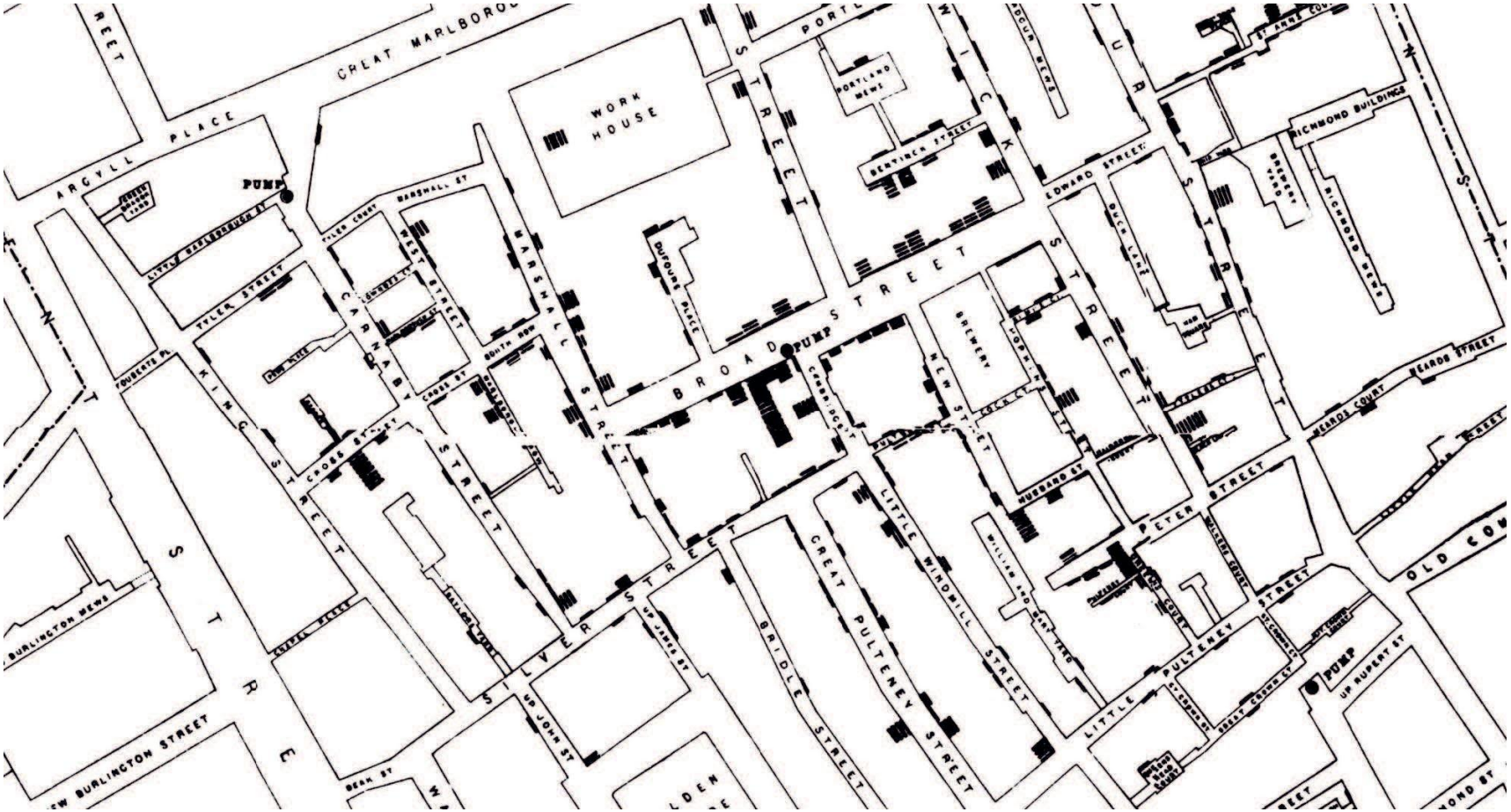
La visualisation des données : Un moyen de communication des résultats de l'analytique des données d'affaires

