THE 7 G.R.A.P.H.I.C. PRINCIPLES OF PUBLIC HEALTH INFOGRAPHIC DESIGN

A new set of evidence-based guidelines to help the production & commissioning of health infographics for use with the general public.

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INTRODUCTION

Who is this guide for?
These guidelines are for any organisation or designer who needs to design or commission public health infographics for the general public.

Using the Guidelines:
The 7 GRAPHIC principles are all equally important. We strongly recommend that you go through each one in turn.

Where did the guidelines come from?
1. Results of interviews and viewing tasks with 85 members of the general public across Leeds, Wakefield and Halifax in West Yorkshire, UK.
2. Original findings from focus groups with 25 members of the general public in Leeds and York, UK.
3. Original analysis of popular health infographic formats.
4. Principles from key academic literature.

Add your own findings
The section on research methods is designed to encourage you to contribute your own research findings to www.visualisinghealth.com. The more we know about reception to and understanding of infographics, the more effectively we can design them.

WHAT IS AN INFOGRAPHIC?

The word 'Infographic' is an abbreviation of 'Information Graphic'. According to Lankow, Ritchie & Crooks (2012), put simply:

"AN INFOGRAPHIC USES VISUAL CUES TO COMMUNICATE INFORMATION"

This guide focuses on infographics that communicate a clear message and that simplify information for a general audience.

This guide does not offer support for more complex data visualisations for subject-specialists.

Lankow, J, Ritchie, J, & Crooks, R. (2012). Infographics: The power of visual storytelling. John Wiley & Sons.
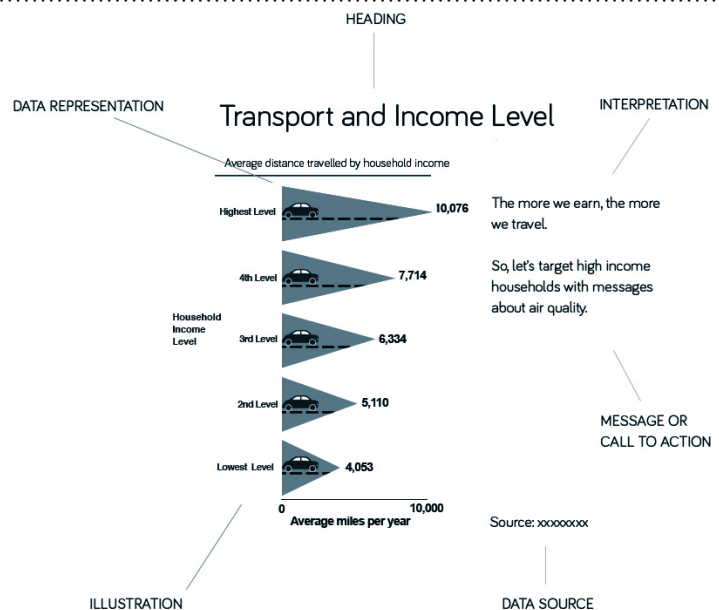
Many infographics contain combinations of the following:
1) An appropriate heading
2) A visual representation of data in the form of charts/graphs. The aim of the data representation is to draw attention to the statistics and also to make them easier to understand and remember
3) Illustration representing, say, the subject of the infographic
4) Brief Interpretation that highlights the main message
5) Key message or call to action
6) Source of the data
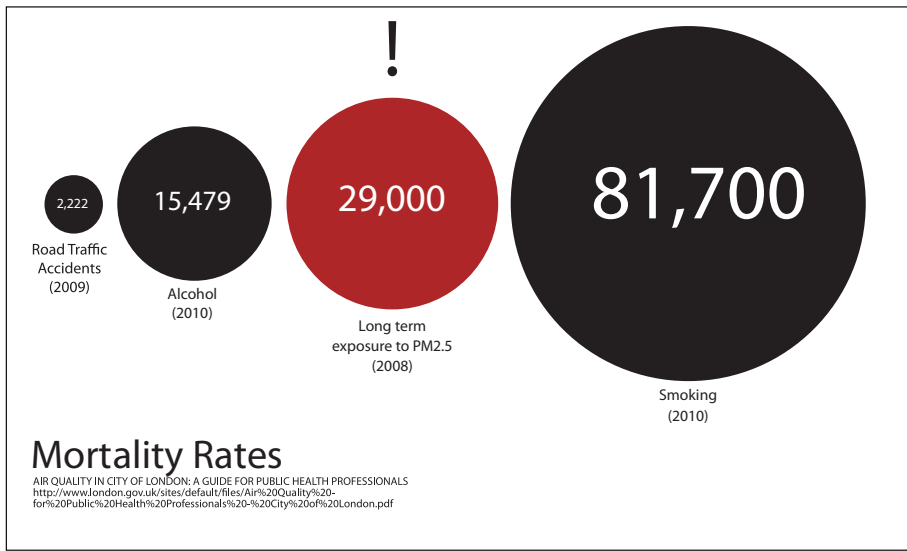
HEALTH PROBABILITIES

