



Curtin University

# THE DELPHI PROCESS FOR PUBLIC HEALTH POLICY DEVELOPMENT: Five things you need to know

Food Law, Policy and Communications  
to Improve Public Health Project

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## 1.0 Introduction

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Informed policy often relies on an assessment of the best available evidence, and intentional strategies for the translation of research into policy and practice. “Effective policy advice must... embody the highest standards of evidence-based analytical rigour; it must have a clear strategic perspective; and it must be compelling”<sup>[1]</sup>. However, in practice many policy strategies are poorly-informed and not based on current evidence<sup>[2]</sup>. For some areas of health it is straightforward to determine best practice, assess the effectiveness and measure potential influence of policy options; whereas in others it is more difficult and, due to the nature of the issue under consideration, requires different types of evidence.

Many public health policy questions cannot be answered by conducting clinical trials, and it would be inappropriate to do so. Nevertheless it is critical that policymakers take an evidence-informed approach to the development of policy strategies, as it reduces the influence of errors and bias, allows them to manage their own use of evidence to support initiatives, and assists them to identify the misuse of evidence by others<sup>[2]</sup>. In many policy initiatives the opinion of experts is used as a key evidence-gathering step. The opinion of an expert is a combination of factual evidence, interpretation of these facts and conclusions derived from both factual and contextual sources<sup>[2]</sup>.

There are many key health issues for which the number of experts is a relatively small group<sup>[3]</sup>. It is important that the knowledge and opinion of these experts guide best practise for the issue, and that this expertise is gathered by appropriate research techniques<sup>[3]</sup>. As such, it is often inappropriate to use large-scale surveys that consult a broad group of people on an issue<sup>[4]</sup>. A well-informed policy initiative is one that has considered a range of evidence types as appropriate to the topic under consideration, and is characterised by a transparent and systematic approach to evidence-gathering<sup>[2]</sup>. The Delphi Process is one such approach that allows for expert consultation with the rigorous organisation of research.

### 1.1. Delphi

Named after the ancient Greek oracle at Delphi<sup>[5]</sup>, the method is a fitting alternative to population surveys or meta-analyses. The Delphi Method allows for consultation with the experts in a particular field and has been used in a wide range of settings such as health care, social sciences, environment, business, real estate, tourism, transportation, education, information systems and many others<sup>[6]</sup>. It is a unique method for facilitating communication and gathering information (including opinion and/or estimation) on an often complex topic or issue<sup>[4]</sup>. The topics raised are often those that cannot be simply answered, and a population survey or meta-analysis would not yield satisfactory results.

Although attempts have been made to define the Delphi Process, **there is no one true Delphi**<sup>[4, 7]</sup>. A number of types of Delphi have been identified, including the Classic Delphi, Modified Delphi, Real Time Delphi, Decision Delphi, e-Delphi, Argument Delphi and Disaggregative Delphi<sup>[5]</sup>. This paper discusses the Delphi Process in general terms, and then focuses on a technique used commonly in health and policymaking: The Policy Delphi.

