Short communication

**WHO Five Keys to Safer Food** communication campaign - Evidence-based simple messages with a global impact

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1. Introduction: the food safety threat

It is estimated that globally at least 600 million fall ill and at least 420 000 die every year from pathogenic microorganisms in food, resulting in a loss of at least 33 million healthy life years (DALYs). Children under 5 years of age carry 40% of the foodborne disease burden, with at least 125 000 deaths every year. (Foodborne Disease Burden Epidemiology Reference Group 2007–15, 2015; Havelaar et al, 2015). It should be noted that these estimates do not include the very significant effect of most chemical hazards in food.

To respond to these complex issues and evolving threats, and especially to the need for consumer education in the area, the World Health Organization (WHO) in 2001 initiated a communications campaign known as the Five Keys to Safer Food (WHO, 2002). The campaign addressed common food handling mistakes that are relevant globally. The “Five Keys” include simple messages (recommendations) with supplemental actionable steps on how to properly achieve each of the five recommendations along with specific evidence supporting the recommendation itself. (See Table 1 for a description of the “Five Keys” messages).

2. A new approach to WHO health promotion

In the initial development of the “Five Keys” programme, WHO decided that it was essential to provide ready-to-use communication tools for national and local health authorities. This represents a departure from traditional WHO health promotion activities, which almost exclusively have focused on the creation and dissemination of scientific and academic messages.

WHO had long been aware of the need to educate food handlers about their responsibilities for food safety. In 1990, WHO developed the *Ten Golden Rules for Safe Food Preparation* (WHO, 1990). While the “Ten Golden Rules” were translated and used by several countries, it became apparent that something simpler and more generally applicable was needed if WHO wanted to actively and efficiently encourage the local implementation of new, more directly applicable recommendations.

In the early 2000s, countries increasingly recognized the need to strengthen food safety education programs for the prevention of foodborne diseases. In 2000, the World Health Assembly adopted resolution WHA 53.15 on Food Safety (WHO, 2000), specifically directing WHO towards more efficient food safety action in support of countries. In response, WHO undertook various activities in collaboration with international and national institutions and stakeholders on risk communication and advocacy. The overall approach, as defined in the *WHO Global Strategy for Food Safety* (WHO, 2002), included the provision of materials which countries could easily use, reproduce and adapt to different target audiences.

2.1. The WHO process to reach scientific consensus around messaging

The WHO has significant experience in gathering scientific expertise through its ability to distil the views of eminent scientists in the subject area, agreeing on the scientific description of the questions and answers relevant to the issue. More recently WHO has included communication expertise with a view of ensuring clear messaging.

2.2. WHO’s development of public health messaging in food safety

Food safety messaging is generally complex and there are many different aspects of food handling that needs explanation understandable to a variety of audiences. Scientific experts are often concerned with the reputational risk to the Organization (WHO) should messages be perceived as too simple, while end-users may lose interest or trust in WHO should the messages be too complex (Ratnera & Riis, 2014). It was therefore important to move forward with the development of these food safety messages balancing both the need for scientific rigour in determining what needed to be communicated and the need for the resulting messages to be comprehensible to diverse public
Table 1

