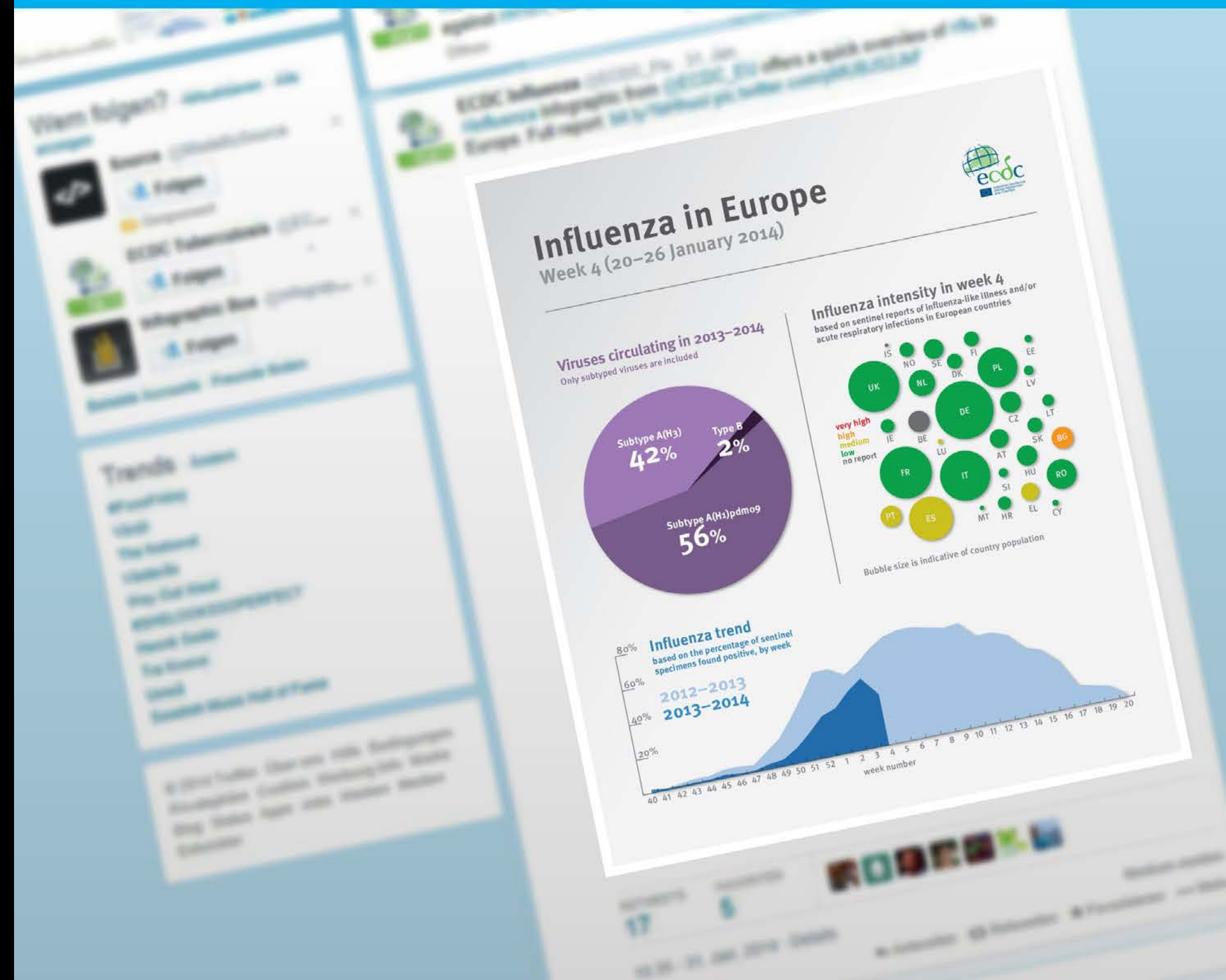# Data visualisation at ECDC

With a focus on infographics produced in-house

The European Centre for Disease Prevention and Control (ECDC) should aim to become the leading source of reliable and timely information in the field of communicable diseases in Europe and worldwide. Diseases do not know borders, therefor e ECDC should focus on Europe, but also monitor global developments.