Often public health data is used to communicate personal health risks -e.g. frequencies or probabilities. Such information may play a role in behavioural change.

1 in 7 deaths are caused by smoking.
1 in 7 deaths are caused by inactivity.
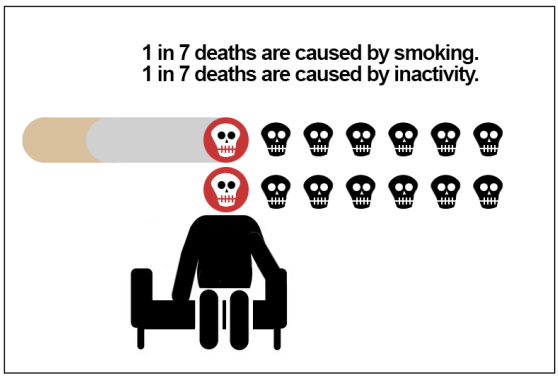
COMMON TYPES OF INFORMATION USED IN PUBLIC HEALTH INFOGRAPHICS

HEALTH QUANTITIES

Some data is concerned with quantities and comparisons, sometimes comparing rates over time or comparing causes of death or disease. Whilst not as personally relevant as risk information, it is still useful for the general public to understand societal trends and to appreciate what the largest health problems are.

!

2,222
Road Traffic Accidents (2009)

15,479
Alcohol (2010)

29,000
Long term exposure to PM2.5 (2008)

81,700
Smoking (2010)

Mortality Rates
AIR QUALITY IN CITY OF LONDON: A GUIDE FOR PUBLIC HEALTH PROFESSIONALS
http://www.london.gov.uk/sites/default/files/Air%20Quality%20-for%20Public%20Health%20Professionals%20-%20City%20of%20London.pdf

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01 GET TO KNOW YOUR AUDIENCE

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DEFINE YOUR AUDIENCE

The first 4 questions you need to ask when creating an infographic is:

1) Who is your audience?

2) How will they see it?

3) What is the key message you want them to 'take away'?

4) What are the key barriers to communication?

We'll look at each one of these questions in turn in this section.

We asked a group of 15 public health professionals in the UK to identify the audiences who see their data. This is what they said:

PUBLIC HEALTH SPECIALISTS

PUBLIC HEALTH COLLEAGUES
LOCAL AUTHORITIES/COUNCILS
DIRECTORS OF PUBLIC HEALTH

HEALTH PROFESSIONALS

PRACTICE NURSES
GENERAL PRACTITIONERS

NON HEALTH AUDIENCES

THE PUBLIC
STUDENTS
VOLUNTARY SERVICES
CULTURAL/ARTS SECTOR
FUNDING BODIES
LOCAL COUNCILLORS
DEVELOPERS (HOUSING/TRANSPORT)
PORTS/AIRPORTS

Whilst this guide focuses on the design of infographics for the general public, there are many other non-specialist, non-health audiences who might benefit from an infographics approach.

How can you present the data in a way that connects with a particular audience?