Five Keys to Safer Food

<table>
<thead>
<tr>
<th>Recommendations (What?)</th>
<th>Actionable steps to achieve recommendations (How?)</th>
<th>Reasoning behind the recommendations (Why?)</th>
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| 1) Keep clean           | • Wash your hands before handling food and often during food preparation  
                           • Wash your hands after going to the toilet  
                           • Wash and sanitize all surfaces and equipment used for food preparation  
                           • Protect kitchen areas and food from insects, pests and other animals | While most microorganisms do not cause disease, dangerous microorganisms are widely found in soil, water, animals and people. These microorganisms are carried on hands, wiping cloths and utensils, especially cutting boards and the slightest contact can transfer them to food and cause |
| 2) Separate raw and cooked | • Separate raw meat, poultry and seafood from other foods  
                             • Use separate equipment and utensils such as knives and cutting boards for handling raw foods  
                             • Store food in containers to avoid contact between raw and prepared foods | Raw food, especially meat, poultry and seafood and their juices, can contain dangerous microorganisms which may be transferred onto other foods during food preparation and storage. |
| 3) Cook thoroughly     | • Cook food thoroughly, especially meat, poultry, eggs and seafood  
                           • Bring foods like soups and stews to boiling to make sure that they have reached 70 °C. For meat and poultry, make sure that juices are clear, not pink. Ideally, use a thermometer  
                           • Reheat cooked food thoroughly | Proper cooking can kill almost all dangerous microorganisms. Studies have shown that cooking food to a temperature of 70 °C can help ensure it is safe for consumption. Foods that require special attention include minced meats, rolled roasts, large joints of meat and whole poultry. |
| 4) Keep food at safe temperatures | • Do not leave cooked food at room temperature for more than 2 h  
                                     • Refrigerate promptly all cooked and perishable food (preferably below 5 °C)  
                                     • Keep cooked food piping hot (more than 60 °C) prior to serving  
                                     • Do not store food too long even in the refrigerator  
                                     • Do not thaw frozen food at room temperature | Microorganisms can multiply very quickly if food is stored at room temperature. By holding at temperatures below 5 °C or above 60 °C, the growth of microorganisms is slowed down or stopped. Some dangerous microorganisms still grow below 5 °C. |
| 5) Use safe water and raw materials | • Use safe water or treat it to make it safe  
                                          • Select fresh and wholesome foods  
                                          • Choose foods processed for safety, such as pasteurized milk  
                                          • Wash fruits and vegetables, especially if eaten raw  
                                          • Do not use food beyond its expiry date | Raw materials, including water and ice, may be contaminated with dangerous microorganisms and chemicals. Toxic chemicals may be formed in damaged and mouldy foods. Care in selection of raw materials and simple measures such as washing and peeling may reduce risk. |

audiences.

2.3. Communicating the ‘Why’ - a pre-requisite for success

Each of the five keys invites the consumer to understand the ‘why’ behind the risk, potentially triggering a real and lasting change in behaviour. In line with best practices of risk communication, careful attention was given to describe and explain the risks and the benefits in relevant detail within a science-based framework (FAO/WHO, 2016; Frewer et al., 2016). The concept of core messages (what), specific instructions (how) and benefits to the consumer (why) allows everybody to understand the rationale supporting each of the recommendations.

2.4. Validation

The process of consultation with scientists, health educators, risk communicators, and the WHO food safety advisors in regions and countries lasted more than a year. The final Five Keys to Safer Food poster was validated in 2001 by the Joint FAO/WHO Expert Committee on Microbiological Risk Assessment (JEMRA), an independent expert body of international scientists.

3. An international reference

Progressively, the Five Keys to Safer Food became a global reference source and by 2008 the poster had been translated into 50 languages, primarily initiated and financed by individual countries. Consistency and repetition are key parts of the success of a communication campaign to maximize impact and create a brand. As of 2018, 146 countries have reported using the Five Keys to Safer Food to train food handlers and food inspectors; educate consumers and school children; build healthy market places; improve food safety hygiene in canteens, health centres and hospitals; promote food safety in the tourism sector; and educate the general public at international events (e.g. international sport events) and prevent and control outbreaks (e.g. following natural disasters). As a result, billions of food handlers, including ordinary consumers, are empowered to prevent foodborne diseases, make safe and informed choices and have a voice to push for a safer food supply.

The poster is now (November 2018) available in 87 languages. It is suggested that the success of the “Five Keys” to a large degree can be attributed to four factors:

- Simplified and evidence-based messaging;
- Global messaging;
- Coherent and continuous messaging; and
- De-centralized funding through country buy-in.

3.1. Evidence-based information translated into simple messages easy to adapt and adopt - and provision of ready-to-use materials

The poster was immediately adopted by both developing and developed countries. Later, the countries translated the poster into additional languages to use in various settings. The use of local language is paramount in building trust within communities, and now generally promoted by the WHO (WHO, 2017b). The visual identity and the reference of keys allowed communities to easily adapt the text without changing the visual identity. During the original development “Five Keys” designers were prepared to adjust the messages according to cultural needs; however, users continued to use the poster messages as originally written with no feedback requesting terminology or contextual alterations.

In 2006, the Five Keys to Safer Food Manual was created as a facilitator’s guide on how to teach the “Five Keys”. WHO adapted the “Five Keys” to target additional audiences (e.g. travellers, food markets vendors, school children). The “Five Keys” were subsequently included in all WHO recommendations for health professionals and the general public to prevent foodborne diseases caused by microbiological contamination (WHO, 2015a).

In 2008 an augmented campaign known as the 3 Fives (Five Keys to
Safer Food, Five Keys to a Healthy Diet, Five Keys to appropriate physical activity) was launched during the Olympic Games in Beijing (WHO, 2008).