The press and the public need credible information that is prepared properly. Processing data carefully and drafting the right messages takes time. On the other hand, those who are in need of information might turn to other sources if not served early enough. Rumour and misinformation can quickly be perceived as fact and so need to be countered rapidly. To balance these desires is a challenge. To achieve this, ECDC needs to define new tools and update its communication procedures.

People are interested in ECDC's content and are happy to share or retweet it if the output is appealing, credible and timely. Only content that fulfils these criteria leads to a higher visibility and to further user engagement.

In the last months ECDC's social media platforms gained increasingly more user participation after new infographics have been published. Consequently, many now consider infographics a helpful tool for a variety of communication purposes.

This document presents the past and present situation with regard to (information) graphics and offers advice on how to solve current problems.

ECDC will soon finalise a first set of infographics. Graphics will cover all ECDC disease programmes and visualise datasets, causal relationships and knowledge facts. Some of these graphics explain knowledge or relationships, some other visualise a data set.

In the future, the ECDC website will serve as a pool for visual representations of all aspects of communicable diseases. All diseases that fall under ECDC's mandate will eventually be represented by an infographic explaining the current state of disease knowledge.
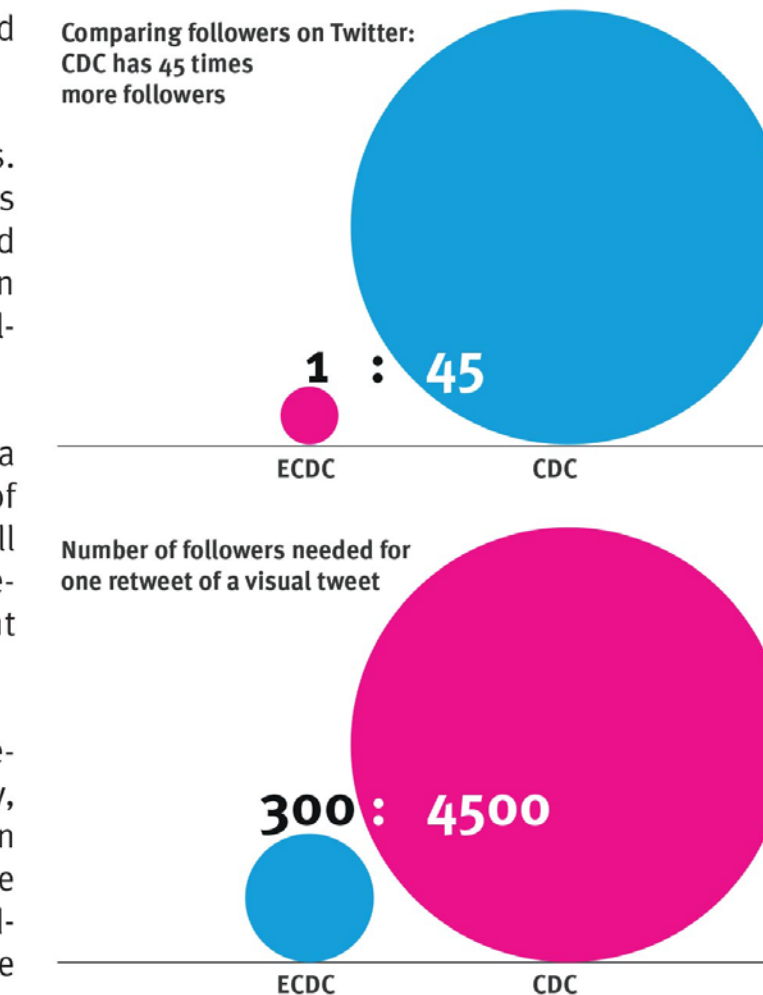
Some graphics will be static, others will be presented in a motion format. More importantly, regularly updated datasets will be available on ECDC's website in an interactive format. The users' participation should be a major consideration for future planning. A new user interface design of ECDC's website should incorporate infographics in all possible formats and support interactive data visualisation. Infographics displaying real-time data or containing interactive elements will become a core output. Motion graphics, a good tool for explaining more comprehensive topics will complete ECDC's portfolio (See 4.2).