For instance a local councillor may want to quickly understand the financial implications of disease prevalence whilst a member of the general public needs to be able to first notice and then understand the risks of getting a disease.
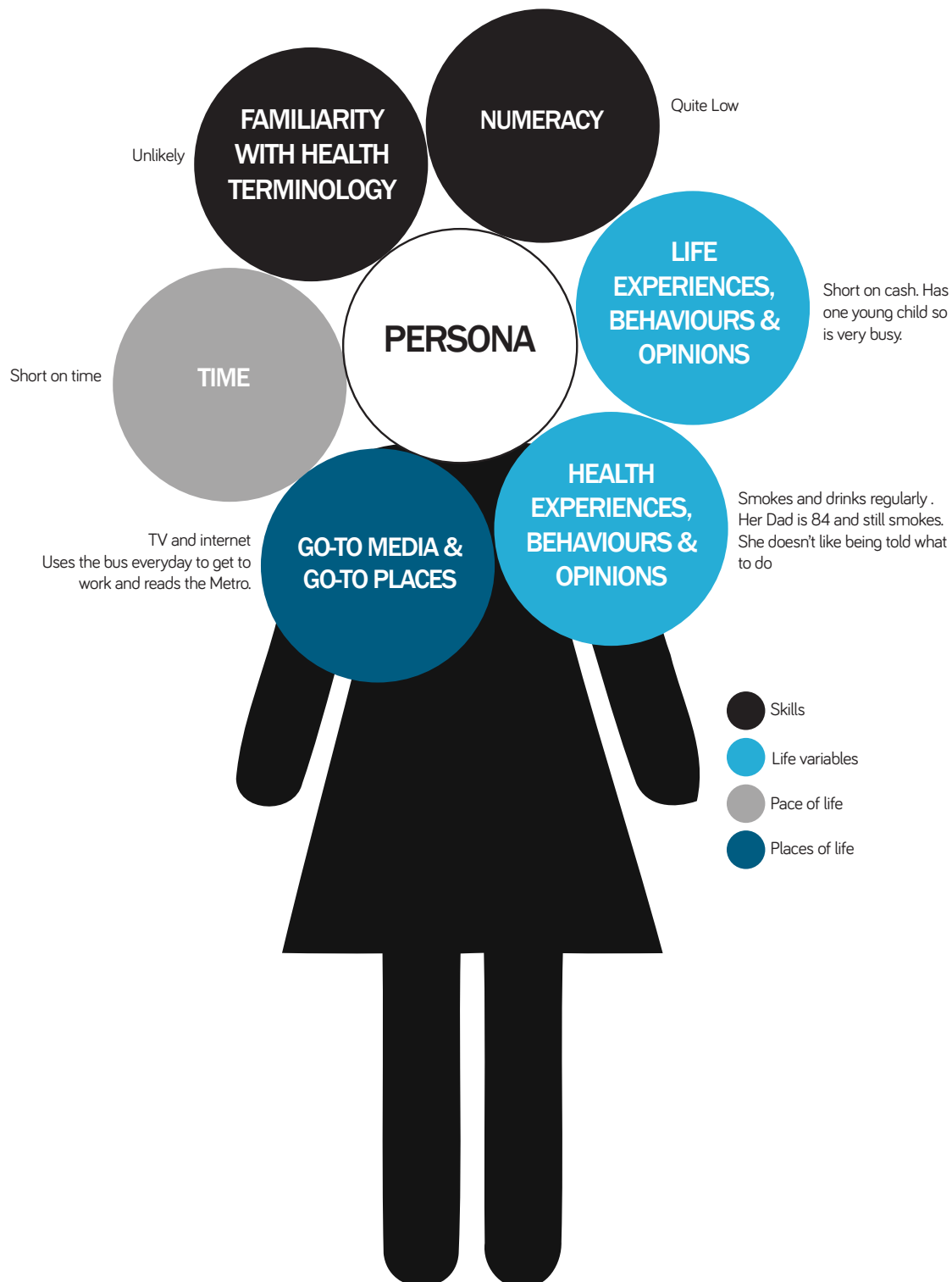
BUILD A PERSONA TO HELP UNDERSTAND YOUR AUDIENCE

The 'general public' is made up of individuals with different personalities and needs. One of the first things we need to do is create a design persona for the kind of individuals you want to reach. You can consult the persona documents whenever you want to question particular design and content decisions.

To build a design persona, create, say 4 'archetypal' audience members and write down their characteristics according to the structure below. You can also create your own structure to tailor the persona further. You can also include 'fictional' photographs too to aid designers in imagining the audience more clearly.