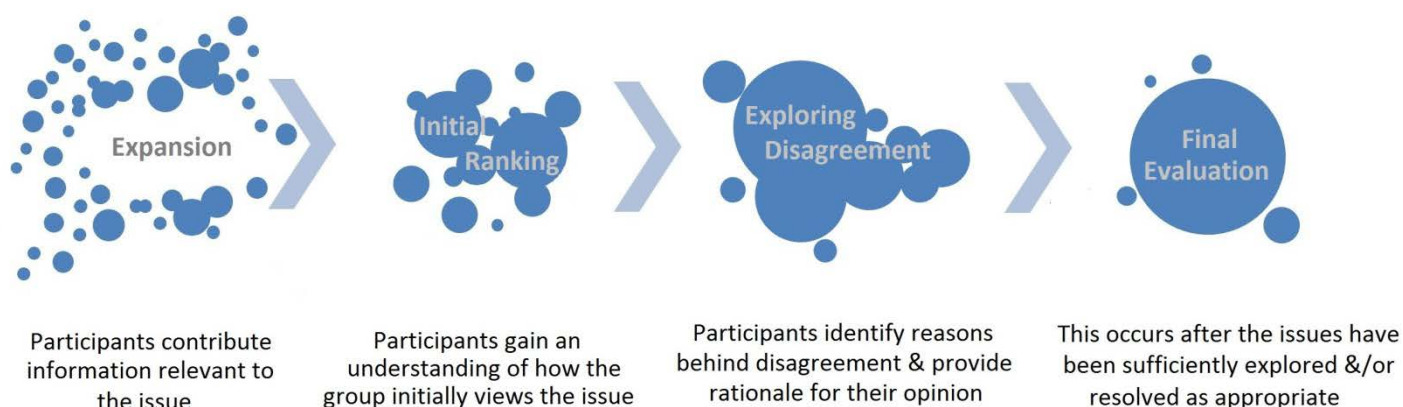
## 2.0 The Delphi Method

### 2.1. Core Characteristics

Delphi methodology has continued to evolve since its genesis in the 1950's by the RAND Corporation, but has retained three core characteristics: **Anonymity**, **Iteration** and **Controlled Feedback**<sup>[3, 6, 8]</sup>. In essence, all Delphi processes follow these three principles in some way. Anonymity is concerned with “protecting the Delphi results from the influences of group conformity, prestige, power and politics”<sup>[8]</sup>; Iteration sees the “..Delphi procedure taking place over a number of rounds, allowing individuals to change their opinion”<sup>[8]</sup>; and Controlled Feedback ensures the results of previous rounds are fed back to the participants. In addition to these three, the fourth core characteristic that has been identified is that of **Statistical Group Response**<sup>[3, 5, 8]</sup>. This characteristic asserts that all participants are equally represented in the findings<sup>[4, 8]</sup>; a key characteristic for ensuring participants trust and engage fully in the process.

### 2.2. Methodology

Figure 1 shows the four main stages of the Delphi Process. Each of these stages, also referred to as Delphi rounds, may have multiple iterations until their purpose is achieved. Each round may be conducted using a range of techniques.



**Figure 1: The Delphi Process**

Adapted from Linstone and Turoff<sup>[4]</sup>

Techniques employed in the *Expansion* round may include a face-to-face workshop, structured interviews, the generation of expert papers, paper-based or electronic questionnaires, literature review and/or small panel review<sup>[3, 4, 9]</sup>. This round aims to gather a wide range of information on the topic and is sometimes conducted by a smaller group than those who participate in the *Initial Ranking* and *Exploring Disagreement* rounds. If this is the case the larger group of participants are usually given the opportunity to provide additional material to that identified in this round during the early stages of the ranking processes<sup>[3, 4]</sup>.

The *Initial Ranking* and *Exploring Disagreement* rounds are generally conducted via online or paper-based questionnaires, which provide the opportunity for participants to give their opinions on the topic<sup>[3, 4]</sup>. Throughout the Delphi participants may be asked to provide a rationale if their response greatly differs from the majority of the group. This rationale is then included in the feedback for that round<sup>[3]</sup>. The number of iterations in these two rounds is often flexible, and tends to continue until a predetermined end-point is reached<sup>[3, 5]</sup>. Older Delphi writings<sup>[4]</sup> suggest that up to six iterations may be required across these two rounds to achieve stability and consensus, but more recently the view is that two to three is sufficient<sup>[3, 5]</sup>.

It is important to allow participants to see their original responses as well as those of the overall group when being asked to revote in subsequent rounds<sup>[4, 5]</sup>. This may be done by providing a downloadable or emailed copy of the participant's responses at the conclusion of the survey, or to embed the previous individual and/or group responses into the following survey.

The *Final Evaluation* stage occurs once the predetermined objective is achieved, and may involve the generation and dissemination of reporting materials, with or without final review by participants. It may also include some final ranking steps and/or process evaluation<sup>[4]</sup>.

### 2.2.1. Responsible Conduct of Research

As the Delphi Method is considered a credible research technique, it is important to ensure that rigorous research processes be undertaken, in accordance with the Australian Code for the Responsible Conduct of Research<sup>[10]</sup>. This Code outlines the standards and procedures for conducting research responsibly, including general principles, data management, dissemination of findings, authorship, peer-review and so on. Also important to consider is the National Statement on Ethical Conduct in Human Research<sup>[11]</sup>. A quality Delphi will generally obtain approval from an appropriate research ethics committee, which will require evidence that the study methodology meets these guidelines. This will assist in credibility of the findings, particularly in peer-reviewed settings. It may also be appropriate to utilise other supporting research techniques such as systematic literature review, to provide direction, verification and credibility to the gathered evidence.

