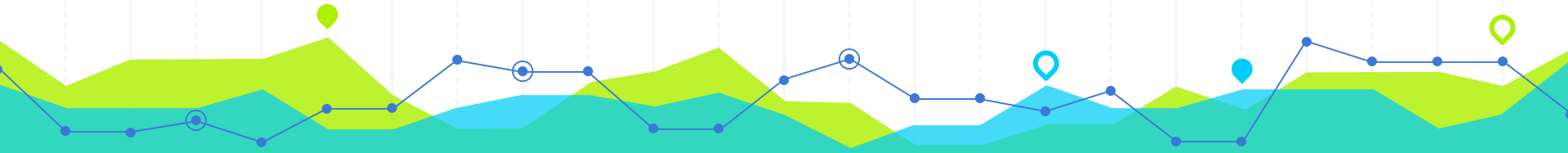
Amy Estill

Auburn Larose

LET’S GET VISUAL!

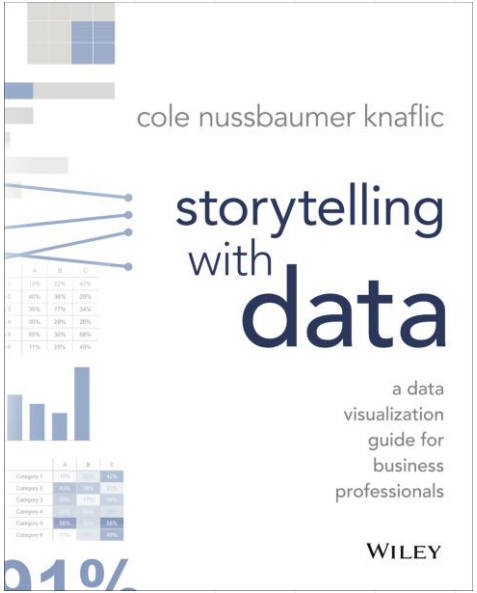
TODAY'S LEARNING OBJECTIVES

- Understand the basics of data visualization and infographics
- Learn skills and collect tools to create effective visualizations
- Find creative inspiration for your visualizations

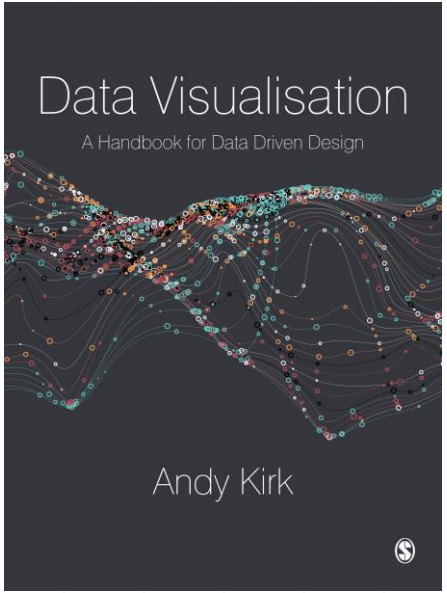


Tell Us About Yourself!

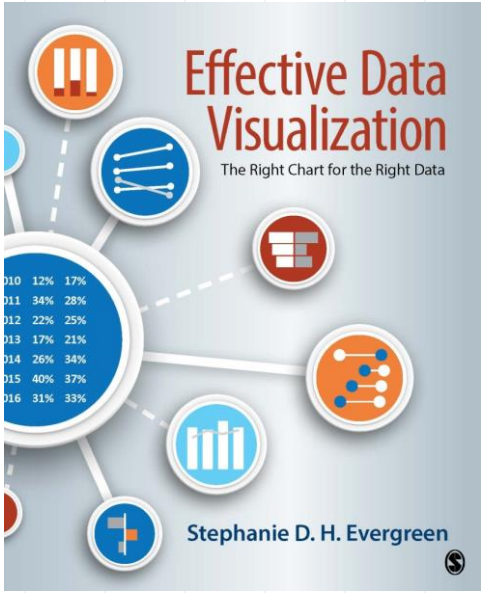
SOURCES OF INSPIRATION



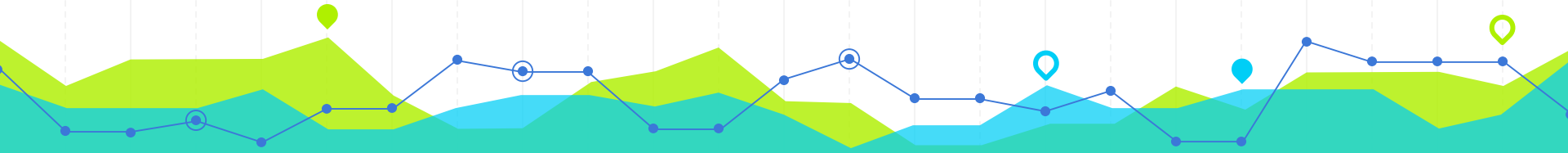
Storytelling with Data
by Cole Nussbaumer Knaflic



Data Visualization
by Andy Kirk



Effective Data Visualization
by Stephanie Evergreen

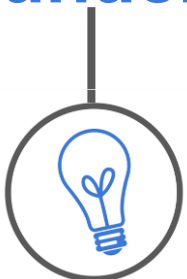


DATA VISUALIZATION 101

1

So, what is data visualization anyways?

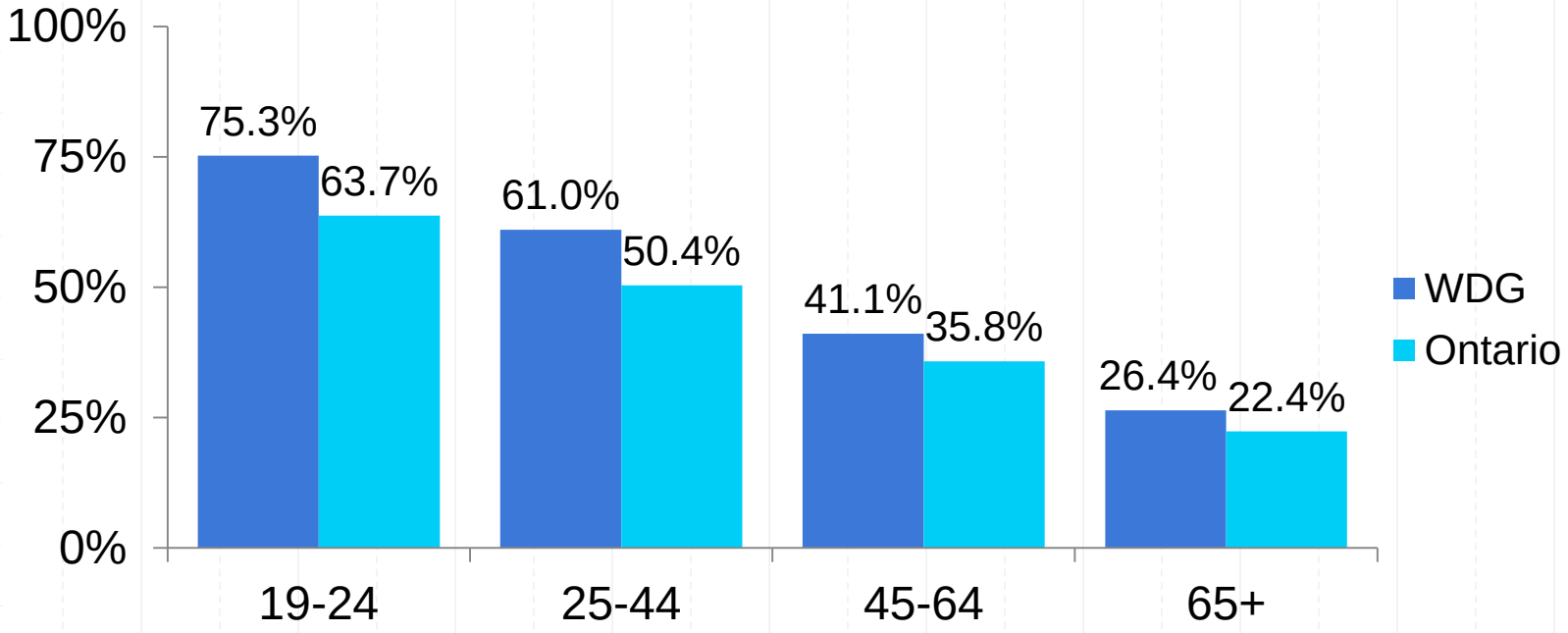
The representation and presentation of data to facilitate understanding.



