatising content. At the same time, the impact of this exposure may be mediated by personal beliefs, body satisfaction, and other perceptions and experiences, including lived experiences of stigma. Some studies also noted differences in the impacts by gender and weight status, with women and people with overweight or obesity tending to exhibit fewer stigmatising attitudes after exposure to stigmatising material, but also lower body satisfaction. However, the reasons for these differences are unclear. It may be that as these populations are more likely to experience weight-based stigma, they have a greater ability to empathise. The interaction between media-based stigma and stigmatising attitudes is therefore complex, with exposures interacting with socio-demographic characteristics, existent beliefs about people with overweight or obesity, and body image. While further research on the differences between different socio-demographic groups, such as age, and media-based stigma is warranted, our review confirms that weight stigmatising content is highly prevalent in mass media and that it perpetuates negative attitudes and beliefs.

A key element in the persistence of stigmatising content in media appears to be the bidirectional relationship with dominant discourses around the causes of overweight and obesity. These discourses, both reinforced by and generative of public commentary on mass media, tend to attribute responsibility for overweight and obesity to individuals while failing to build or consolidate an understanding of biological factors and the more complex societal and environmental contributors. This is not unique to media, however, with studies of overweight and obesity policies and mass media overweight and obesity prevention campaigns finding that the focus is predominantly on individual behaviours. Despite their intent, in reality, these discourses reinforce that overweight and obesity can be solved by individual choice only, rendering the wider systemic causes (junk food marketing, processed food supply, social isolation, poverty etc.) invisible and unchallenged. It appears that a similar process occurs in media, with systemic causes downplayed or ignored, which ultimately contributes to weight stigma. We echo the call of others that this must change if there is to be a reduction in stigmatising content on media and, ultimately, a reduction in weight stigma across society.

To change the discourse on weight, content creators and distributors, policymakers, and other parties need to take action to avoid or minimise stigmatising content on media, with greater emphasis on how to address weight stigma proactively through mass media-based interventions. Our review found that using positive language and images of people with overweight or obesity may assist in minimising stigmatising content. Resources are already available on the choice of language and imagery when reporting on obesity-related issues (e.g., The Obesity Collective). In addition, these parties should ensure there is representation of people of different body shapes and sizes more generally in media including, but not restricted to, content that is specific to weight or health. More research is needed particularly in relation to social media, as these platforms were understudied in comparison with their widespread use and their potential to perpetuate stigma is already clear. Careful evaluation of efforts to destigmatise content is also required to ensure there are no unintended consequences of these changes, such as demotivation to improve health as indicated by Lin and McFerran. Further, unintended consequences might be avoided by shifting the narrative on overweight and obesity to focus on nutrition and physical activity rather than weight.

Our review found only two studies which specifically examined proactive media-based interventions to address weight stigma, of which only one could truly be said to make use of mass media. There is thus very little guidance we can derive from the peer review evidence on whether mass media interventions have the potential to reduce stigmatising attitudes, as has been found in a review of weight stigma in contexts other than mass media. More interventions are needed, especially as weight stigma continues to be so prevalent. It is essential that these interventions follow best practice approaches, such as those outlined in the FLOW-PROOF protocol. This includes extensive formative research with the target audience and with people with overweight or obesity. This research should focus on terminology, given the contested nature of what is and what is not appropriate, and ways of shifting the dominant discourse away from individual responsibility and toward the systemic causes of overweight and obesity.

A limitation of our review is that, although we did not exclude studies based on language, our search terms were in English, reducing the likelihood of including studies conducted in non-English speaking countries and populations. Perhaps consequently, the included studies were
predominantly from English-speaking countries, especially the United States, and therefore our findings may not reflect important cultural differences in weight stigma prevalence and intervention on media. Additionally, some relevant studies may have been missed because they are more implicit in their discussion of stigma (e.g. referring to public discourse or opinion) and thus would not have been found by our search terms. Finally, although we conducted a systematic synthesis of the findings, because of their heterogeneity we were only able to provide a narrative summary of the included studies.

There can be no doubt that stigmatising content is highly prevalent in all types of mass media and that this needs to change if we are to reduce weight stigma and its harms. Critically, a change in discourse in media needs to occur, with the focus shifting to systemic causes of overweight and obesity. Public health policymakers, practitioners, and researchers should drive this shift, in partnership with empowered consumers and makers, practitioners, and researchers should drive this shift, in partnership with empowered consumers and the media. At the same time, our review found that a pathway, proactively to reduce stigma through media is largely unclear. The focus of weight stigma research must progress from assessing the prevalence and impacts of media content to an evaluation of interventions to address stigma through media.

Contributors
JK led the preparation of the manuscript. MT, YL, BM and BH conducted the searches and excluded duplicates. BB conceived the study. JK, BH, BM, YL, AG, MT, and BB screened studies, conducted quality appraisal and extracted data. All authors contributed to the review design, synthesis of findings, and writing of the manuscript. All the authors agreed to submit the manuscript for publication.

Data sharing
All data extracted for this study are available upon request upon request to the corresponding author.

Declaration of interests
Dr. Kite reports grants from Quit Tasmania, outside the submitted work. Dr. Williams reports personal fees from NovoNordisk, personal fees from Pfizer, personal fees from Lilly, outside the submitted work. Dr. Thomas has nothing to disclose. Dr. Grunseit has nothing to disclose. Dr. Bellew has nothing to disclose. Dr. Laird has nothing to disclose. Mr. Huang has nothing to disclose. Dr. McGill has nothing to disclose.

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