### 2.3. The Experts

As a Delphi is concerned with the opinion of experts, random sampling of the general population is usually inappropriate<sup>[3, 5]</sup>. Instead, it is important to engage participants who have **high-level knowledge and understanding** of the issues; can provide input that is **relevant, widely recognised and verifiable**; have a sense of **vision, interest and commitment**; and bring in a wide **variety of viewpoints**<sup>[3, 4]</sup>. Experts do not necessarily require specialist knowledge of the entire issue – they may be bringing in highly specific knowledge of one facet of the topic being explored<sup>[4]</sup>. The careful selection of participants is the cornerstone of a successful Delphi, and has been a source of significant criticism, due to the high risk of creating bias via a non-representative sample<sup>[5]</sup>. To address this, a number of recent Delphi studies have developed inclusion criteria, to provide some minimum qualifications, publications and/or experiences of the desired 'expert'; however this technique introduces its own set of pitfalls<sup>[5]</sup>. The engagement of the expert for Policy Delphi is further discussed below.

### 2.4. Interpreting the Responses

Another area of Delphi methodology that often receives criticism is the manner in which responses are interpreted and fed back to participants<sup>[7]</sup>. Transparent methodology and unbiased reporting from an impartial research team are key to a successful Delphi<sup>[6]</sup>.

As it is unlikely that any topic will reach complete consensus, researchers often define an arbitrary agreement level to be regarded as "consensus". This could range from 51% agreement, to a two-thirds majority, or up to 95% concurrence depending on the issue<sup>[3]</sup>. Some consider the point of diminishing returns<sup>[5, 12]</sup>, or the concept of stability, which looks at the similarity of the group response on any topic over multiple iterations<sup>[3]</sup>.

However, consensus is not always the objective of a Delphi<sup>[4, 6, 12]</sup>. Instead, multimodal consensus or a convergence of views may be appropriate end-points<sup>[3]</sup>. In the Policy Delphi a consensus is decidedly NOT the objective (see below)<sup>[3, 4]</sup>.

The Delphi Process typically gathers both quantitative and qualitative data<sup>[13]</sup>, so a range of techniques must be employed to interpret the participant responses. Generally a combination of both a computer-based statistical package (such as SPSS) and manual manipulation of the data is required<sup>[14]</sup>.

#### 2.4.1. Statistical Measures

Generally, measures of central tendency and level of dispersion are all that is required to assess the quantitative responses and observe convergence of participants between iterations<sup>[3, 14]</sup>. The main statistical measures used are median, mode and standard deviation, although mean and interquartile range are also frequently used<sup>[3, 14]</sup>.

The qualitative responses require an alternate approach. In early stages of the Delphi, qualitative statements are generally recommendations, ideas, or issues (depending on the Delphi topic). These statements must be fed back accurately to participants in subsequent rounds<sup>[14]</sup>. Similar statements should be grouped and may be reduced to one encompassing statement where appropriate, retaining original wording as much as possible<sup>[14]</sup>.

#### 2.4.2. Presenting the Results

It is important to present the research in a manner that is suitable for the intended audience<sup>[15]</sup>. Publication of the findings in peer-reviewed setting adds credibility to the work, and builds the body of evidence on the topic. However, relevant, timely politically-oriented evidence in a variety of formats is also required for use in policymaking. Evidence suggests that a lack of interaction and trust between researchers and policymakers, poor timing of research, negative attitudes towards research evidence by policymakers, lack of perceived relevance and the presentation of research to scholarly audiences that contain high amounts of jargon all decrease the likelihood of research having an impact on policy<sup>[15]</sup>. There is often a window of opportunity to act on a policy issue, and the delay in making research available via peer-review can be prohibitive in having an influence on policy. These are important considerations to ensure translation of research into practice in all research settings, but are of particular importance when conducting a Policy Delphi.

