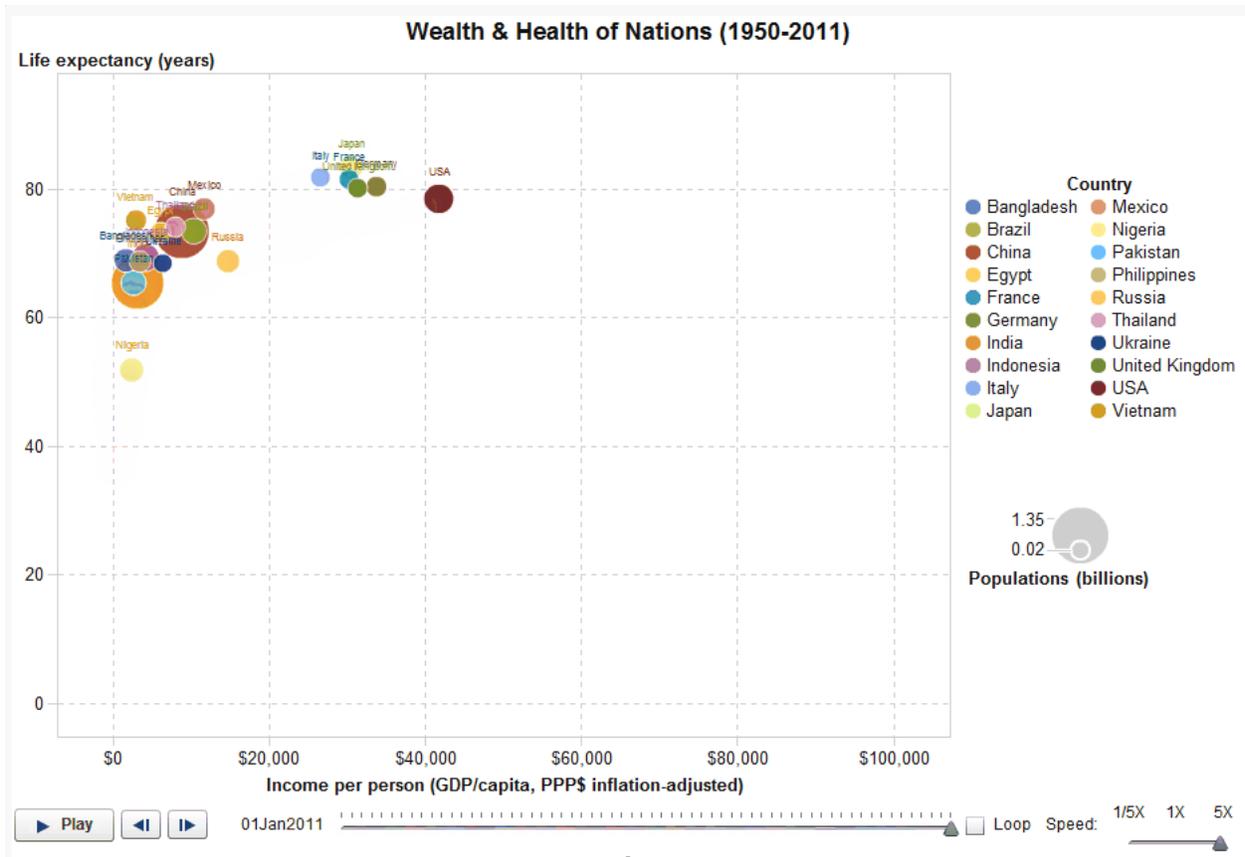


Q1: Describe an innovative and effective form of information visualization that you have found helpful to convey complex and voluminous information. What do you like about it? How could it be improved?



This graph was taken from <https://blogs.sas.com/content/sgf/2017/02/24/18-visualizations-created-by-sas-visual-analytics/gapminder/#prettyPhoto>

To me, this is an innovative and effective way to show how the top 20 country's life expectancy and income per person has changed over the years from 1950 to 2011. The population of each country is represented by the size of the color-coded dots. I love the fact that the data sets are on a loop so that each progression of each country is shown every year. The active movement of the country's dots over the years holds my attention longer.

What would be interesting is to:

- 1) Instead of starting at the \$0-x and 0 years-y axis, I would like it to have started on the \$0-x axis and 40 years y axis. The small dots felt too small. I would've like to have seen the data up "closer".
- 2) I would love it if you could separate each country so that I could see a specific country or set of countries instead of all of them at once.