Predicting the life variables, in particular, will be hard so build your personas by researching the audience more via interviews and focus groups.

Personas will help to bring your audience more into focus.

FAMILIARITY WITH HEALTH TERMINOLOGY

Unlikely

NUMERACY

Quite Low

LIFE EXPERIENCES, BEHAVIOURS & OPINIONS

Short on cash. Has one young child so is very busy.

PERSONA

TIME

Short on time

HEALTH EXPERIENCES, BEHAVIOURS & OPINIONS

Smokes and drinks regularly . Her Dad is 84 and still smokes. She doesn't like being told what to do

GO-TO MEDIA & GO-TO PLACES

TV and internet
Uses the bus everyday to get to work and reads the Metro.

Skills

Life variables

Pace of life

Places of life

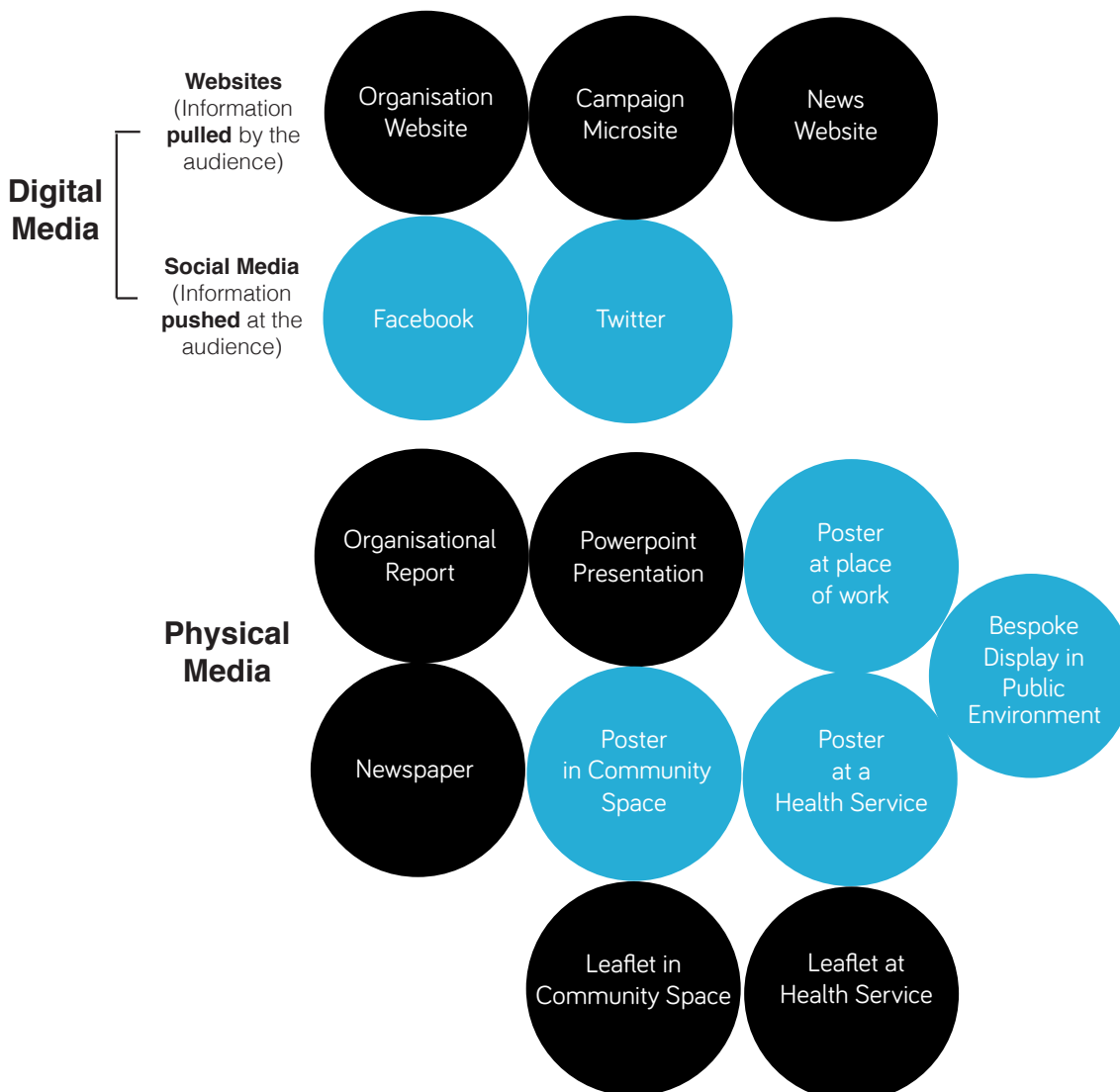# CONSIDER WHERE YOUR AUDIENCE WILL SEE THE INFOGRAPHIC

Infographics can be used in a wide variety of locations. Unlike pure text-based approaches the images and bright colours within infographics make them highly suitable for media that requires an immediate impact such as social media or posters. All these locations demand efficiency of communication, as non-specialists are unlikely to spend time studying your designs.

Attention-Seeking