TYPES OF DATA VISUALIZATIONS

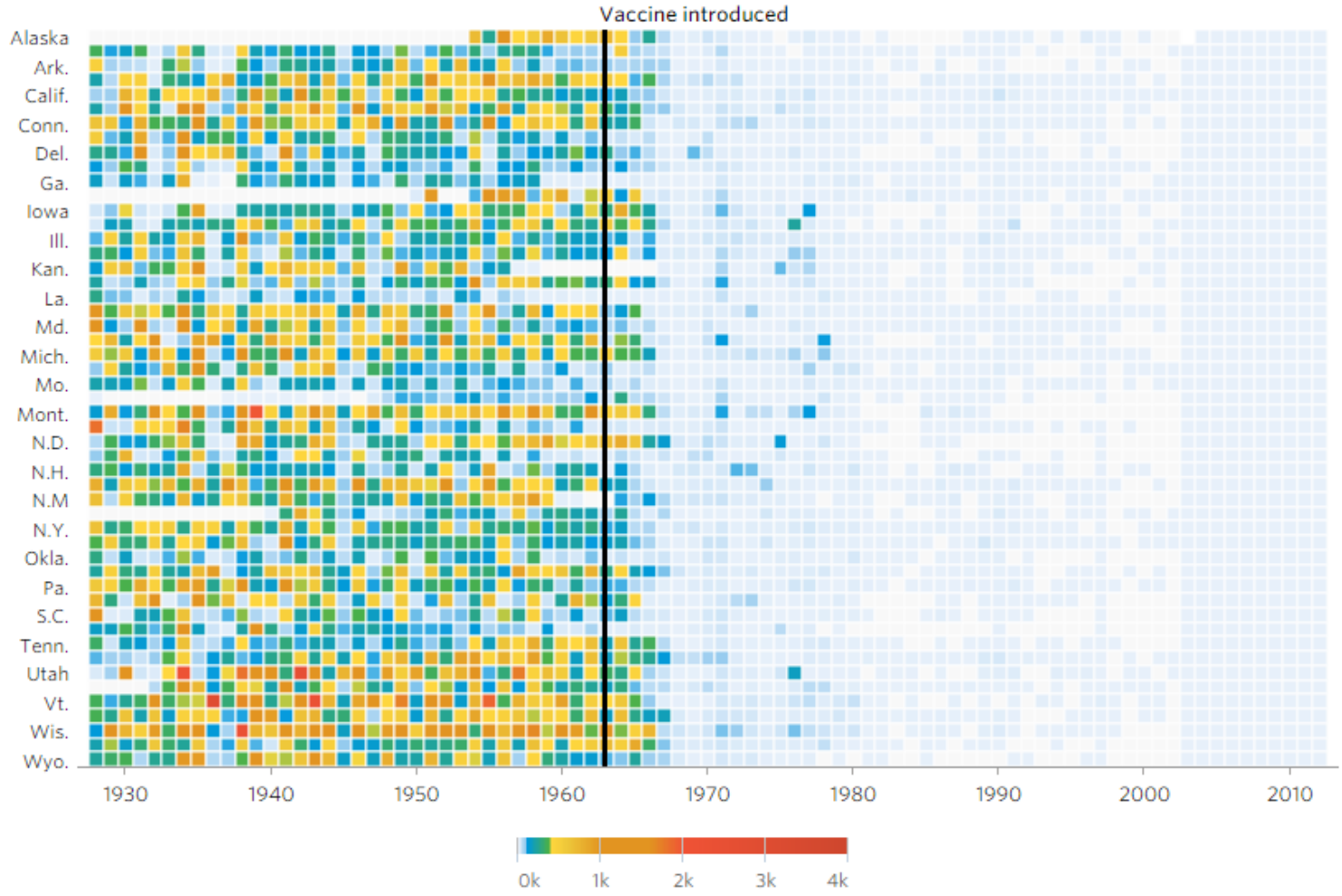
2

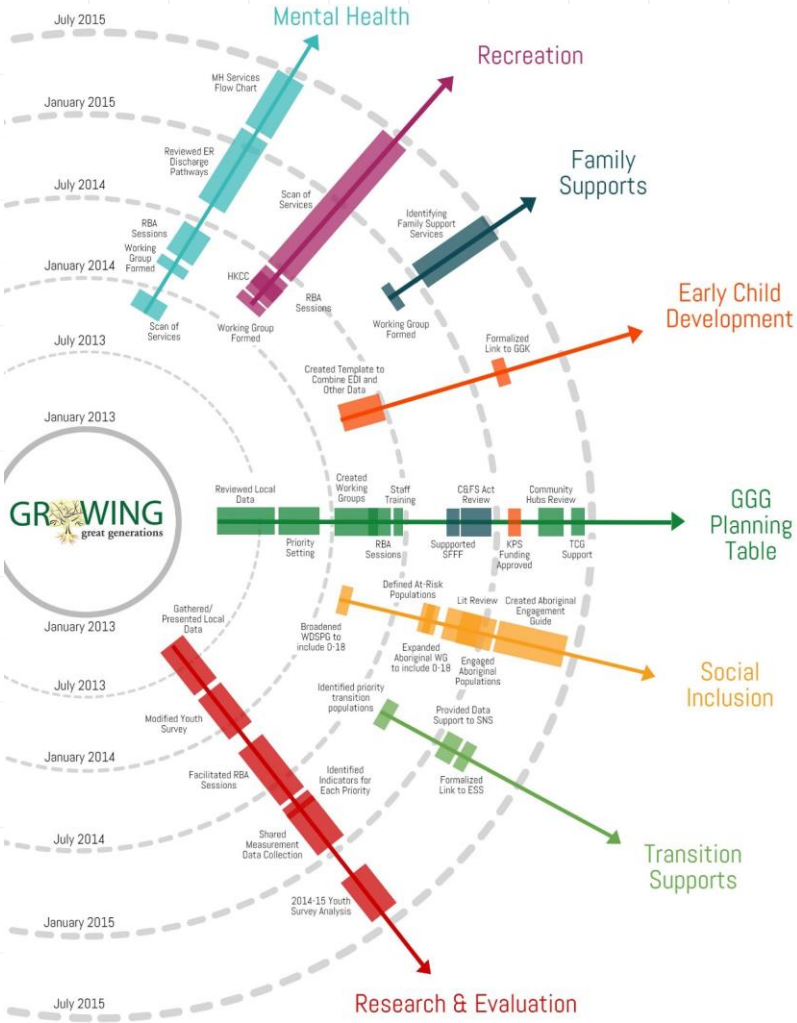
Risk of exceeding the low-risk drinking guidelines decreases with age



Source CCHS, 2013

Measles


Vaccine introduced
Alaska
Ark.
Calif.
Conn.
Del.
Ga.
Iowa
Ill.
Kan.
La.
Md.
Mich.
Mo.
Mont.
N.D.
N.H.
N.M
N.Y.
Okla.
Pa.
S.C.
Tenn.
Utah
Vt.
Wis.
Wyo.
1930
1940
1950
1960
1970
1980
1990
2000
2010
0k
1k
2k
3k
4k


July 2015
January 2015
July 2014
January 2014
July 2013
January 2013
January 2013
July 2013
January 2014
July 2014
January 2015
July 2015
GROWING great generations
Mental Health
MH Services Flow Chart
Reviewed ER Discharge Pathways
RBA Sessions
Working Group Formed
Scan of Services
Recreation
Scan of Services
HKCC
RBA Sessions
Working Group Formed
Family Supports
Identifying Family Support Services
Working Group Formed
Early Child Development
Created Template to Combine EDI and Other Data
Formalized Link to GGK
GGG Planning Table
Reviewed Local Data
Priority Setting
Created Working Groups
Staff Training
RBA Sessions
C&FS Act Review
Supported SFFF
Community Hubs Review
KPS Funding Approved
TCG Support
Social Inclusion
Defined At-Risk Populations
Broadened WDSPG to include 0-18
Expanded Aboriginal WG to include 0-18
Lit Review
Created Aboriginal Engagement Guide
Engaged Aboriginal Populations
Transition Supports
Identified priority transition populations
Provided Data Support to SNS
Formalized Link to ESS
Research & Evaluation
Gathered/ Presented Local Data
Modified Youth Survey
Facilitated RBA Sessions
Identified Indicators for Each Priority
Shared Measurement Data Collection
2014-15 Youth Survey Analysis

2011 CENSUS BULLETIN: Marriage & Families

This report summarizes the family, household and marital status data for Wellington, Dufferin, and Guelph (WDG). In 2011, our area was home to 75,510 census families. In WDG, 61.1% of people aged 15 and over were married, down from 62.1% in 2006. The number of children aged 25+ living at home in WDG increased by 14% since 2006.

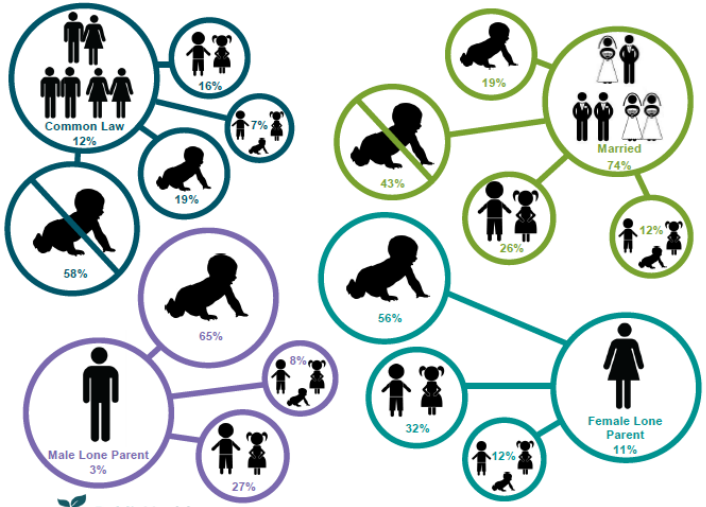
28.1% of Guelph's population 15 and older have never been legally married.

WDG had an average of **1.1** children per census family.

59.9% of married couples in Dufferin have children living at home.

In Wellington County **11.9%** of couple families are common law.

WDG Marital Status by Presence of Children At Home



PublicHealth
WELLINGTON-DUFFERIN-GUELPH
Stay Well.

Note: Direct comparisons cannot be made between the 2006 Census Long-Form data and the 2011 National Household Survey, which replaced the Long-Form. The 2006 Census Long-Form was mandatory while the new 2011 National Household Survey was voluntary. Due to this change in methodology, the 2011 sample may be subject to underreporting, or non-response bias, from individuals of certain sub-groups who are less likely to respond to surveys.