Social media channels will give ECDC an active voice. Infographics, which are easily understood, will give ECDC's experts the possibility to better advertise findings and publish opinions. The information transported by infographics will help ECDC to engage in online discussions and increase visibility on third-party websites.

When comparing user participation, ECDC is already in a very promising position.

A post on ECDC's Twitter channel that contains a visual element (picture or infographic) creates about 20 retweets. The twitter channel of CDC (US) creates about 63 retweets per visual post. This number looks a lot less impressive when one takes into account that CDC has 45 times as many followers as ECDC. So in terms of user participation, ECDC is actually ahead: while CDC averages 1 retweet per 4500 followers (per visual post), ECDC needs only about 300 users to get the same result.

Comparing followers on Twitter: CDC has 45 times more followers

1 : 45

ECDC   CDC

Number of followers needed for one retweet of a visual tweet

300 : 4500

ECDC   CDC

The way we communicate has fundamentally changed in the last decades. We are able to communicate faster, cheaper and more globally than ever before. It has become easier to consume data and it has never been easier to provide information at the same time. This massive amount of information needs to be consumed and processed, which requires new methods of communication. Our attention span has shortened and social media platforms like Facebook, Pinterest, Twitter and Instagram facilitate this behaviour. Infographics, in many different forms, enable us to meet these new challenges.[1]

1. Making data talk

1.1 What is data visualisation?

Data visualisation is the creation and study of the visual representation of data, meaning "information that has been abstracted in some schematic form, including attributes or variables for the units of information"[2]. These visualisations help people see things that were not obvious to them before. Even when data volumes are very large, patterns can be spotted quickly and easily. Visualisations convey information in a universal manner and make it simple to share ideas with others. It lets people ask others, "Do you see what I see?" And it can even answer questions like "What would happen if we made an adjustment to that area?"

Figure 1

Interplay of design, data and narrative
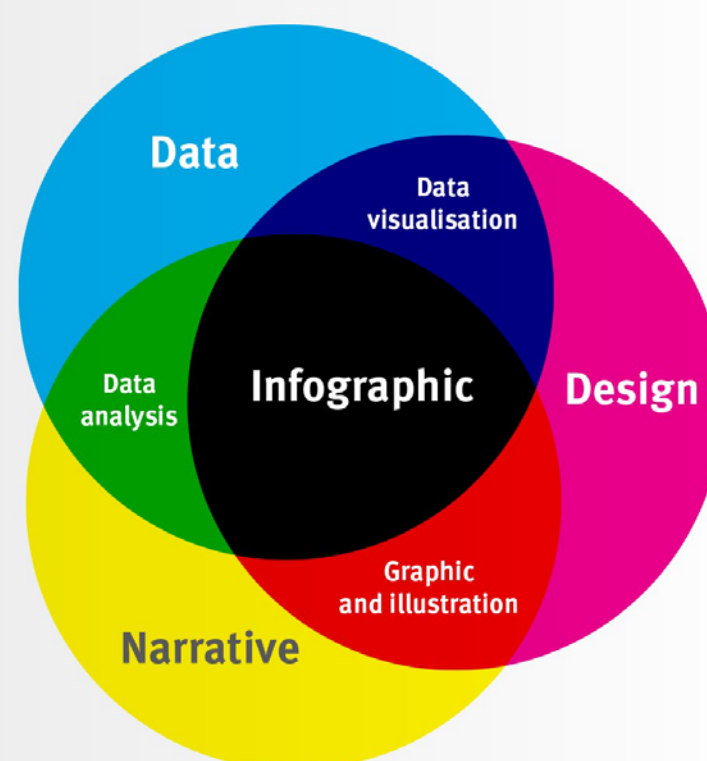
According to 'the picture superiority' effect, concepts are much more likely to be remembered experientially if they are presented as pictures rather than words. Experiments testing associative recognition memory, participants studied random concrete word pairs and line drawing pairs. They had to discriminate between intact and rearranged pairs. The picture superiority effect continued to exert a strong effect, with a greater hit rate for intact picture pairs.[3]

Some examples of basic forms of data visualisation can be found at the end of this document. (Annex 1)

1.2 What are infographics?

Infographics are visual representations of information, data or knowledge intended to present complex information quickly and clearly, utilising the processing power of the human visual system and its ability to see patterns and trends.[4]