These infographics will require simple messages presented with greater attention to visual qualities such as bright colours and relevant images.

Accompaniment
These infographics will require simple messages that provide a clear accompaniment to surrounding text.
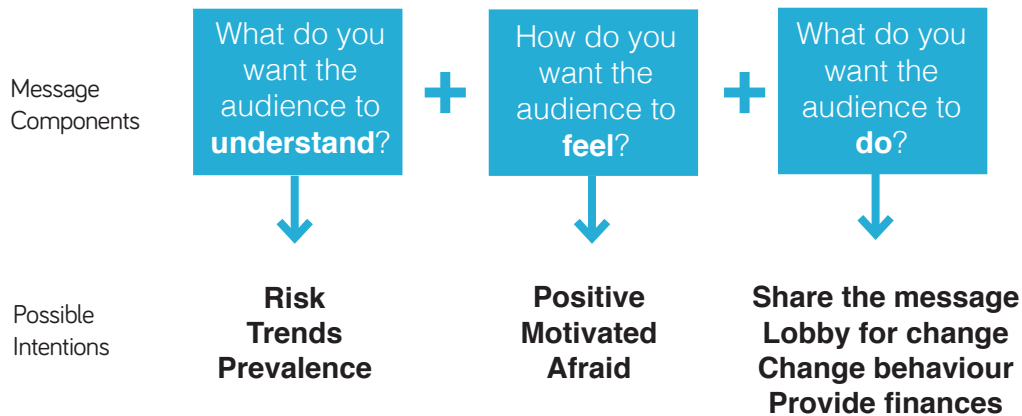
Sharing
Be clear in your identification of appropriate media. Consider scenerios and critique your distribution strategies. Why would a health infographic be shared on social media amongst teenage friends?

Digital Media

Websites
(Information **pulled** by the audience)

- Organisation Website
- Campaign Microsite
- News Website

Social Media
(Information **pushed** at the audience)

- Facebook
- Twitter

Physical Media

- Organisational Report
- Powerpoint Presentation
- Poster at place of work
- Bespoke Display in Public Environment
- Newspaper
- Poster in Community Space
- Poster at a Health Service
- Leaflet in Community Space
- Leaflet at Health Service

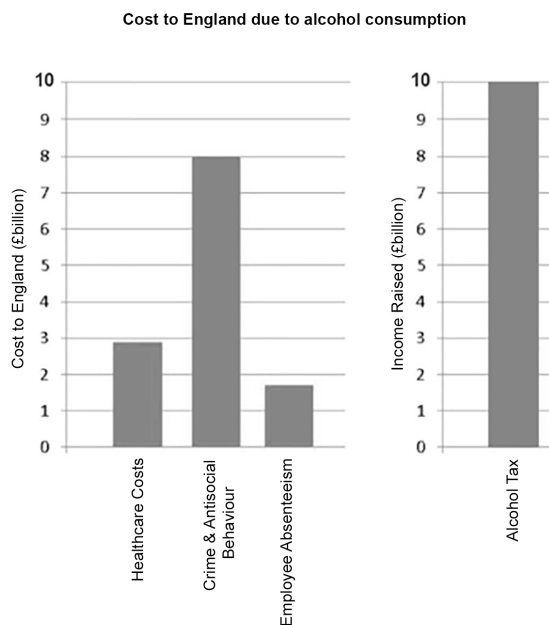# DEVISE A KEY MESSAGE AND TONE TO GUIDE CONTENT AND VISUAL DESIGN CHOICES

Once you've identified your audience and appropriate media, consider the key messages you want the infographic to communicate. This 3 step structure for planning is useful.