Strength in Numbers
month/year

If
Community Name
were a village of 100 people

Gender
male
female

Age
0-14
15-24
25-64
65-74
75+
median age: #

Marital Status
single / never married
common law
married
divorced / separated / widowed

Languages Spoken at Home
En
English
Fr
French
top non-official languages

Population Groups
Aboriginal peoples
visible minorities
immigrants

employed
low income

renters
owners

Community Data Program
CCSD's flagship initiative

Source: Statistics Canada, 2011 Population Census; 2011 National Household Survey. The Community Profile series is produced by the Canadian Council on Social Development (ccsd.ca) using data available from its Community Data Program (communitydata.ca)

How does breastfeeding help your baby?

Breastfeeding helps your baby to continue to grow outside the womb. It is a natural progression! Colostrum (first milk) and breast milk have all the essential nutrients in all the right amounts to develop and protect your baby. It is the best food and medicine you can give to your precious baby!

Gives your baby 32% more brainpower that improves memory, speech and ability to think and understand information.

Decreases risk of childhood cancers, sudden infant death, diabetes and obesity.

Has 10x more vitamins, which improves eyesight so they see better.

Reduces ear infections so they hear better.

Builds twice as strong immune systems to fight off infections such as pneumonia and chest infections so they have 74% less infections than formula fed babies.

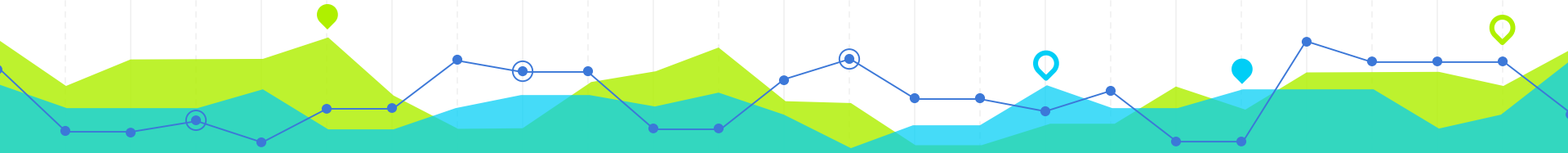
Prevents bacteria/viruses from entering the body which decreases stomach flus and diarrhea by 64%.

WHAT DATA HAVE YOU VISUALIZED?

How long have you been visualizing data?

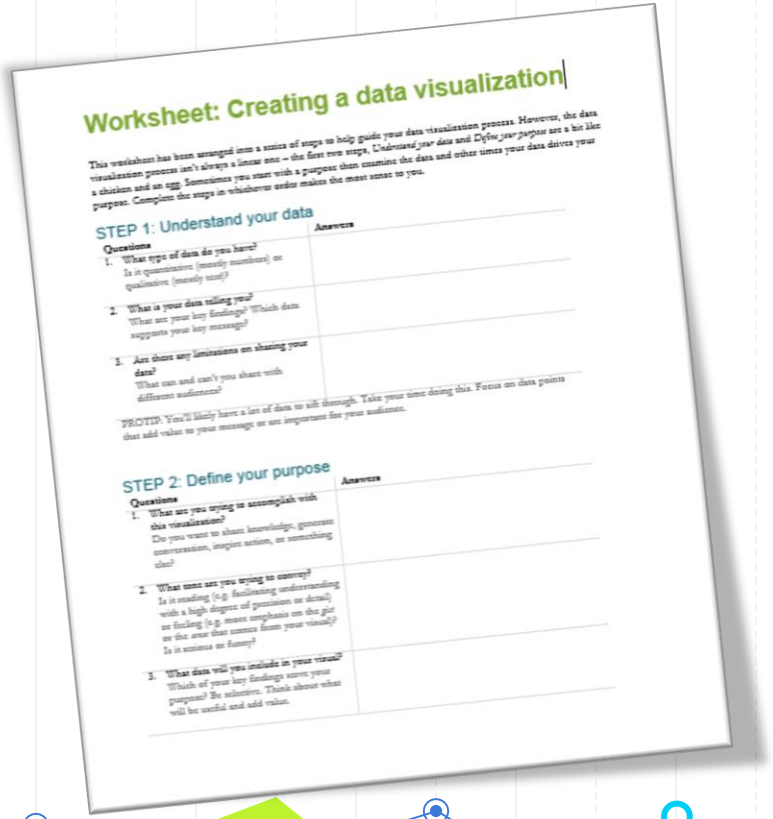
How do you typically visualize data?

Why does data visualization matter?



DATA VISUALIZATION BASICS 3

HOW TO MAKE AN EFFECTIVE VISUALIZATION



Worksheet: Creating a data visualization

This worksheet has been arranged into a series of steps to help guide your data visualization process. However, the data visualization process isn't always a linear one – the first two steps, *Understand your data* and *Define your purpose* are a bit like a chicken and an egg. Sometimes you start with a purpose then examine the data and other times your data drives your purpose. Complete the steps in whichever order makes the most sense to you.

STEP 1: Understand your data

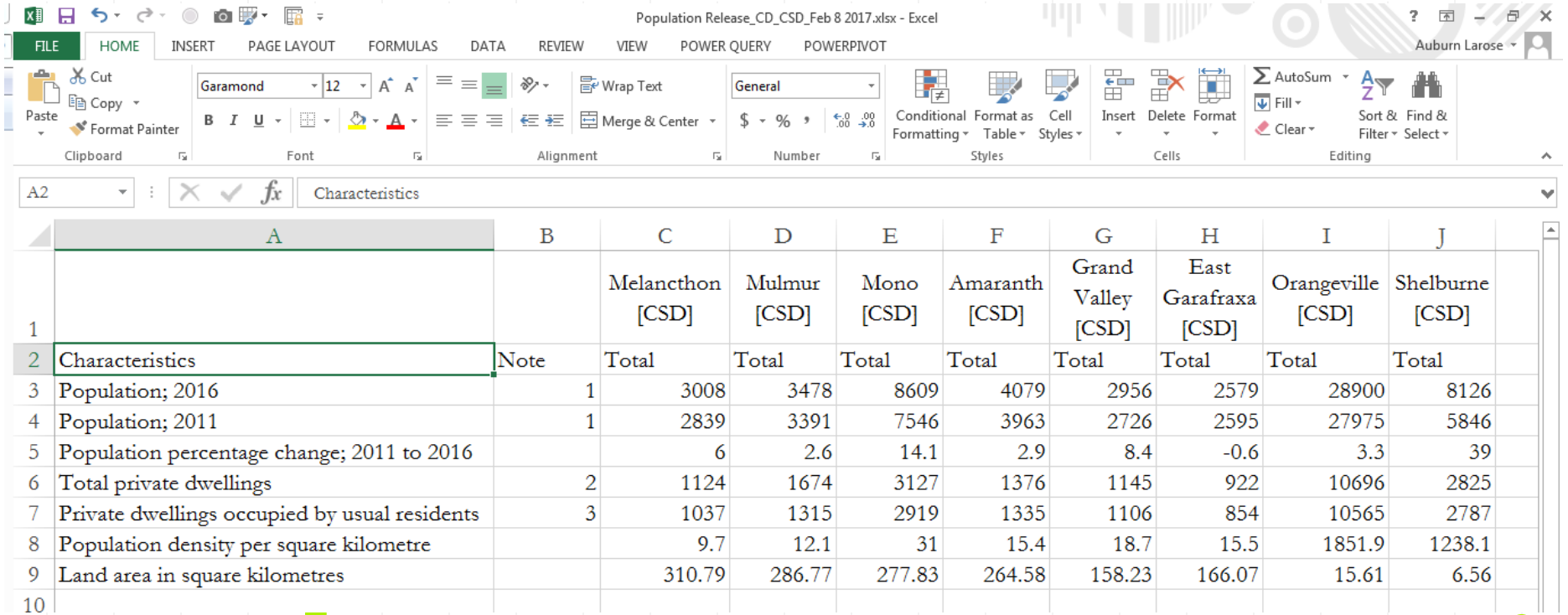
Questions	Answers
1. **What type of data do you have?** Is it quantitative (mostly numbers) or qualitative (mostly text)?	
2. **What is your data telling you?** What are your key findings? Which data supports your key message?	
3. **Are there any limitations on sharing your data?** What can and can't you share with different audiences?	

PROTIP: You'll likely have a lot of data to sift through. Take your time doing this. Focus on data points that add value to your message or are important for your audience.

STEP 2: Define your purpose

Questions	Answers
1. **What are you trying to accomplish with this visualization?** Do you want to share knowledge, generate conversation, inspire action, or something else?	
2. **What tone are you trying to convey?** Is it exciting (e.g. facilitating understanding with a high degree of precision or detail) or inviting (e.g. more emphasis on the gist or the areas that connect from your visual)? Is it serious or funny?	
3. **What data will you include in your visual?** Which of your key findings serve your purpose? Be selective. Think about what will be useful and add value.	