Nabil Beitinjaneh

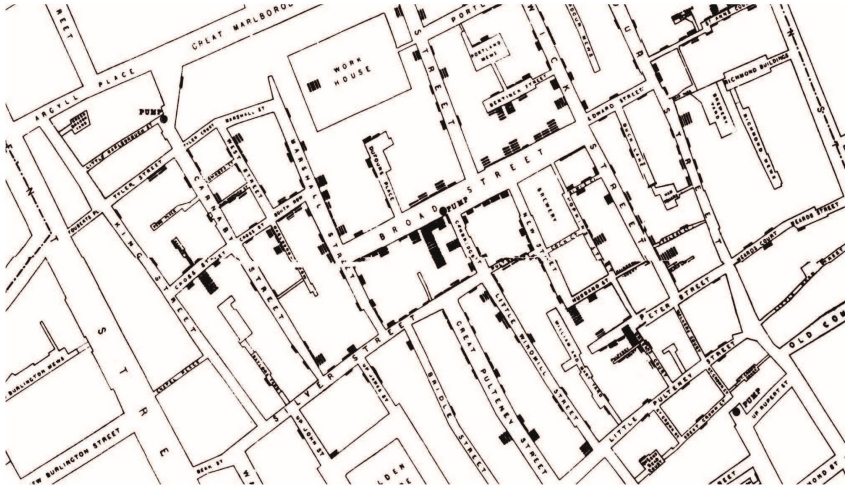
Coordonnateur, programmes des données

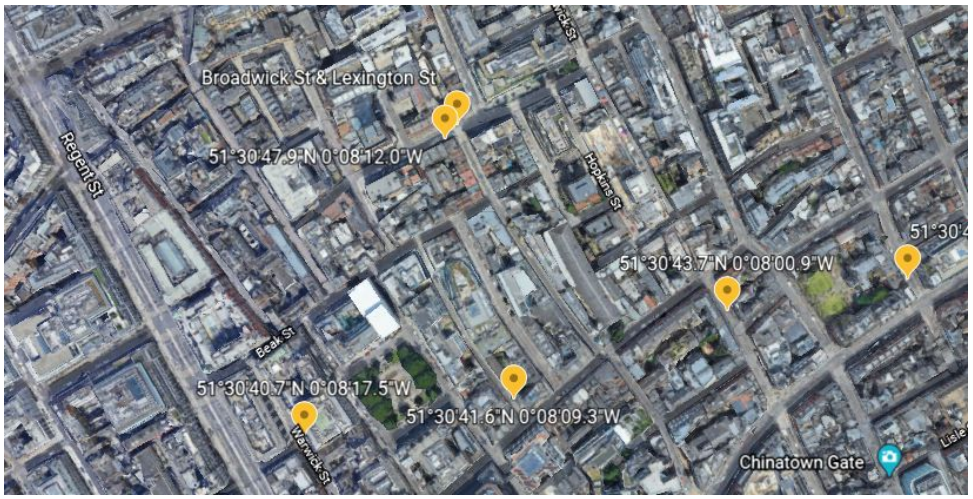
École d'éducation permanente McGill

Londres, quartier Soho vers 1854



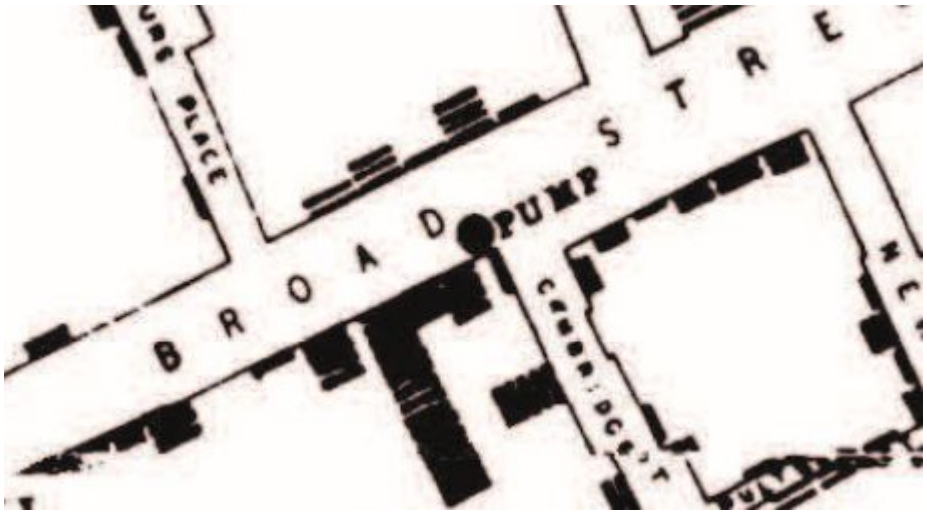
Soho : à l'époque et aujourd'hui