In newspapers, infographics are commonly used to show the weather, maps, site plans, and graphs for statistical data. Modern maps, especially route maps for transit systems, use infographic techniques to integrate a variety of information, such as the conceptual layout of the transit network, transfer points, and local landmarks. Public transportation maps, such as those for the Washington Metro and the London Underground, are well-known infographics. Public places such as transit terminals usually have some sort of integrated "signage system" with standardised icons and stylised maps.[5]

Infographics are generally created for the purpose of telling or explaining a specific story, and are usually intended for a specific audience, thus infographics are mostly subjective. They are self-contained and discrete: it is information presented with context.

Many modern infographics combine multiple types of data visualisations into one graphic, along with other features, such as illustrations and text. Some do not even contain data visualisation, and instead are simply a colourful and succinct way to present knowledge. Fifty-three percent of the 30 most-viewed infographics on the infographic sharing site visual.ly did not contain actual data.[6]

Data visualisation roadmap

Now
Assure consistency in the production process of infographics. ECDC has to implement a workflow. Approval steps, responsible people and goals need to be defined (See 4.5 and Figure 14)

Now
The way ECDC publishes infographics on the website and its social media channels need to be unified. Date, timing and back-linking follow common agreements. (See 4.4)

Within 3 month
Together with updated design guidelines copyright issues are going to be solved. License-free fonts will be used and a handbook on how to modify infographic templates is available.

Within the next few months
The possibilities of infographics and data visualisation are known to all ECDC staff/scientists. Experts are involved in the process of coming up with new concepts.

Within one year
The appeal of data visualisation at ECDC is enhanced and comprehensive data visualisation guidelines are in place. These guidelines focus on attractiveness of data presentation and are less dogmatic with regard to corporate branding.

Within one year
Infographics that occur on a regular basis should be understood as a stage eventually leading to real-time data visualisation. Within the next year ECDC will introduce tools to display such content on the website. ECDC will assess the various technolgies available.

Within the next years
Automatise the production of data visualisations. All data which can be published without major reformatting should be produced by an automated system. This would empower ECDC's scientists to produce graphics without assistance from the team.
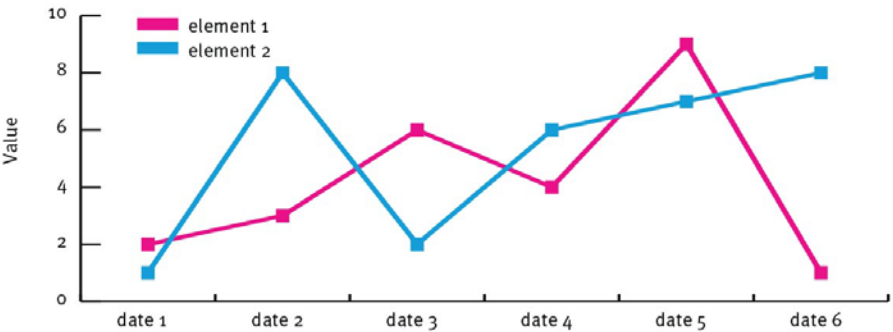
Within the next years
ECDC is the main source for visualised public health topics, providing up-to-date information and comprehensive coverage of disease data.
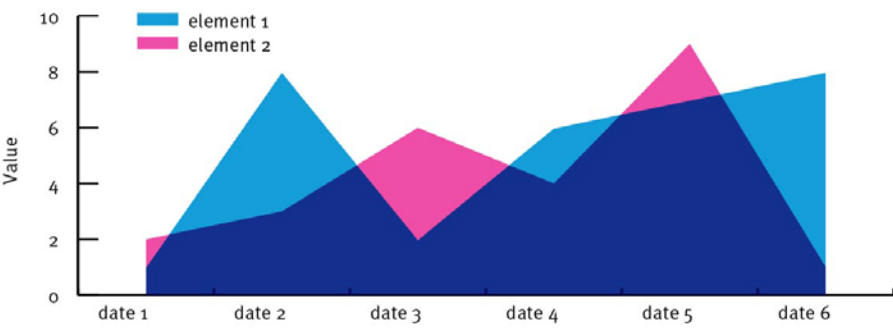
## Annex 1. Data visualisation examples

Time-series

A **line chart** or line graph is a type of chart which displays information as a series of data points connected by straight-line segments


A **layered area chart** or area graph displays graphically quantitive data. It is based on a line chart.