SAMPLE DATA: CENSUS 2016 POPULATION RELEASE



	A	B	C	D	E	F	G	H	I	J
1			Melancthon [CSD]	Mulmur [CSD]	Mono [CSD]	Amaranth [CSD]	Grand Valley [CSD]	East Garafraxa [CSD]	Orangeville [CSD]	Shelburne [CSD]
2	Characteristics	Note	Total	Total	Total	Total	Total	Total	Total	Total
3	Population; 2016	1	3008	3478	8609	4079	2956	2579	28900	8126
4	Population; 2011	1	2839	3391	7546	3963	2726	2595	27975	5846
5	Population percentage change; 2011 to 2016		6	2.6	14.1	2.9	8.4	-0.6	3.3	39
6	Total private dwellings	2	1124	1674	3127	1376	1145	922	10696	2825
7	Private dwellings occupied by usual residents	3	1037	1315	2919	1335	1106	854	10565	2787
8	Population density per square kilometre		9.7	12.1	31	15.4	18.7	15.5	1851.9	1238.1
9	Land area in square kilometres		310.79	286.77	277.83	264.58	158.23	166.07	15.61	6.56
10										

STEP 1: UNDERSTAND YOUR DATA

- What type of data do you have?
- What is your data telling you?
- Are there any limitations on sharing your data?

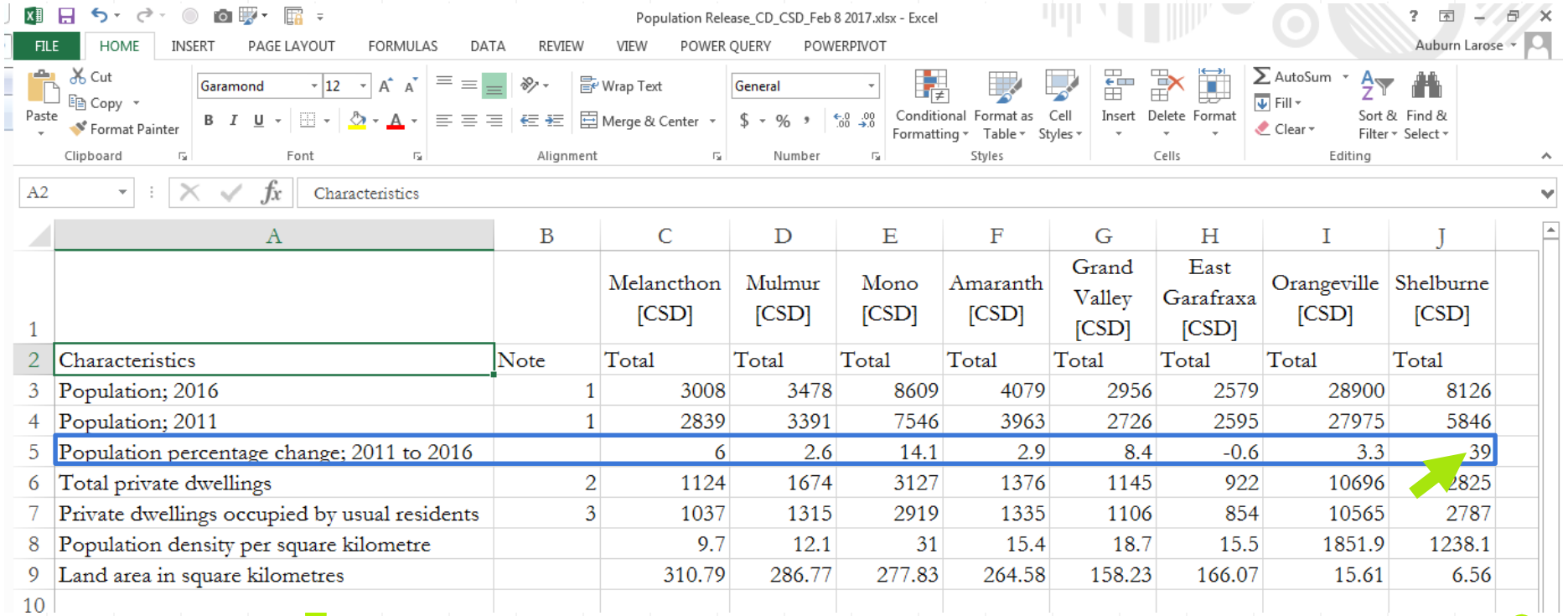
EXAMPLE STEP 1: UNDERSTAND YOUR DATA

- What type of data do you have?

-Quantitative census data for 8 CSDs in Dufferin County.

- What is your data telling you?

SAMPLE DATA: CENSUS 2016 POPULATION RELEASE



	A	B	C	D	E	F	G	H	I	J
1			Melancthon [CSD]	Mulmur [CSD]	Mono [CSD]	Amaranth [CSD]	Grand Valley [CSD]	East Garafraxa [CSD]	Orangeville [CSD]	Shelburne [CSD]
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9	Land area in square kilometres		310.79	286.77	277.83	264.58	158.23	166.07	15.61	6.56
10										

EXAMPLE STEP 1: UNDERSTAND YOUR DATA

- What type of data do you have?

-Quantitative census data for 8 CSDs in Dufferin County.

- What is your data telling you?

-Population changes over time

-Shelburne has increased more substantially than the other CSDs

- Are there any limitations on sharing your data?

No

STEP 2: DEFINE YOUR PURPOSE

- What are you trying to accomplish with this visualization?
- What tone are you trying to convey (e.g. reading vs. feeling)?
- What data will you include in your visual?

EXAMPLE STEP 2: DEFINE YOUR PURPOSE

- What are you trying to accomplish with this visualization?

Highlight Shelburne's population growth for system planning

- What tone are you trying to convey (e.g. reading vs. feeling)?

Reading tone – facilitating understanding with a high degree of precision or detail
Serious tone

- What data will you include in your visual?

% change over time from 2011 to 2016
Comparisons with other local CSDs

STEP 3: DEFINE YOUR AUDIENCE

- Who are you creating this visualization for?
- How comfortable is your target audience with interpreting data?
- How will they access your visualization?
- What does your target population care about?
- How will you combine your target audience's interests and the findings from the data to frame your key messages?

EXAMPLE STEP 3: DEFINE YOUR AUDIENCE

- Who are you creating this visualization for?

Executive directors of agencies that provide services to Dufferin County and local politicians

- How comfortable is your target audience with interpreting data?

We would expect that they would have a medium level of data literacy

- How will they access your visualization?

Presentation and a report brief

- What does your target population care about?

Meeting the needs of the community and securing adequate funding for services

- How will you combine your target audience's interests and the findings from the data to frame your key messages?

Shelburne is the fastest growing communities in Dufferin. Without increased funding to services in Shelburne, the needs of the community will not be met.

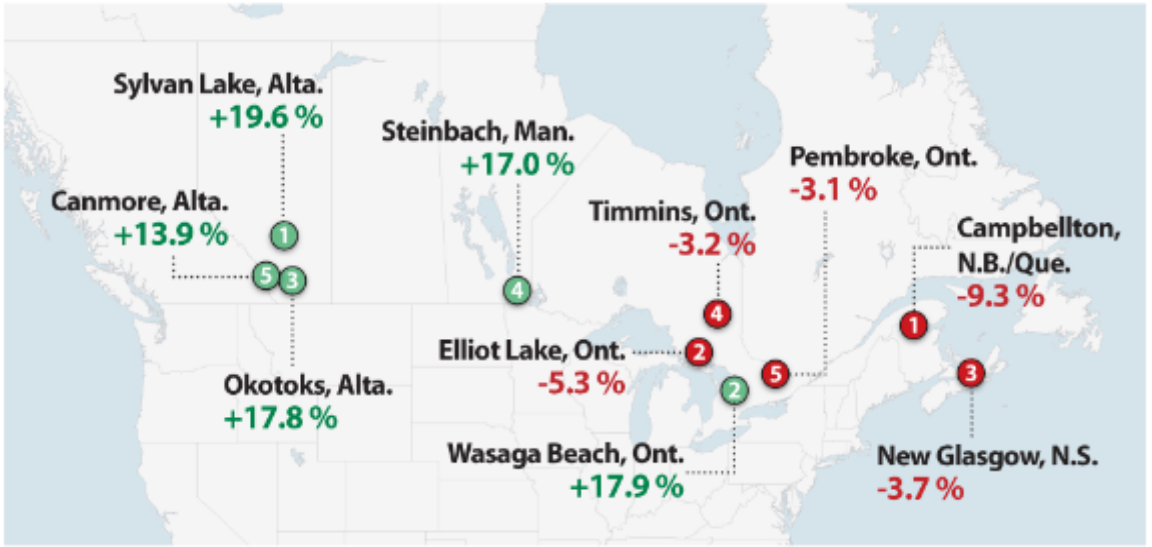
STEP 4: BEGIN FORMULATING YOUR IDEA

- What keywords come to mind when you think about your visual?
- What mental images come to mind?
- What inspiration can you draw from elsewhere to help shape your visual?