### 2.5. The Policy Delphi

The Policy Delphi was introduced in 1970, with a different objective to the Classic Delphi. The Policy Delphi aims to identify and critique a wide range of appropriate solutions to a policy issue, rather than to form consensus<sup>[3, 16]</sup>. It is not generally used as a decision-making tool; rather that it is a way of structuring a communication process, to identify strong opposing views, and analyse issues<sup>[4, 16]</sup>. The methodology (Figure 1) and core characteristics (Anonymity, Iteration, Controlled Feedback and Statistical Group Response) are similar to the Classic Delphi, however the iterations may be fewer or altered in the *Exploring Disagreement* stage, to reduce the likelihood of consensus<sup>[3]</sup>.

A Policy Delphi should aim to:

- **Gather all possible options** on a particular issue for examination and/or;
- Explore the **consequences and impact** of each option and/or;
- Investigate and appraise the **acceptability** of each option<sup>[4]</sup>

Generally a Policy Delphi is followed by further evaluation and decision-making strategies by policy-makers to determine the appropriate option(s) to undertake<sup>[3]</sup>.



### 2.5.1. Rating Scales in the Policy Delphi

There are four key dimensions that have been identified as the minimum for successful evaluation of policy recommendations throughout a Delphi Process; **Desirability, Feasibility, Importance and Confidence**<sup>[4]</sup>. Further dimensions may include value, priority, urgency, timing, impact and others<sup>[7]</sup>. When communicating these dimensions to the participants, the definitions need to be clear to ensure all participants make similar interpretations. It is also recommended that no neutral stance be available, to force participants to express an opinion. It is appropriate instead to offer an *Unable to Judge / Don't Know* option with every question<sup>[4]</sup>.

It is important to allow participants the opportunity to comment on the wording of the policy items, as the opinion on policy is often significantly influenced by wording<sup>[4]</sup>.

### 2.5.2. Policy Delphi Modifications to Classic Delphi Methodology

There are a number of modifications to the Classic Delphi that are often employed in the Policy Delphi. Prior to administering the Delphi, it may be appropriate to conduct a literature review, consultation with experts, subject interviews, conference workshop and/or other process to identify many of the key issues for consideration and expansion, before engaging the full set of participants<sup>[3, 4]</sup>. This is useful for streamlining the process, reducing the length and time-burden of the initial *Expansion Phase*, and giving some direction with regards to the scope of the Delphi<sup>[3]</sup>.

Due to the broad scope of the Policy Delphi, the large volume of data collected and the non-consensus-forming objective, it is difficult to reach an appropriate end point using Classic Delphi methodology. The incorporation of an expert panel to examine the findings of the Delphi Process and determine the most appropriate approach is commonly used to address this<sup>[3, 4]</sup>. This is generally the final stage of the process, conducted after the exploration and ranking rounds, in a setting that is not conducive to the anonymity of the panel members<sup>[3]</sup>.

The definition of the term 'expert' in a Policy Delphi may also differ from that of the Classic Delphi. It is crucial that a heterogeneous group of experts be identified, to gather all possible options on an issue and serve the non-consensus-forming objective of the Policy Delphi<sup>[4]</sup>. It has been observed that "a policy issue is one for which there are no experts, only informed advocates and referees"<sup>[4]</sup>. Influencers of health policy have been identified as academics and medical professionals, those who have been around for a long time, are well networked, and have a key understanding of a particular content area<sup>[17]</sup>. Research from Victoria, Australia found that those most commonly nominated as influential in health policy were situated in academia, health bureaucracies, research institutes, non-government organisations or hospitals<sup>[17]</sup>. For a truly successful Policy Delphi all interest groups must be at the table, and all voices must be heard<sup>[4, 7]</sup>.

## 2.6. Potential Benefits of the Delphi Method

- **Costs** associated with the Delphi Process may be lower than other consultancy strategies such as face to face workshops<sup>[4, 6, 12, 16, 18]</sup>.
- Both large and small **sample sizes** can be supported<sup>[8, 18]</sup>. Writings suggest that a panel should be at least seven people, and can number in the thousands as appropriate to the topic<sup>[4, 7]</sup>.
- A variety of **media** can be used, meaning that participants do not have to be in the same place at the same time<sup>[8]</sup>. Because of this, an expert can be accessed almost anywhere without the hindrance of their availability at any given time<sup>[3, 16]</sup>.
- This process is well-suited to **health-related research**, where a group of experts hold the knowledge on a particular issue<sup>[3, 8]</sup>.