Message Components

| What do you want the audience to **understand**? | **+** | How do you want the audience to **feel**? | **+** | What do you want the audience to **do**? |

Possible Intentions

**Risk
Trends
Prevalence**

**Positive
Motivated
Afraid**

**Share the message
Lobby for change
Change behaviour
Provide finances**

PROVIDE A KEY MESSAGE IN WORDS

When 85 people were asked to interpret the simple bar graph (shown below) related to the costs caused by alcohol versus the amount raised in alcohol taxes, 19% of participants focused their answer on the high amount raised by alcohol tax, sometimes claiming that the government were making more money by alcohol tax than they spent.

People generally were not prepared to add values together and instead they tended to make assumptions based on quick glances. It's therefore important to pick out key messages for the general reader.

Cost to England due to alcohol consumption

Cost to England (£billion): Healthcare Costs, Crime & Antisocial Behaviour, Employee Absenteeism

Income Raised (£billion): Alcohol Tax

"So they're not going to stop us drinking cos they're making too much money out of it"
Female, 63

"After paying for this we're still in profit"
Female, 41

Shah, P., & Hoeffner, J. (2002). Review of graph comprehension research: Implications for instruction. Educational Psychology Review, 14(1), 47-69.

Shah & Hoeffner, (2002) compared viewers' interpretation of graphs that depicted familiar data for which they had expectations and unfamiliar relationships for which viewers did not have any expectations. Overall, when viewers were familiar with the data they tended to describe those relationships ignoring data points that didn't 'fit' with their expectation.

BARRIERS TO THE RECEPTION OF YOUR MESSAGE

As part of our interview and focus group research we spoke to over 100 members of the general public and we were met with a variety of responses to infographics, not just relating to their visual appearance but also to their content.

CHOOSE KEY MESSAGES THAT ARE PERSONALLY RELEVANT & SURPRISING

"Congestion in Leeds is a real issue for me"

Male, 31

"I didn't realise liver disease had gone up that much"

Male, 50

During a recall test of 12 infographics 85 participants were asked why they thought they could remember a particular infographic or a fact.

The top 4 reasons cited for their recall of particular infographics were:
1. Personal Experience/Relevance
2. Surprise
3. No Reason
4. Visual Appearance of Infographic

To try to ensure as much personal relevance ensure that your target audience is tightly specified. If you want to target smokers, ensure it reaches them through specific media.

Notice also how 'surprise' appears on the list. Avoid familiar facts and highlight new findings or equivalencies. For instance, the fact that smoking and inactivity have equal risk of mortality was cited as being surprising in our study.

ACKNOWLEDGE DISBELIEF

"I think that's a load of rubbish…I don't believe a word of it. That's not my experience"
Female, 51

"But executives have a different type of stress so I thought it would be pretty even"
Female, 63

"I think they're useful as I've always tried to be healthy but where do they get their figures from? How do they know? It's 50/50 I believe"
Female, 71

Just because the infographic is based on a reliable source it doesn't mean the viewer will always believe it. People apply their own knowledge when considering facts. Some people will integrate their own personal anecdotes and experiences to the data and will be keen to question it.

People may also question how the information has been found. A simplified statement about 'How we know' may be useful to append.

In your own field of public health where does scepticism lie? Counter it through use of a small piece of simplified text such as :

'Even accounting for where you live, or your genetic history, 20 studies in 5 countries found the above to be true'