EXAMPLE STEP 4: BEGIN FORMULATING YOUR IDEA

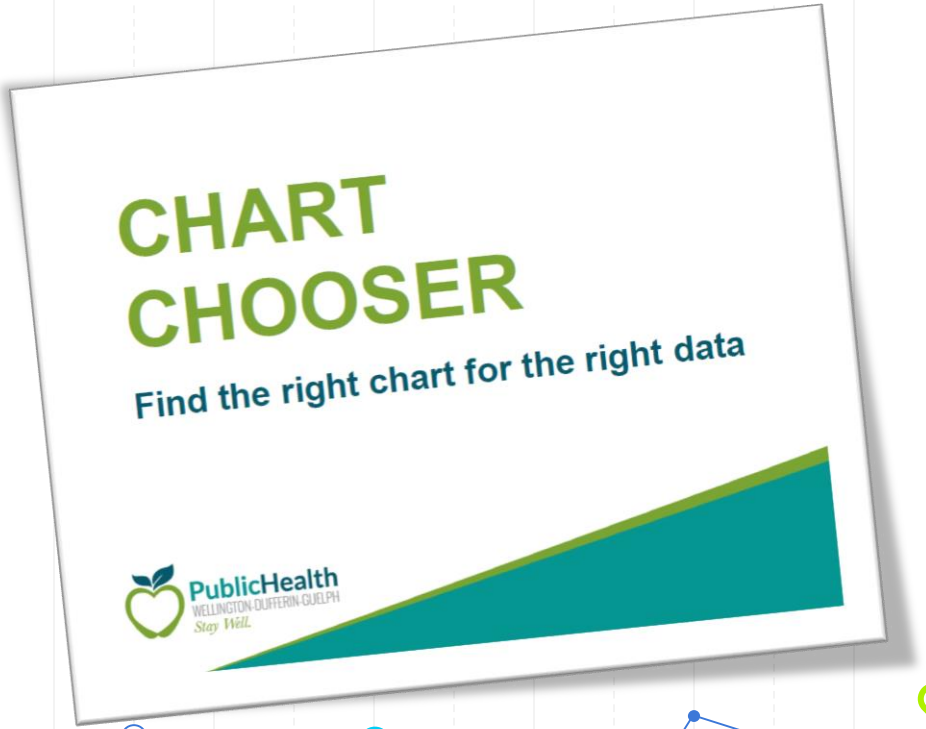
LARGEST GAINS AND LOSSES

A look at the census agglomerations with the largest percentage gains and losses in population between 2011 and 2016, according to census data from Statistics Canada:



STEP 5: DEVELOP YOUR VISUAL SOLUTION PART 1

- Which type of chart/graphic works best for your type of data, purpose, message and audience?

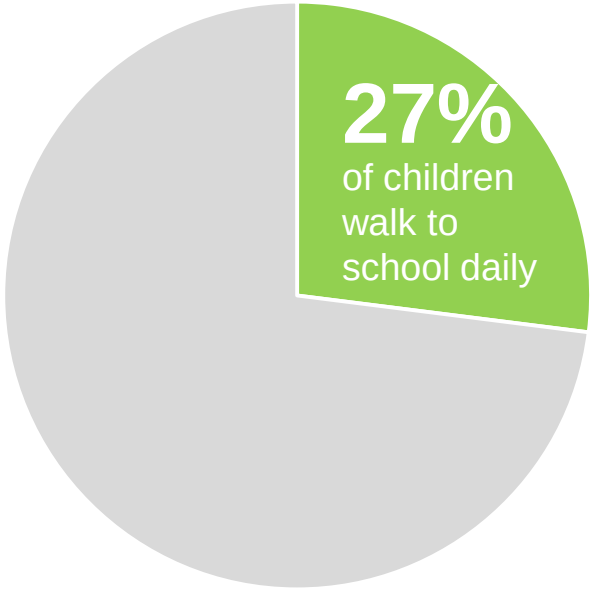


1. Simple Text

27%

of children **walked to school** in 2016, compared to 75% in 1970

2. Pie Charts



3. Tables

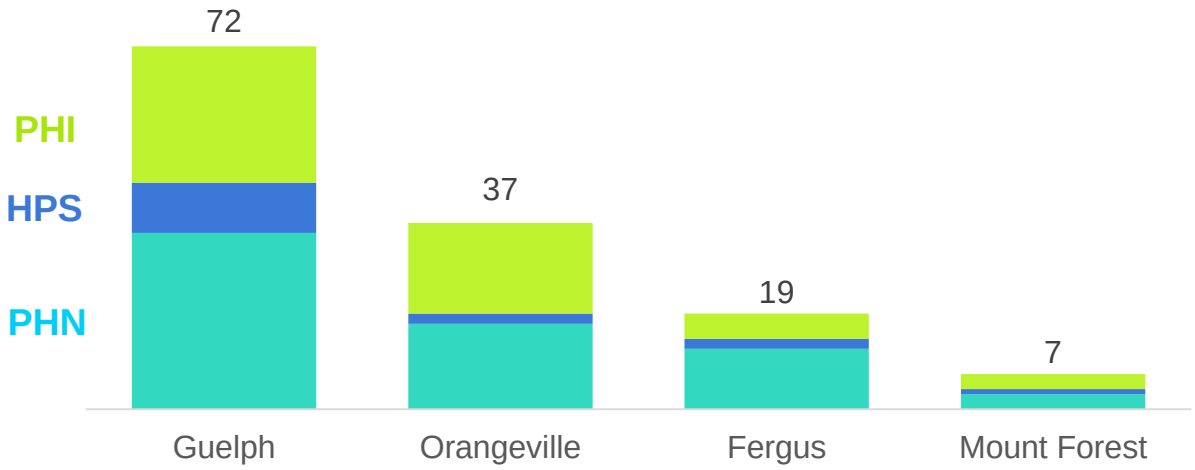
Location	% Mothers Who Did Not Take Folic Acid Pre-Conception	% Mothers Who Smoked During Pregnancy	% Mothers Who Did Not Breastfeed Exclusively Until 6 Months
Clifford	88%	5%	60%
Guelph	22%	24%	34%
Mapleton	10%	2%	90%
Mount Forest	95%	0%	13%
Orangeville	20%	2%	88%
Shelburne	70%	0%	55%

3. Tables Cont'd

Location	% Mothers Who Did Not Take Folic Acid Pre-Conception	% Mothers Who Smoked During Pregnancy	% Mothers Who Did Not Breastfeed Exclusively Until 6 Months
Clifford	88%	5%	60%
Guelph	22%	24%	34%
Mapleton	10%	2%	90%
Mount Forest	95%	0%	13%
Orangeville	20%	2%	88%
Shelburne	70%	0%	55%