- Controlled Feedback can provide participants with a **sense of ownership**, which may result in extensive engagement, higher response rates and positive impacts on implementation of findings<sup>[5]</sup>.
- The anonymity of the approach means that the **responses are honest** and free from the influence of group conformity, and the research can operate above biases of prestige, power and politics<sup>[3, 4, 6, 16]</sup>. It also allows participants to express a **minority opinion**, or change their opinion on a topic without losing face, once they have seen further evidence and/or had time to reflect on the issue<sup>[9, 19]</sup>.
- The Delphi Process allows for **comparison of a broad range of issues and strategies** that may have significantly different research design, and which could not be successfully investigated via meta-analysis or systematic review<sup>[4, 8]</sup>
- A Delphi conducted with a highly heterogeneous mix of respondents often results in an increased understanding of the broad range of perspectives on any topic, and the journey of *Exploring Disagreement* allows participants to gain education on the rationale behind alternate perspectives, resulting in a **more informed group of experts**<sup>[4, 6]</sup>.

## 2.7. Potential Drawbacks of the Delphi Method

- **Costs** of repeating the survey via multiple iterations may be higher than for a one-off questionnaire<sup>[3]</sup>.
- There is a risk of **artificial consensus**, as a result of attrition from the process of participants with a minority opinion<sup>[3, 4]</sup>. This should be minimised if the work of the researchers are thorough and unbiased, and follow the principle of Statistical Group Response, so that the minority opinion is given a voice and disagreements are explored thoroughly<sup>[4, 5]</sup>.
- As the Policy Delphi does not push for consensus, there may be less critical analysis of suggestions and an **oversimplification of issues**. It is therefore suggested that the Policy Delphi be used as one part of a discussion process that brings in a group of experts to examine the findings and determine the most appropriate approach<sup>[3, 4]</sup>.
- **"Illusory Expertise"**<sup>[4]</sup>. High-level experts that tend to have a narrow field of proficiency risk bringing in significant bias or skew, or lack ability to hold a big picture perspective<sup>[4]</sup>. It is therefore important to ensure a heterogeneous range of perspectives are represented<sup>[3, 8, 16]</sup>.
- It is important that the Delphi be conducted with appropriate pace, as a pressure for resolution may result in superficial contribution by participants, hasty exploration of findings by the researcher, insufficient iterations and the formation of an **artificial or biased consensus**<sup>[3]</sup>.
- **Underestimation of the time and effort** required by participants, and the demanding nature of the Delphi may lead to high attrition rates<sup>[3-5]</sup>. Strategies to reduce this include clear definition of the process and what is expected from the participants, good communication strategies, transparent methodology and reasonable turnaround times<sup>[4, 16, 20]</sup>.
- **Results are subjective** and there is a risk of bias in the definition of scope, the presentation of responses, the grouping of variables etc. One way to reduce this risk is for at least two researchers to be involved in developing and administering the Delphi, to independently define, develop and interpret, and then to compare and discuss their reasoning<sup>[4, 8]</sup>. It is also crucial to provide transparent and valid methodology<sup>[6, 21]</sup>.
- The Delphi Method generally incorporates both Qualitative and Quantitative elements<sup>[3, 4, 9]</sup>. This will likely result in the generation of a **large volume of data**, which increases from the first to the second round<sup>[4]</sup>. It is important to allow sufficient time to process this data, utilising at least two researchers to ensure the thorough and unbiased approach that is critical to the Delphi Method<sup>[4]</sup>. It may also be useful to provide sample written responses to participants, to demonstrate the importance of providing brief, specific and singular statements<sup>[4]</sup>.

## 2.8. The Public Health Policy Delphi Question

“The usefulness of the knowledge we acquire and the effectiveness of the actions we take depend on the questions we ask.”<sup>[22]</sup> The use of well thought out, powerful questions is necessary to create truly innovative solutions. Many of the problems that public health is faced with require a paradigm shift to occur and often, the solution to the problem can only really be answered from outside health, or at least with extensive collaboration with other sectors. Often the responsibility for the action lies with other agencies or sectors. The Delphi Process is a powerful mechanism for exploring the answers to pressing questions from inside the current paradigm.