In 2015, to complement the existing “Five Keys” materials, WHO produced an educational animated movie to explain the Five Keys principles to audiences of all ages in a catchy and humorous style (WHO, 2015b) (Fig. 1 - QR code Five Keys to Safer Food video). It was embraced by countries, and quickly became the second most viewed video on WHO’s YouTube channel. Within months it was translated into more than a dozen languages.

3.2. The buy-in from countries, generating local funding and auto promotion

The development of the “Five Keys” campaigns was driven by WHO’s global headquarters along with the strong participation, commitment and collaboration from the Regional and Country Offices, which were involved from the beginning of the process. The communication strategy included the set-up of communication mechanisms to stimulate ideas and share experiences and tested solutions for example through the International Food Safety Authorities Network (INFOSAN) (FAO/WHO, 2004).

While WHO provided technical assistance to countries to help build national campaigns and design trainings, in many cases countries undertook to use the materials on their own initiative, investing their own funding, maximizing the dissemination of the messages through collaborative funding.

4. Continuing education efforts towards different target groups

In 2010, WHO extended the “Five Keys” concept to cover additional groups across the farm-to-table continuum by broadening the scope of the campaign and recognizing the importance of small-scale farmers within the food production chain. WHO’s objective in this was to promote the same understanding of the importance of food hygiene to protect health along the full food production chain, including small-scale primary producers. In the process, WHO wanted to target those who do not have access to food safety education despite the crucial role they play in feeding their community (e.g. female rural farmers).

4.1. Five keys to provide safer fruits, vegetables and aquaculture products

In 2008, JEMRA reviewed the scientific data and made recommendations for limiting the risks associated with microbial contamination of fruits and vegetables (FAO/WHO, 2008). A poster and manual (WHO, 2012) applying the “Five Keys” messages in this area was published in 2012.

In 2014, in collaboration with the FAO, WHO extended the Five Keys concept with the preparation of the Five Keys to Safer Aquaculture Products to protect public health. A poster and manual covering this area was published in 2016 (WHO, 2016).

The resulting two manuals focus on primary production and smallholder systems, and present a practical approach. Through repetition of the principles of hygiene, end-users can understand the health risks associated with contaminated food and the importance of adopting hygienic practices along the full food chain.

5. Discussion

Considering the need for preventive action throughout the full food production chain it seems obvious that everyone involved should have a clear understanding of the health risks associated with food. The development of the “Five Keys” should be seen in this perspective. The fact that the five messages did not need modification when spread to vastly different regions with a plethora of food preparation cultures speaks to the robustness of the messages but also to a general realization that the important food handling practices necessary to promote food safety are similar across the world. This does not automatically imply that introduction of the messages in a community will lead to change in behaviour. Indeed it was noted, based on experience with the adoption of the “Five Keys” messages in Ghana, that interventions should focus on intensive and continuous food safety education and strategies for eliminating barriers that can limit adoption of recommended messages (Omari, 2014).

An impact assessment of the “Five Keys” used in a resource-poor community in Ghana showed that 68% of the vendors had acquired some knowledge from the workshop and were putting it into practice (Donkor et al, 2009). Similarly, the provision of a food safety information poster targeting rural households (modified WHO Five Keys to Safer Food messages) in rural communities in Cambodia proved very effective in improving household food safety practices (Warnock, 2007). A community-based participatory approach in Vietnam to increase awareness and knowledge of inhabitants about food safety also used the “Five Keys” concepts, and results of the activities showed a decrease of incidence of diarrhoeas in the community (Takanashi et al., 2009). Nevertheless there is a continued need to initiate further research into the area to document effect of “Five Keys” messaging.

A significant amount of scientific research exists that more precisely examines the effects of the specific practices mentioned in the “Five Keys” programme as well as in similar national programmes (e.g. ‘Fight Bac’ in the USA). In light of this it is also interesting to note that the scientific validity of the messages and statements in the “Five Keys” has never been questioned.

The Key that continuously causes most confusion is the message about cross-contamination. There is, however, significant research documenting the importance of preventing cross-contamination in kitchens (Byrd-Bredbenner, Berning, Martin-Biggers, & Quick, 2013), and there is ample evidence that prevention of cross-contamination in kitchens reduces food safety risk (De Jong, Verhoef-Bakkenes, & Nauda, 2008); (Nauta, 2008), and that failure to prevent cross-contamination results in significantly higher contamination levels in kitchens (Evans E. R., 2018).