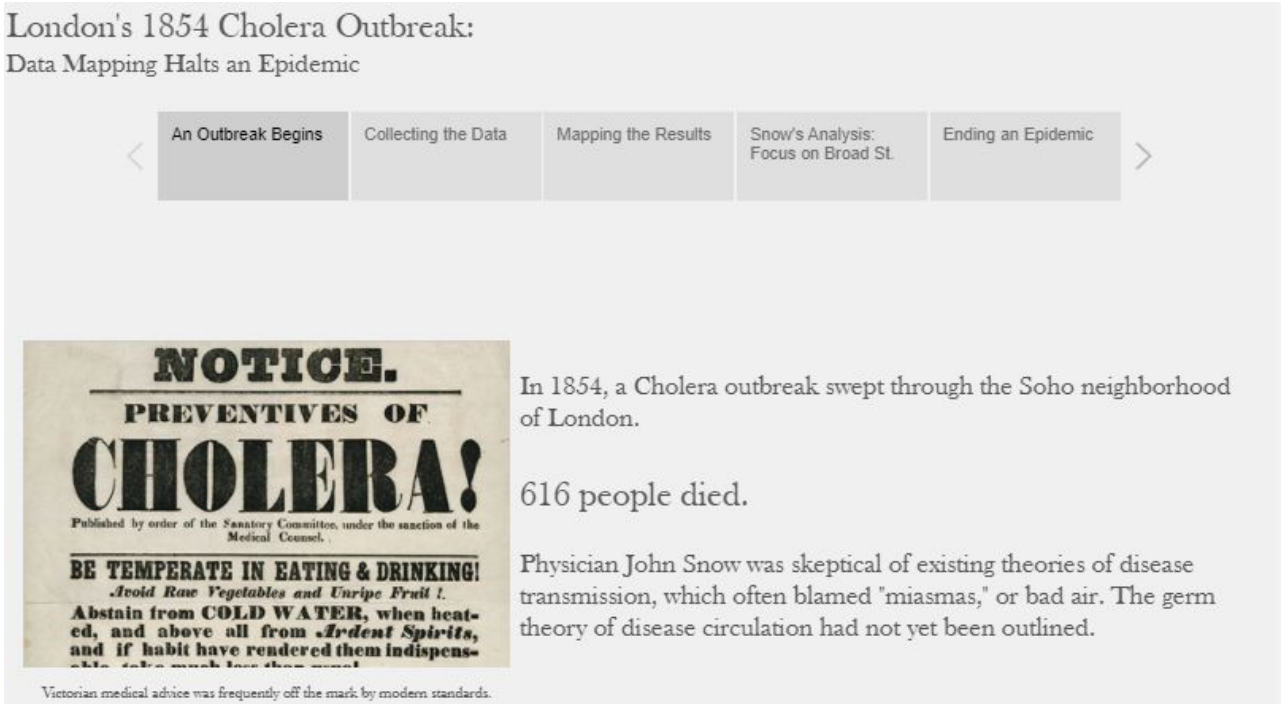
Rendons-nous-y avec Google Earth.
Bon voyage!

Visitons Broad Street



[Google Earth]

Examinons maintenant une représentation visuelle



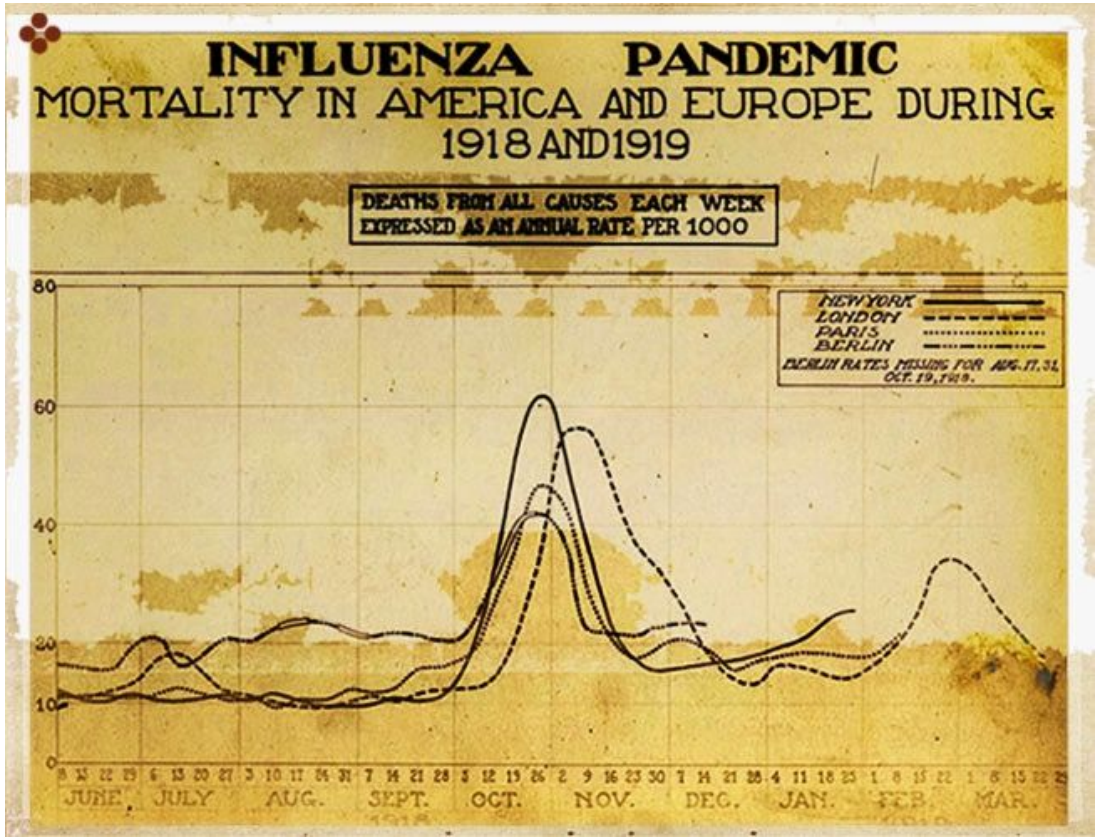
Cartographie de l'épidémie de choléra de 1854 : [Tableau Public – Tim Deak (auteur)]