One public health policy questions that is being asked is ‘What could or should we do to improve or address ‘x’?’ A comprehensive approach to public health intervention planning covers policy, program interventions, and the infrastructure required to support them. It is important that all aspects of policy and practice are considered during the Delphi planning process: ranging from the problem definition, objective and outcomes; to the potential public health (or other) intervention options, to the infrastructure and support needed (including financial resources, research and evaluation, and human resources). The full range of intervention types should be considered when contemplating appropriate actions. Types included public policy development, legislation and regulation, resource allocation, engineering and technical interventions, incentives (financial and other), service development and delivery, education (including skills development), communication (including social marketing), collaboration/partnership building (community and intersectoral), community and organisational development (including organisational policy) and advocacy<sup>[23]</sup>.

Public health policy actions to reduce or prevent chronic disease through a reduction in modifiable risk factors, are often inter-related and complex. Some areas, such as the approach for tobacco reduction and control, have achieved a certain level of consensus among public health practitioners and related sectors, whereas consensus-building is still a key activity in other areas such as obesity prevention<sup>[24]</sup>.

## 3.0 Conclusion

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This report describes the key characteristics and considerations for responsible research for the development and implementation of a Delphi Process to inform policy and practice for use in the public health chronic disease prevention area.

The five things you need to know about the Policy Delphi are:

1. The Delphi Process is a timely, effective way to build the preventative health policy evidence base
2. The Delphi should be considered when the issue is broad and complex, when solutions are not simple or forthcoming, when expert opinion and communication is desired and when meta-analyses will not sufficiently address the issue.
3. Although Delphi methodology varies according to the topic for consideration, the core characteristics of all Delphi Processes are: Anonymity, Iteration, Controlled Feedback and Statistical Group Response.
4. The Policy Delphi has a different overall aim and therefore employs a number of variations to Classic Delphi methodology, including pre and post activities and a critical focus on the selection of experts.
5. The ethical conduct of scientific rigour (eg. ethics, sample selection, analysis of findings etc) is required to enable the results of a Delphi to be considered valid scientific evidence.

## 4.0 Further Reading

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### Two recent, succinct summary papers of the Delphi Process

De Meyrick, J. (2003). *The Delphi method and health research*. Health Education Research, 2003. 103(1): p. 7-16. DOI: 10.1108/09654280310459112.

Mullen, P.M. (2003). *Delphi: myths and reality*. Journal of health organization and management, 2003. 17(1): p. 37. DOI: 10.1108/14777260310469319.

### Two significant works on the Delphi Process

Linstone, H.A. and M. Turoff, eds. (2002). *The Delphi Method: Techniques and Applications* E-Book. New Jersey Institute of Technology: Newark, NJ.

**Accessible here:** <http://is.njit.edu/pubs/delphibook/index.html>

Keeney, S., F. Hasson, and H. McKenna.(2011). *The Delphi Technique*, in *The Delphi Technique in Nursing and Health Research*. Wiley-Blackwell. p. 1-17.

**Accessible here:** <http://onlinelibrary.wiley.com/book/10.1002/9781444392029>

### Two examples of Delphi studies in preventative health research and/or policy

Waterlander, W.E., I.H.M. Steenhuis, E. de Vet, A.J. Schuit, and J.C. Seidell. (2010). *Expert views on most suitable monetary incentives on food to stimulate healthy eating*. The European Journal of Public Health, 2010. 20(3): p. 325-331. DOI: 10.1093/eurpub/ckp198.

Aarts, M.J., A.J. Schuit, I.A.M. van de Goor, and H.A.M. van Oers. (2011). *Feasibility of multi-sector policy measures that create activity-friendly environments for children: results of a Delphi study*. Implementation Science, 2011. 6(1): p. 128.

### SALUD America! – Conducted a Delphi targeting obesity prevention in Latino children (report and peer-reviewed paper)

*SALUD America!*: The RWJF Research Network to Prevent Obesity Among Latino Children. (2008). *Delphi Survey Report Summary*, Institute for Health Promotion Research, University of Texas, San Antonio.

Ramirez, A.G., P. Chalela, K.J. Gallion, L.W. Green, and J. Ottoson. (2011). *SALUD America! Developing a national Latino childhood obesity research agenda*. Health Education & Behavior, 2011. 38(3): p. 251-260.

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