Q2:

Consider what features of medical software might be important for hospital stakeholders who are in charge of purchasing software. Next, consider what features might be important for medical staff who use that software. How might the perspectives of these 2 sets of end-users influence the design of the EMR software that is ultimately purchased?

Oftentimes hospital stakeholders are made up of local business leaders, lawyers, government and private sector leaders, and providers, sometimes active and sometimes retired, such as physicians and nurses. Hospital board members are concerned with ensuring safe, effective, and efficient patient care.¹ They would want patients to have a positive healthcare experience. After all, the better the experience, the more confidence people have in the hospital and its care, which is spread by word-of-mouth and online reviews and surveys. The more people that are drawn towards the hospital, the more revenue it will bring in to help with operating expenses and show a return of investment for investors, charitable donors, and taxpayers.

Clearly, the cost of an EMR weighs heavily for hospital stakeholders. However, they are concerned as well with meeting patient safety standards within the hospital to avoid lawsuits which would damage the reputation of the hospital. Hospital stakeholders want:

- efficient workers making minimal errors, so making the case for software usability by clinicians can be tied to lower patient safety risk and thus lower overhead and overall costs for the hospital.
- an EMR that can integrate with a data hub that is securely protected to house PII data on its patients
- To know the cost of maintenance of the EMR and upgrades
- Whether the EMR can fit seamlessly into the current hospital digital environment and if not, what the integration plan is

The point of needing functionality for software usability would likely need to be made by the medical staff to remind the hospital stakeholders of the real world implications of the ultimate design of the EMR software and why it matters.

Medical staff would want software features that allowed for ease of information visualization and access so that based on that accurate information, a diagnosis or a treatment plan could be quickly started. Prioritization of lists and alerts and color coding to indicate severity are fundamental standards that would need to have the input of the medical staff.

In the end, the medical staff would need to make a strong case to the hospital stakeholders for usability and examples that would translate to real-world issues that are tied to some dollar amount. And that is how these two sets of end users would influence the EMR decision making process.

¹ <https://insights.diligent.com/board-of-trustees/what-is-the-composition-of-a-hospital-board-of-directors>

Q3:

Considering Nielsen's 10-Usability Principles and Design Heuristics, describe a piece of software or a device that you are familiar with (does not need to be health care related) that, in your evaluation, has been designed with these goals in mind, and could be shown as a good example of these usability goals.

10 Usability Principles and Design Heuristics by Nielsen:

1: Visibility of System Status

A blood pressure machine has a cuff that inflates to a specified pressure of 180 mm/Hg, which displays on a digital screen and then there is a countdown of that pressure that coincides with the release of pressure from the cuff.

There is a beep when the pressure is 0. The systolic pressure over diastolic pressure is displayed to show the system status (aka it indicates completion of task)

2: Match between system and the real world

There are guidelines to these blood pressure numbers

For example, anything above 140 / 90 is considered Hypertension by the American Heart Association (AHA)

However, there is rarely a key to those numbers on the device unless it is a large machine/kiosk in such places as CVS MinuteClinic. In theory, a clinician will be the one taking the blood pressure and thus would not need an indicator and meaning of the different ranges.

3: User control and freedom

There is a stop / off button and one can undo the velcro on the arm to be able to stop the process of taking the blood pressure.

4: consistency and standards

Numbers are universal and the key ranges of normal and the power on/off is universal as well.

5: error prevention

There is a stop / off button and one can undo the velcro on the arm to be able to stop the process of taking the blood pressure.

6: Recognition rather than recall

There is a visual “how to place the cuff on a person’s arm” on the cuff itself

The on/off are common symbols indicating function.

7: Flexibility and efficiency of use

Mobile blood pressure machines are available for novice/home users. They can be portable for greater flexibility and efficiency of use. Those units for novice users have a how-to instruction guide as well as more visual aids on how to use the unit itself.

8: Aesthetic and minimalist design

The unit is relatively small in size and no extraneous information on the digital display such as interpretation of results of the blood pressure.

9: Help users recognize, diagnose, and recover from errors

If blood pressure was not correctly read, then “error” is displayed, which is the prompt to retake the blood pressure

If there is a low battery, the warning displayed is “low battery”. The user can then either recharge the battery or replace the battery.

10: help and documentation

The help/documentation would be the user guide enclosed in the blood pressure machine box or a reference to an online help / documentation guide to use the system.