CONSIDER AN INFOGRAPHIC'S ROLE IN BEHAVIOURAL CHANGE

There are many triggers that can influence behavioural change. During our focus group discussions most participants expressed the view that personal risk statistics could play a role in their decision making, though not as strongly as direct experience of their own health and body. Local health statistics played a smaller role than personal risk statistics.
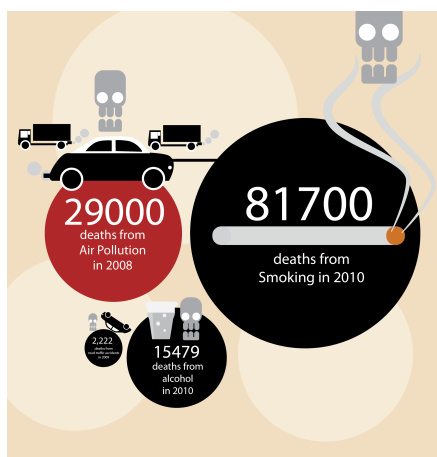
The most common triggers judged likely to lead to behavioural change by the participants were (in order of rated 'likelihood'):
1. How my body feels
2. A personal health scare
3. How my body looks
4. Experiences of friends/family members & how my body used to feel & look
5. Reading/seeing health statistics about my own personal risk

Statistics and thus infographics are only one part of a complex mix of influences on behaviour. By trying to ensure that the infographic is both noticeable, understandable and memorable, we can maximise its chances of making a difference.

AVOID COMPLEXITY

People, in general, value simplicity and simple messages

29000 deaths from Air Pollution in 2008

81700 deaths from Smoking in 2010

2,222 deaths from road traffic accidents in 2010

15479 deaths from alcohol in 2010

Whilst the image on the left resembles contemporary infographics in terms of busyness, people interviewed generally thought it had too much information on it. This was particularly the case for people in the sample who left school at 16 or had no qualifications.
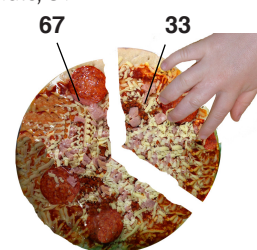
"Too confusing for me"
Female, 49

"Too many numbers"
Female, 40

"It's obvious – people would get the message straight away"
Male, 31

67   33

OBESITY IN AMERICA
33% of children are obese or overweight

FIND SIMPLER WAYS TO EXPRESS RISK REDUCTION

Check that the statistic is as simply described as possible. For example, risk can be complex to describe. In our focus groups there was some confusion about relative risk percentages, with participants wanting to know absolute risk values too.
This tended to make people suspicious of the numbers and in some cases people felt figures were over-inflated, despite being based on good evidence.

Do precise figures always have to be used? In the example below, is it just as effective to say 'exercise reduces your chances of getting dementia'?

Exercise can reduce your risks of disease

HEART DISEASE (-14%)

LUNG CANCER (-21%)

DEPRESSION (-25%)

DEMENTIA (-25%)
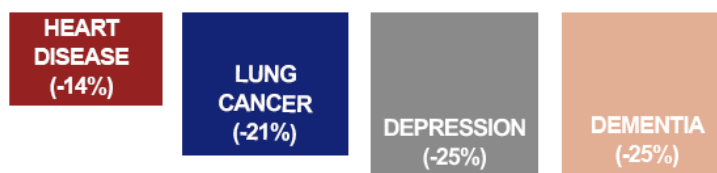
EVALUATE DESIGNS WITH YOUR AUDIENCE

AUDIENCE EVALUATION 1: EYE TRACKING

You may want to consider researching into how effective your infographic is at gaining attention. One way you can do this is to set up an eye tracking study. An eye tracking device varies in cost to buy and can also be hired. You need both an eye tracking camera and software. Participants must be in the room with the camera and sat in front of your designs.

Pros:
1. Gives 'objective' views about where people look.

Most eye tracking software will tell you where people look within a graphic and the order of their viewing. They will also tell you how long viewers look at certain areas. To the right is an example of a screenshot of some eye tracking scanpaths. Raw data is also usually available from the programs to statistically analyse for significance.

Cons:
1. Doesn't tell you why people look where they do unless followed up with interview or 'talking out loud' methods.
2. Not always suitable for older audience where vision problems exist.
3. Generates a lot of data

AUDIENCE EVALUATION 2: COMPREHENSION TASKS

To gauge how people understand certain infographics, you can either ask fixed questions e.g. how many people have diabetes in the UK, or you can ask for the overall meaning of the infographic.
You can time people's reactions if speed is an issue though remember that all participants will process information at different speeds.

There are two main types of knowledge (Hawley et al, 2008) you could measure:

VERBATIM: Accurate reading of the numbers/details within the infographic.
GIST: Getting the overall message/meaning of the infographic.