In general, when implementing mass communication initiatives relative to food safety, messages found to be effective are those that: a) are relevant to the target audience, b) contain reliable information, c) are rapidly distributed at appropriate times, and d) are repeated (Jacob, 2010). Those containing information that is easily received and understood have also been found effective and the use of media commonly accessed by today’s consumers is also valuable (Jacob, 2010). Based on case studies involving food handlers it has been suggested that creating a culture of food safety requires application of the best science with the best management and communication systems, including compelling, rapid, relevant, reliable and repeated food safety messages using multiple media (Powell, 2011). The relative success of the “Five Keys” initiative is likely to relate to the reliability of WHO (honest broker) with national regulators initially adopting the messages for national distribution, but also to the focus on explaining the ‘why’, which makes the message at the same time reliable, relevant and understandable.

The linkage to generalizable teaching material is an interesting spin-off of the “Five Keys” messaging. This notably includes the “Five Keys” messaging.
video and the cartoon characters representing good, bad and dangerous bacteria, which are useful also in general educational efforts about food and microorganisms, busting the myth that bacteria are always dangerous. This type of material has potential for further, future use both for consumers in general and specifically in educational material aimed at children of all ages, representing the use of a medium (YouTube video) commonly accessed by today’s youth as well as consumers in general. A heightened level of understanding in the general population about the life, action and effects of microorganisms in our environment, our food and indeed our bodies would support public health educational efforts in many areas, but food seems like a good entry point because we all relate to food several times every day.

It should be noted that the most recent efforts related to the “Five Keys” campaign have been aimed at redirecting the cartoon thinking and figures towards the explanation of the rather complex issues surrounding AMR in the food chain (WHO, 2017c). In the WHO brochure ‘Did you know that superbugs can be found in food?’ AMR is explained as a serious issue, also linked to food, suggesting a specific role for consumers in the general fight to stop the spread of AMR bacteria, using the cartoon characters from the “Five Keys” video. Improved awareness, and understanding of antimicrobial resistance through effective communication, education and training is part of the strategic objectives of the WHO Global Action Plan on Antimicrobial Resistance (WHO, 2015c).

There are limited educational material available for small-scale farmers in most parts of the world about food safety issues related to fruit and vegetable farming, and specifically about the influence of safe growing practices on the safety of the final products. While there are many national and international guidelines and standards designed for large aquaculture producers the educational materials available to introduce family farmers to the steps needed to produce safe and nutritious fish for themselves, their families and the local communities are limited. The adoption of effective food safety practices when growing and handling fruits, vegetables and fish will/could have impact on overall hygienic and environmental behaviours (WHO, 2015d), which should contribute to improve community health, protect the environment and support sustainable development. Thus the expansion of Five Keys training material also to this area is responding to an existing need.

According to WHO’s Strategic Communications Framework for effective communications published in 2017 “WHO’s communications goal is to provide information, advice and guidance to decision-makers (key audiences) to prompt action that will protect the health of individuals, families, communities and nations,” (WHO, 2017a). While this framework would seem to frame the key audience as decision-makers, it also includes an emphasis on principles for communication to be accessible, actionable, credible and trustworthy, relevant, timely and understandable. The principles presented in the framework were integrated in the Five Keys even before the framework was developed.

6. Conclusion

The “Five Keys” communication strategy of evidence-based, clear and simple messaging, coupling core messages with specific instructions and easily understood reasoning behind recommendations can serve as a model of how global messages can be developed and distributed, even with very limited resources. It also demonstrates how the concept can be expanded to reach additional audiences who play a key role in food safety from farm to table. In particular, this science-based, simple, but still explanatory communication methodology can be used for issues that affect a broad population but can be difficult to explain. This could include some of the increasingly challenging environmental issues (e.g. pollution, climate change and urban migration), issues where populations are confused due to compelling and contradictory information (e.g. vaccination), or issues where commercial interest clouds simple messaging (e.g. problems related to nutrition or antimicrobial resistance). This type of messaging could be used to inspire, motivate and guide in the successful development of preventive campaigns to reach the WHO’s objective of improving the health of 3 billion people by 2030 and to achieve the United Nations Sustainable Development Goals.

The take-up and local translations by over 140 countries of the Five Keys to Safer Food messages shows that a trusted source, sound science and simple messages can make a lasting difference in countries, especially when supported by strong communications activities based on a common drive. This also shows that expensive communication campaigns are not always needed, when the source is trustworthy, and the message is clear.

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