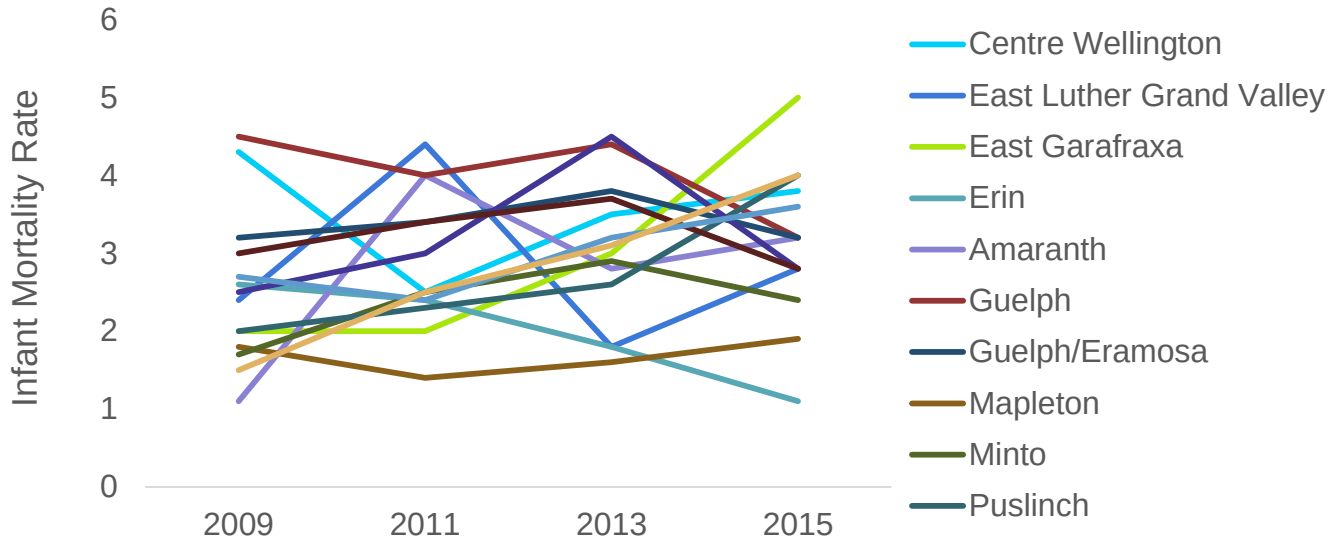
4. Bar Charts

More employees work at our Guelph office than all other offices combined



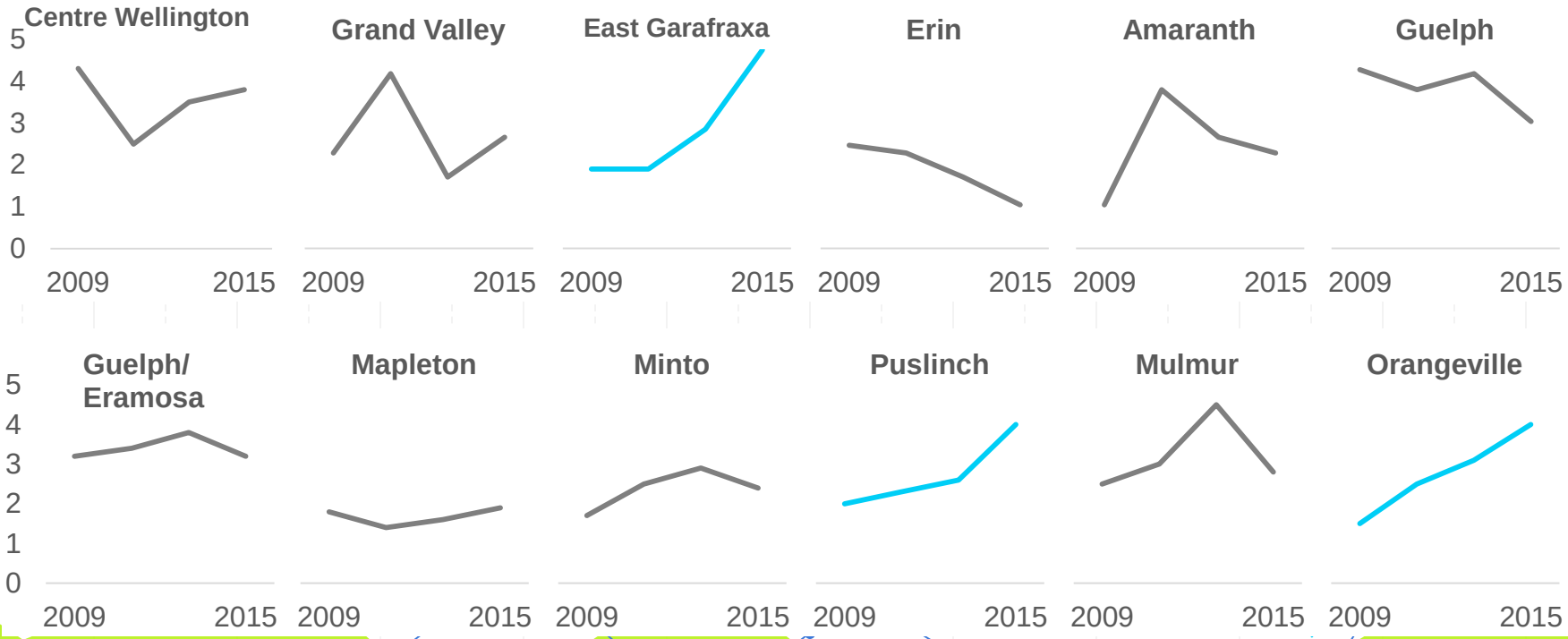
5. Line Charts

What is this graph telling us?



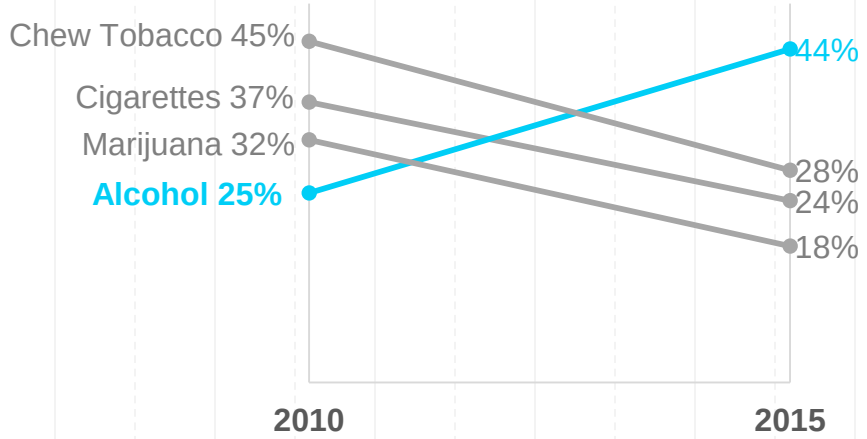
6. Small Multiples

Since 2009, the rate of infant mortality has consistently increased in East Garafraxa, Puslinch, and Orangeville

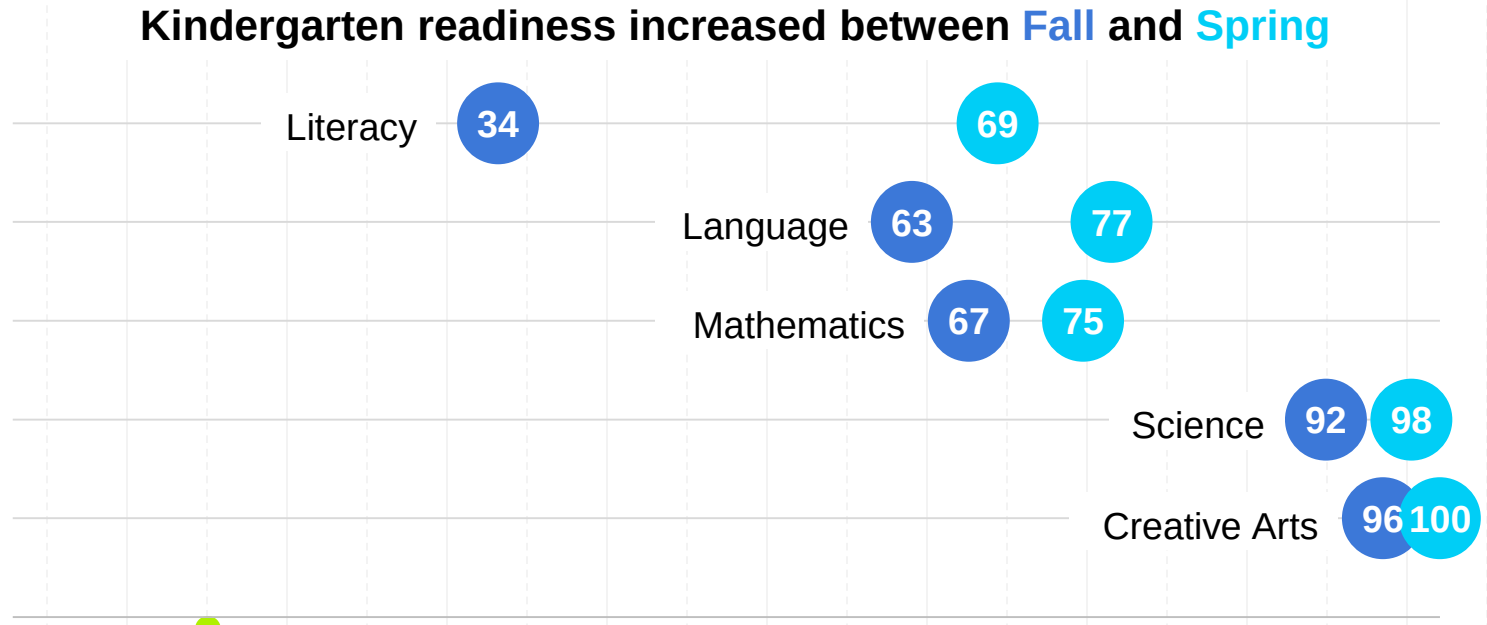


7. Slopegraphs

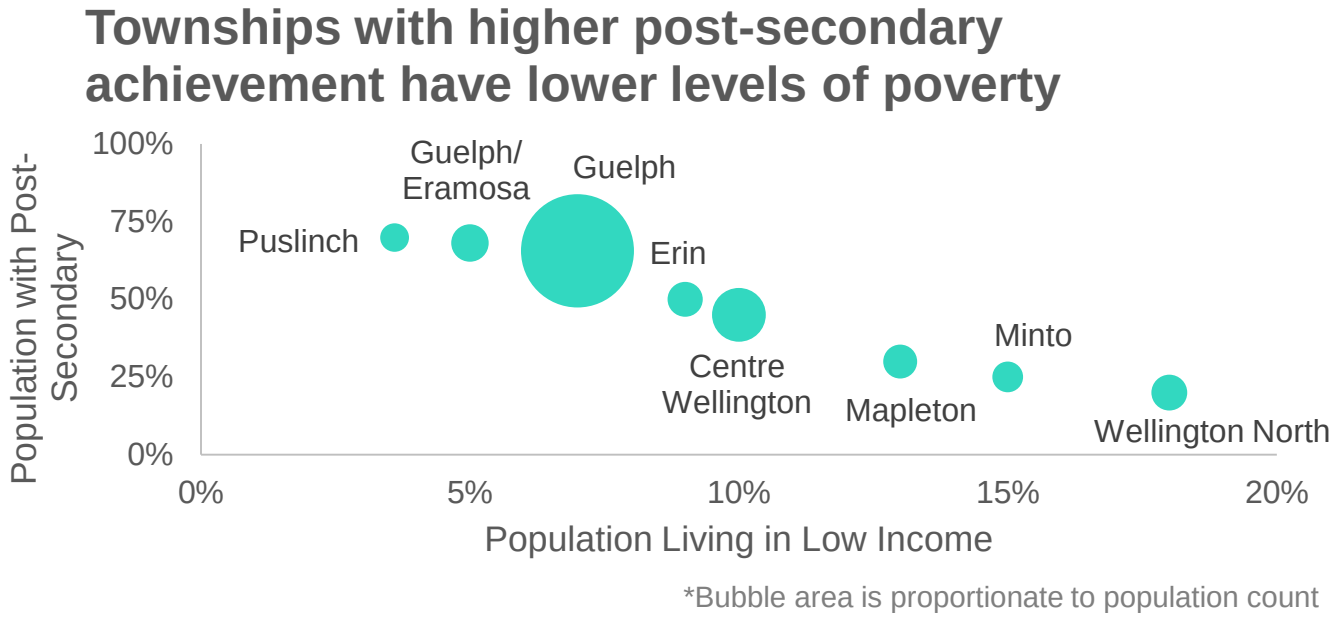
Overall, substance use is declining among youth but rates of **alcohol use** is increasing



8. Dot Plots


Kindergarten readiness increased between Fall and Spring
Literacy
34
69
Language
63
77
Mathematics
67
75
Science
92
98
Creative Arts
96
100
0
100