Since we are dealing with a non-specialist audience in this guide, it is recommended to focus on overall understanding rather than on rates of being able to read numbers from a legend on a chart. Since reading public health data is essentially 'optional' we need to examine how people engage with infographics generally first - e.g. do they process the information or make comparisons. Are they, for instance, prepared to read 'into' the data to reach a conclusion?
We tested for 'gist' knowledge in our study though where you are developing specific designs you may well want to test verbatim knowledge associated with identifying key areas or reading the text with ease.

Shah, P., & Hoeffner, J. (2002). Review of graph comprehension research: Implications for instruction. Educational Psychology Review, 14(1), 47-69.

There is a plethora of work on graph comprehension which mostly stems from the discipline of psychology. The work tends to look at familiar formats - bar and line graphs and pie charts rather than newer formats or unusual infographic styles. Shah & Hoeffner (2002) produced a useful review of graph comprehension with an emphasis on using them for learning and instruction

Pros:
1. Provides accurate record of comprehension e.g. people either understand or they don't.

Cons:
1. Can be time consuming to code results.

Hawley, S. T., Zikmund-Fisher, B., Ubel, P., Jancovic, A., Lucas, T., & Fagerlin, A. (2008). The impact of the format of graphical presentation on health-related knowledge and treatment choices. Patient education and counseling, 73(3), 448-455.

AUDIENCE EVALUATION 3: RECALL TASKS

Open recall involves showing the participants a series of designs. These may be nested within larger documents or on their own. You can fix the time they are viewed or allow for self-directed viewing. The latter is recommended where your audience is diverse.

Once they have been viewed you ask them to say out loud what they remember and why they think they remember it.

Also consider what it is you want to measure about the recall:
1. Having seen the infographic
2. Correctly remembering the gist (overall meaning) of the infographic.
3. Correctly remembering actual statistics from the infographic (verbatim knowledge).

Short Term Recall
This will involve asking participants what they remember almost immediately after they saw the designs.
This provides a quick snapshot of immediacy though doesn't guarantee that the message or the graphic will be retained in memory. In our study we performed short term recall tasks only due to the timescale of the project.

Long Term Recall
This will involve a follow up interview after, say 7-14 days, where you ask participants again what they remember seeing. Whilst more useful than short-term recall this method is more resource intensive.

! When you analyse your results ensure that you factor in 'primacy' and 'recency' effects - e.g. the infographic that is seen last or first likely to be recalled more. To minimise this effect, ensure there is a distraction before asking participants what they recall. In psychology tests where participants have been found to memorise through verbal rehearsal (e.g. saying the facts over and over), distraction tasks have involved counting down in 3's from 100 or asking them a different set of questions for at least a minute.

Pros:
1. Helps to identify what 'sticks' in people's minds.

Cons:
1. People often struggle to remember many details.
2. It can feel artificial.

AUDIENCE EVALUATION 4: APPEAL TASKS

For judging overall appeal create a structured environment for participants to give their views.

For instance, to help people rate and rank designs create small versions of designs they've already seen and ask them to place them in either 'good', 'ok' or 'poor' positions on a table. Then follow this up with discussions.

You can also use focus groups to gauge broad opinions about appeal though do ask people to form individual opinions first. Go round the room to ensure you gain the views of everyone before opening it up to a group discussion.
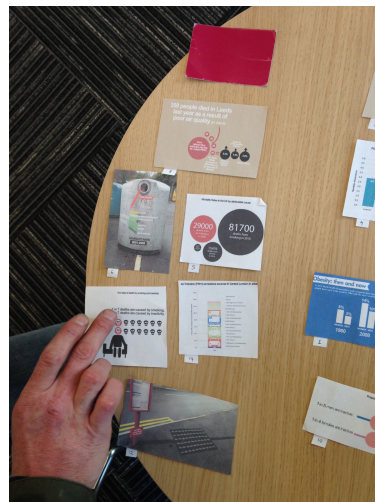
Pros:
1. Provides rich qualitative data.
2. Allows for open and unexpected responses.

Cons:
1. People often struggle to articulate why they have particular responses to visual information.
2. It's still unclear what role appeal plays in the attention to, comprehension of and recall of infographics.