Stacked graphs are area charts that are stacked on top of each other, and depict aggregate patterns.
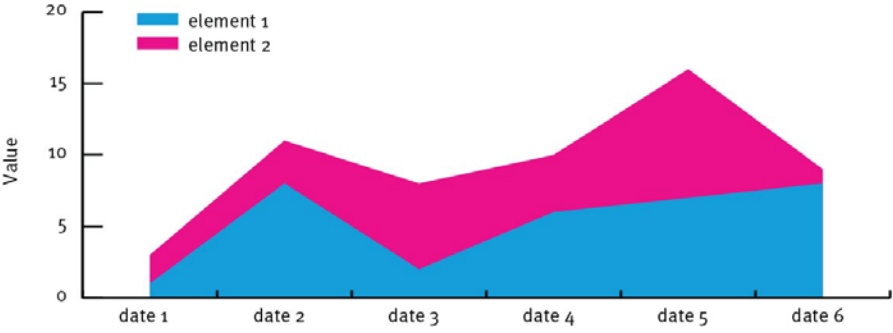
An alternative to stacked graphs are **small multiples**. Instead of stacking each area chart, each series is individually shown so the overall trends of each sector are more easily interpreted
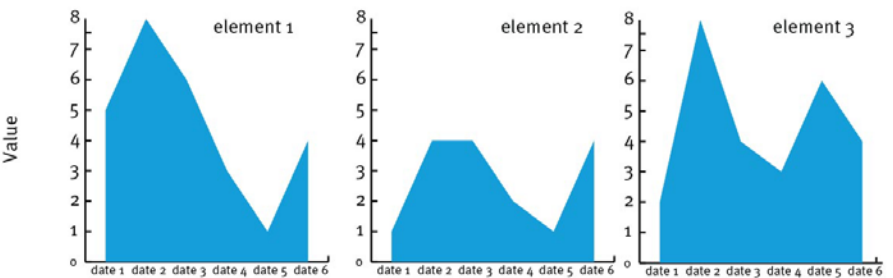
Horizon graphs are a space-efficient method to increase the data density of a time-series while preserving resolution