9. Scatter/Bubble Plots



*Bubble area is proportionate to population count

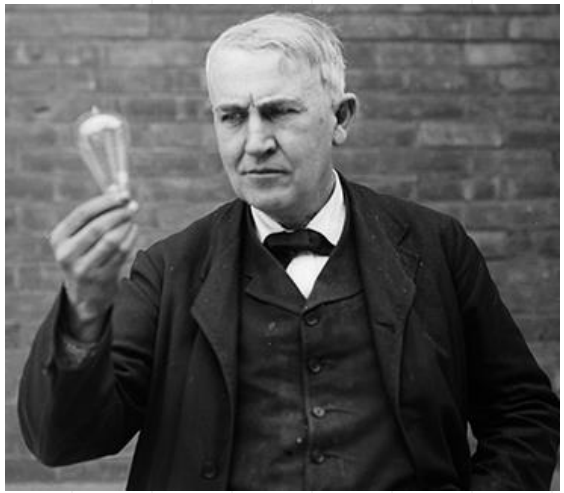
10. Pictogram

1 in 10

pregnant women
report **alcohol use**

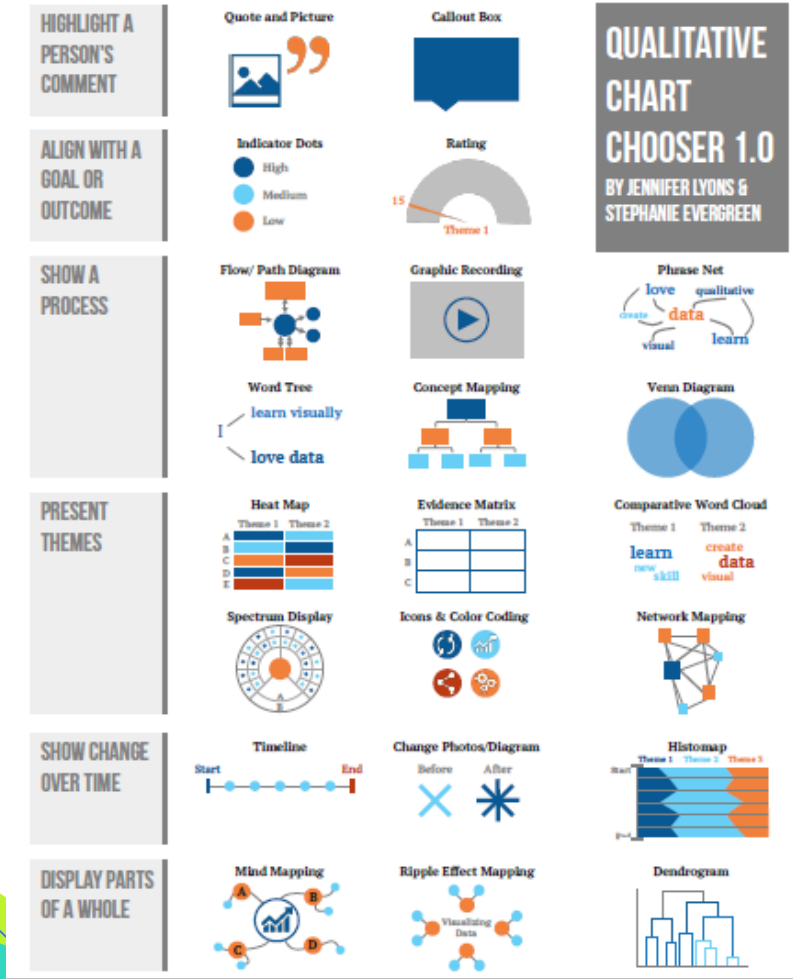
11. Word Cloud

12. Quotations



"To **invent**,
you need a
good **imagination**
and a pile of **junk**."
–Thomas A. Edison

QUALITATIVE DATA VISUALIZATIONS



Stephanie Evergreen's Qualitative Chart Chooser

http://stephanieevergreen.com/qualitative-chart-chooser/

STEP 5: DEVELOP YOUR VISUAL SOLUTION PART 2

- TEXT
- COLOUR
- ELIMINATE DISTRACTIONS
- ARRANGEMENT

Sketch it out!

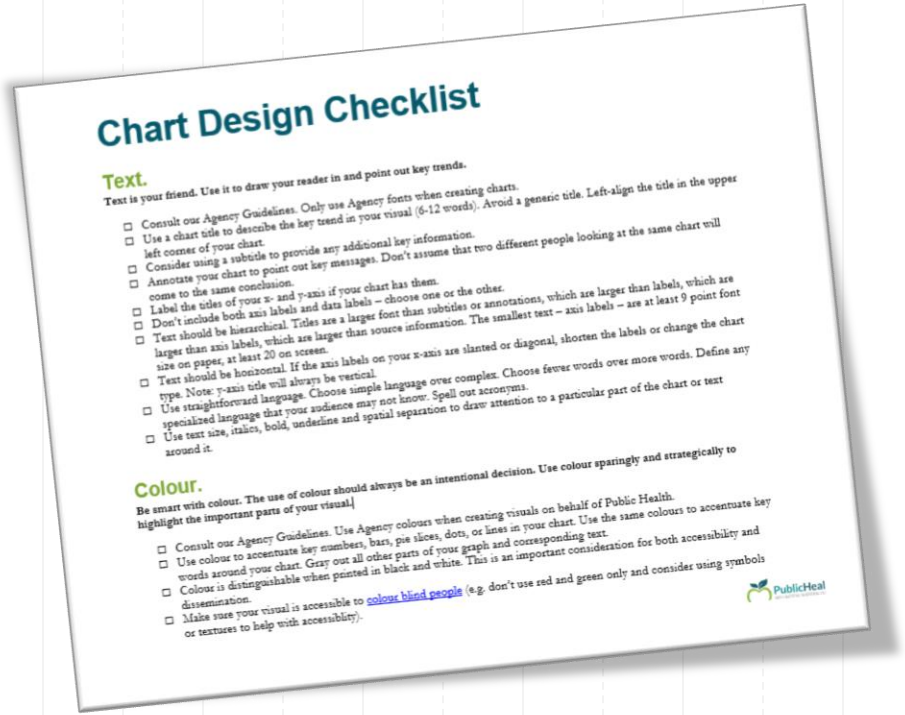


Chart Design Checklist

Text.

Text is your friend. Use it to draw your reader in and point out key trends.

- ☐ Consult our Agency Guidelines. Only use Agency fonts when creating charts.
- ☐ Use a chart title to describe the key trend in your visual (6-12 words). Avoid a generic title. Left-align the title in the upper left corner of your chart.
- ☐ Consider using a subtitle to provide any additional key information.
- ☐ Annotate your chart to point out key messages. Don't assume that two different people looking at the same chart will come to the same conclusion.
- ☐ Label the titles of your x- and y-axis if your chart has them.
- ☐ Don't include both axis labels and data labels – choose one or the other.
- ☐ Text should be hierarchical. Titles are a larger font than subtitles or annotations, which are larger than labels, which are larger than axis labels, which are larger than source information. The smallest text – axis labels – are at least 9 point font size on paper, at least 20 on screen.
- ☐ Text should be horizontal. If the axis labels on your x-axis are slanted or diagonal, shorten the labels or change the chart type. Note: y-axis title will always be vertical.
- ☐ Use straightforward language. Choose simple language over complex. Choose fewer words over more words. Define any specialized language that your audience may not know. Spell out acronyms.
- ☐ Use text size, italics, bold, underline and spatial separation to draw attention to a particular part of the chart or text around it.

Colour.

Be smart with colour. The use of colour should always be an intentional decision. Use colour sparingly and strategically to highlight the important parts of your visual.

- ☐ Consult our Agency Guidelines. Use Agency colours when creating visuals on behalf of Public Health.
- ☐ Use colour to accentuate key numbers, bars, pie slices, dots, or lines in your chart. Use the same colours to accentuate key words around your chart. Gray out all other parts of your graph and corresponding text.
- ☐ Colour is distinguishable when printed in black and white. This is an important consideration for both accessibility and dissemination.
- ☐ Make sure your visual is accessible to colour blind people (e.g. don't use red and green only and consider using symbols or textures to help with accessibility).

PublicHeal

CHART DESIGN CHECKLIST

TEXT

1. Agency fonts
2. Descriptive chart title
3. Subtitles and annotations
4. Label your axes
5. Hierarchical text
6. Horizontal Text
7. Plain language
8. Use preattentive features

COLOUR

1. Agency colours
2. Use colour to draw attention
3. Printed in black and white
4. Accessible

CHART DESIGN CHECKLIST

ELIMINATE DISTRACTIONS

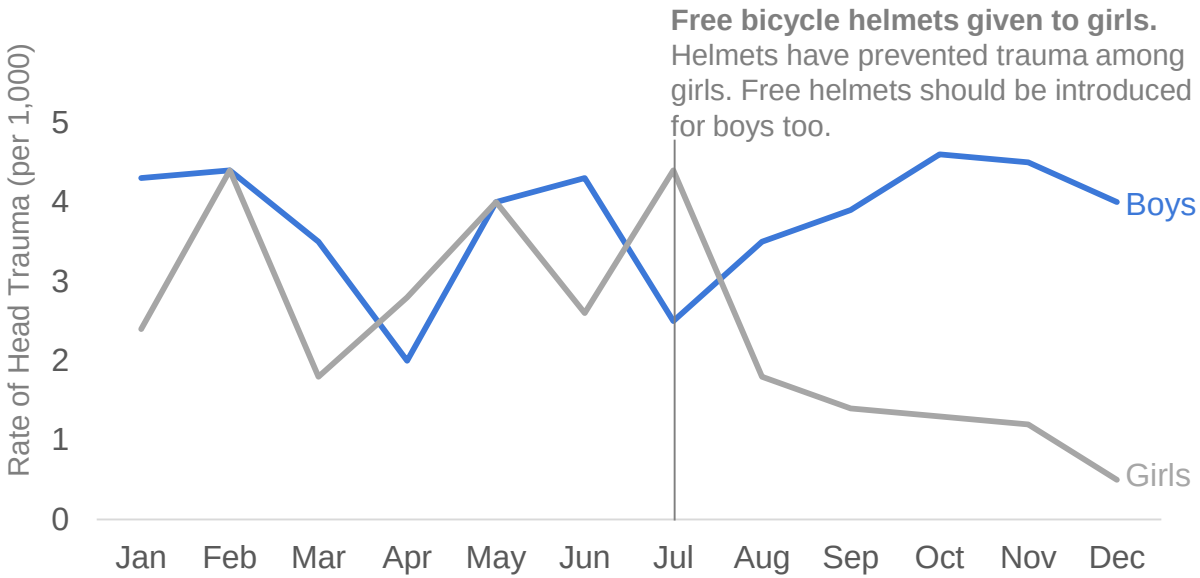
1. Graph border
2. Gridlines
3. Numerical Axes
4. Categorical Axes
5. Legends
6. No special effects
7. Tick marks
8. Precision

ARRANGEMENT

1. No charts that rely on area, 3D or curvature
2. Alignment
3. White space
4. Data arrangement
5. Axis starts at zero
6. Spaces between bars
7. Consistent intervals

TRANSFORMING GRAPHS

Since July, **boys** have experienced more **head trauma** than girls

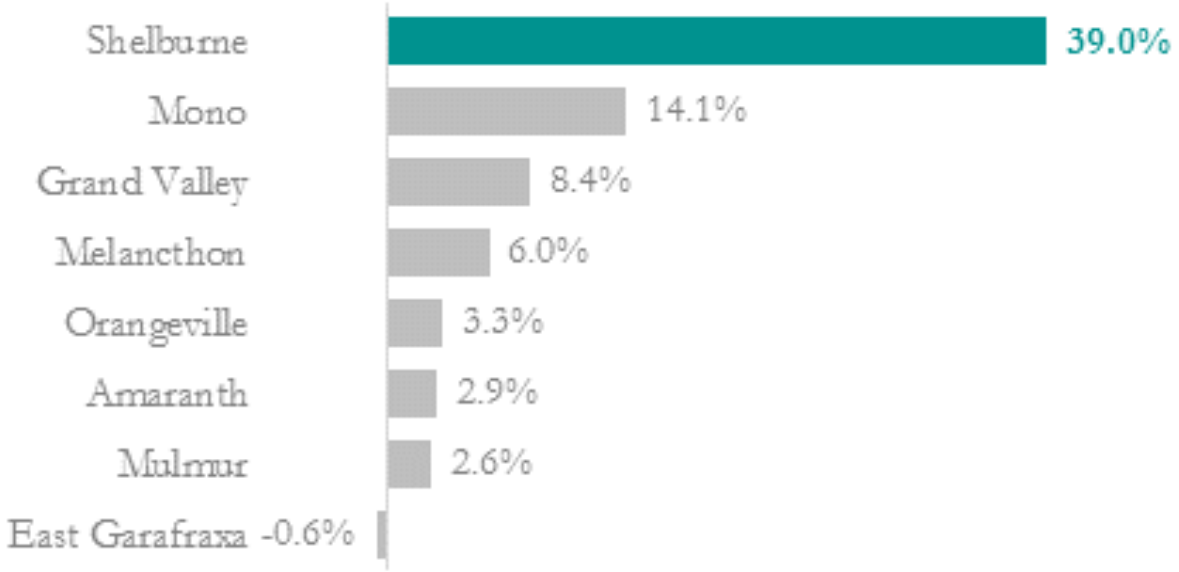


STEP 5: DEVELOP YOUR VISUAL SOLUTION PART 3

- What program should you use? (Pikochart, Excel, templates)

CREATE IT!

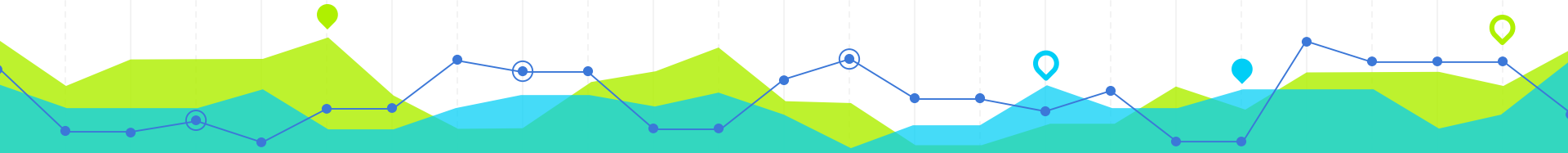
Shelburne had the highest **population growth** of all townships in Dufferin County between 2011 and 2016



STEP 6: TEST, MODIFY, & SHARE!

- What feedback do your colleagues have about your visual?
- What feedback do people in the target audience have about your visual?
- How does your visual need to be changed in order to accommodate the feedback?
- Share your visual!

EXAMPLE STEP 6: TEST, MODIFY, & SHARE!



INFOGRAPHICS 4

TIPS AND TRICKS FOR INFOGRAPHICS

- Follow the standard data visualization guidelines
- Start with powerful piece of data
- End with a clear conclusion or call to action
- Arrange your infographic around a central image or in rows with two, three or four columns

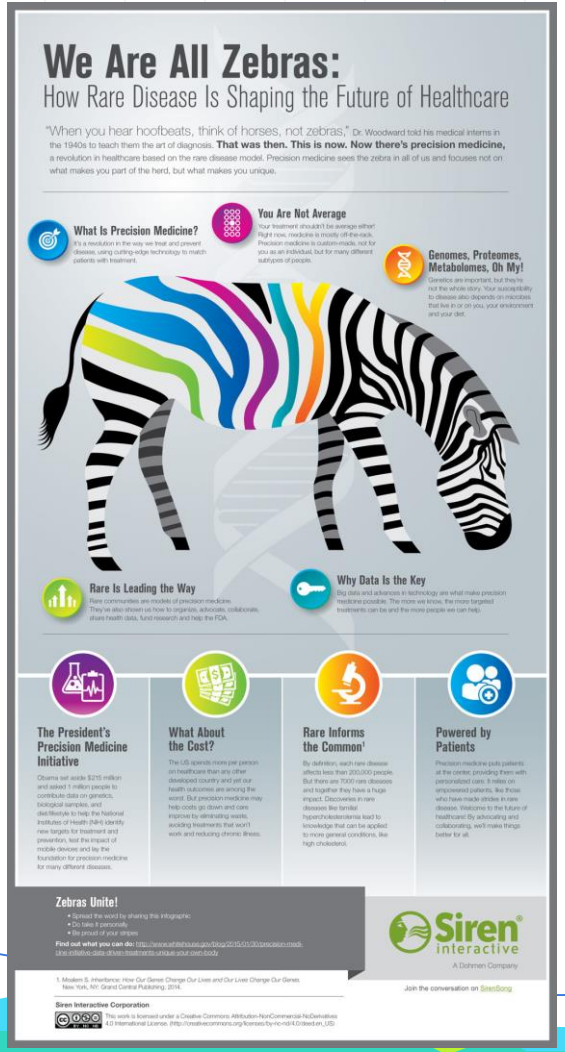
- Accessibility Tools:
- http://webaim.org/resources/contrastchecker/
- http://daprlab.com/ace/

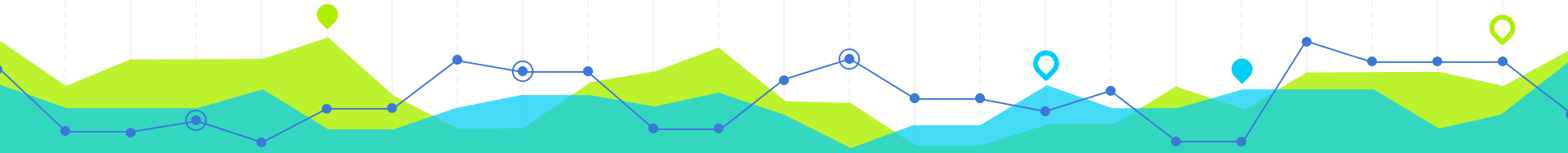
Central image

Call to Action

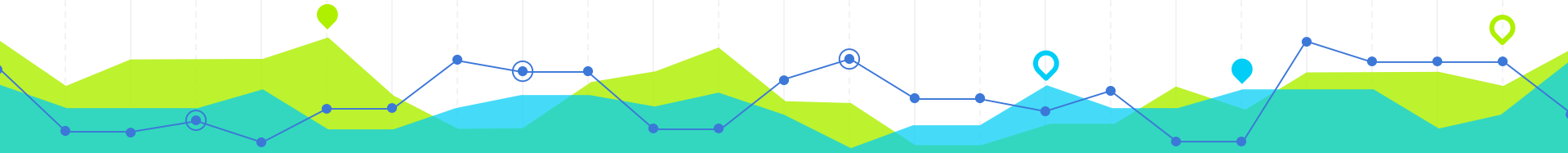
Powerful opening

Columns to structure the information





REFLECTION 5



How will you apply what you learned today to your work?

RECOMMENDED ONLINE RESOURCES

http://flowingdata.com/
http://www.informationisbeautiful.net/
http://www.vizhealth.org/gallery/
http://www.flaticon.com/
http://stephanieevergreen.com/
http://www.visualisingdata.com/

RECOMMENDED BOOKS

Storytelling with Data
by Cole Nussbaumer Knaflic

Data Visualization
by Andy Kirk

Effective Data Visualization
by Stephanie Evergreen

THANKS!

Any questions?