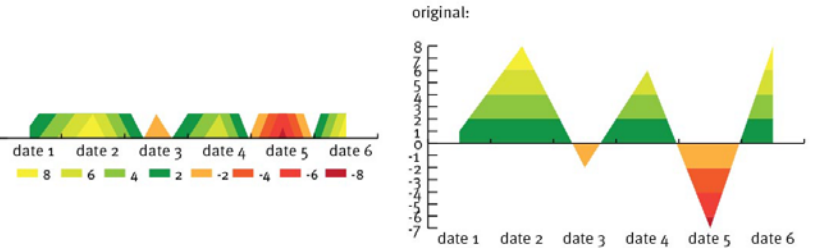
An **epidemiologic curve,** or epi curve, is a graphic tool used in the investigations of epidemics by public health scientists known as epidemiologists. The graph displays time on the horizontal axis and the number of cases of a disease on the vertical axis.
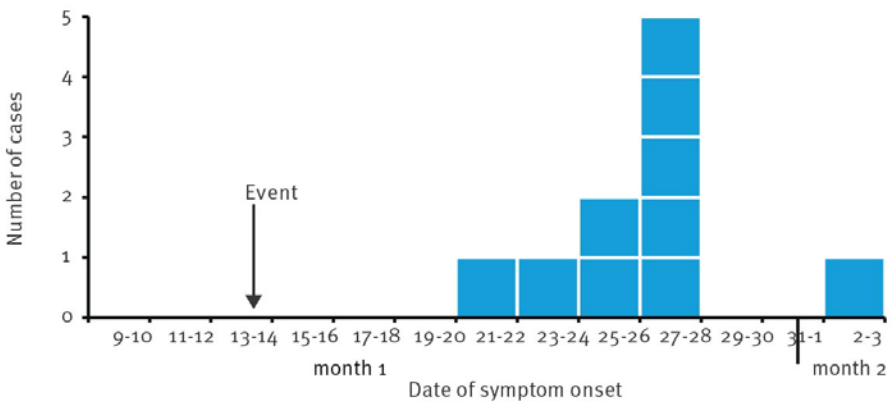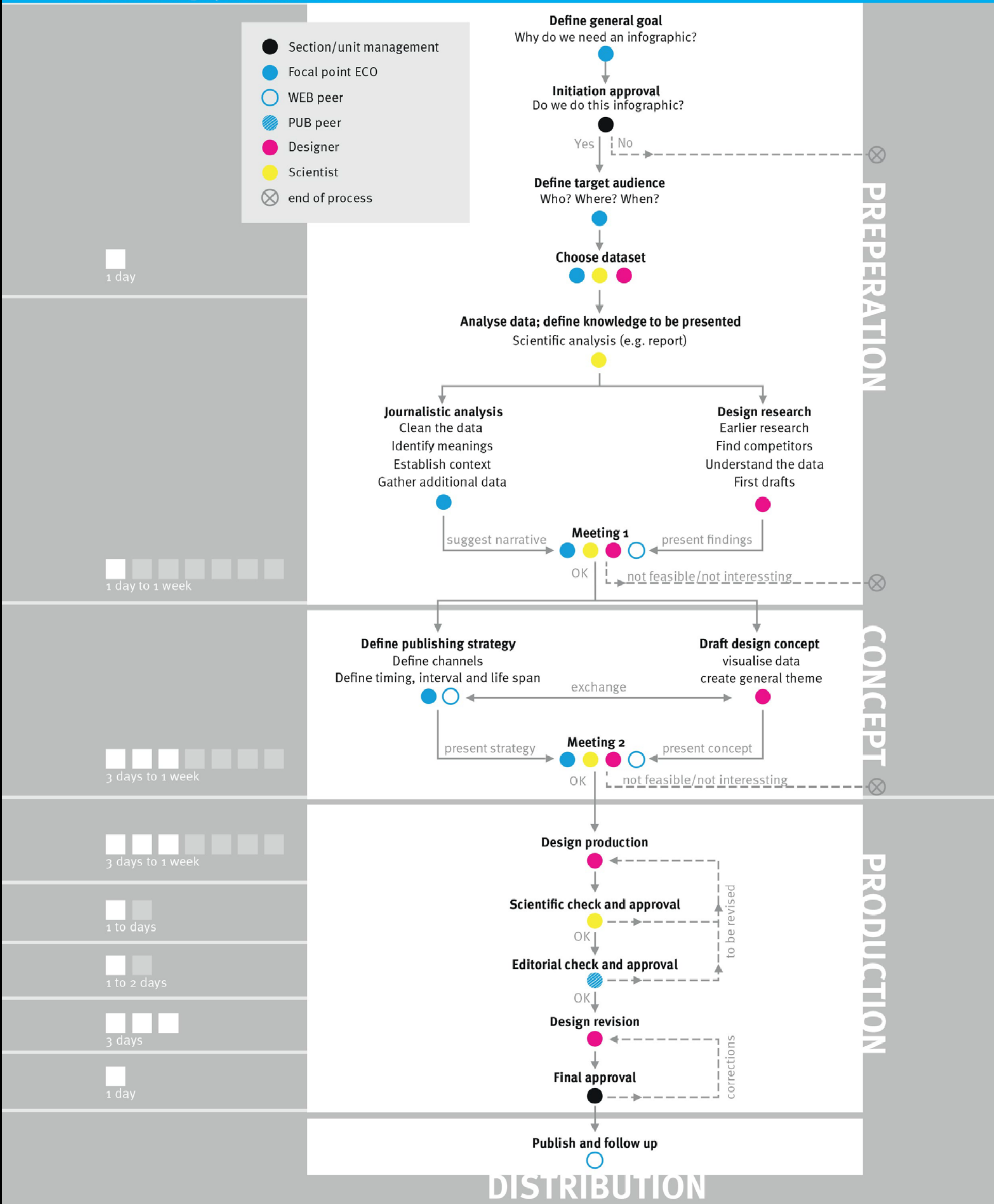
Figure 14

Draft of an infographic workflow for ECDC

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