Il ne s'agit pas d'un nouveau problème

PANDÉMIE DE GRIPPE

MORTALITÉ EN AMÉRIQUE ET EN EUROPE

EN 1918 ET 1919



La « courbe » est connue

Comment les simulations pourraient-elles nous aider?

Pourquoi des épidémies comme celle du coronavirus se propagent-elles de manière exponentielle et comment « aplatir la courbe »?

Merci à Harry Stevens du Washington Post

Limites

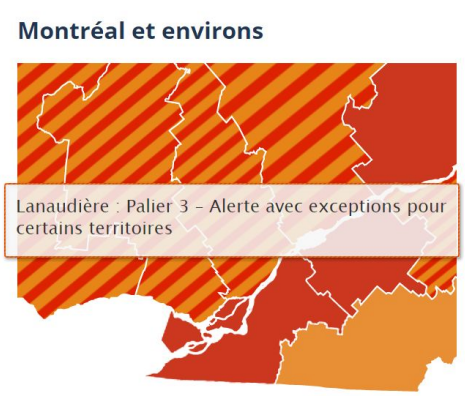
Cas au Canada

CONFIRMÉS	DÉCÈS	RÉTABLIS
192,244	9.708	162.203
(Aujourd'hui : +712)	(Aujourd'hui : +9)	(Aujourd'hui : +713)

10 306 294 tests effectués (aujourd'hui : +38 507)

En date du
16 octobre 2020

Manifestation contre le port du masque du 30 septembre 2020



By Canadian Press

Montreal groups collect race-based COVID-19 data after Quebec flip-flops

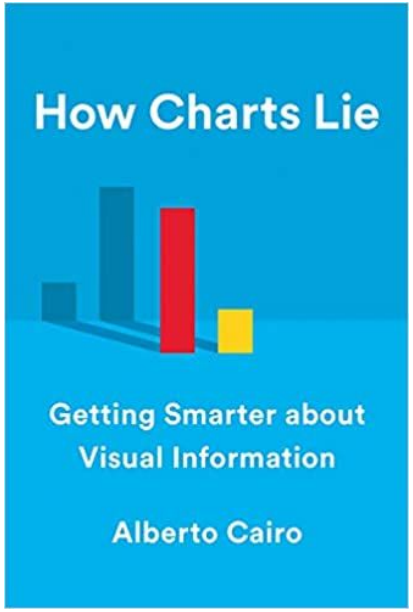
Aug 20, 2020 2:59 PM

[Des groupes montréalais collectent des données fondées sur la race relativement à la COVID-19 après la rétraction du Québec]

Les graphiques en tant que langue

“Les graphiques, également appelés représentations visuelles, reposent sur une grammaire, un vocabulaire de symboles et de nombreuses conventions. Les étudier nous permettra de nous immuniser contre de nombreux abus.”

“Comme il ne s’agit pas que de simples illustrations, il faut apprendre à les lire et à les interpréter correctement.”



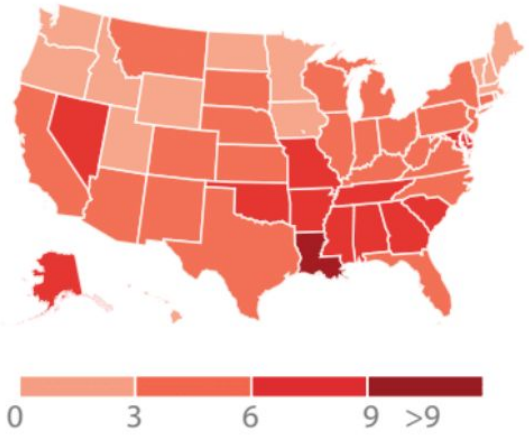
Alberto Cairo, *How Charts Lie*

Différents composants

Graphique complet

Homicides

Taux par 100 000 habitants (2015)

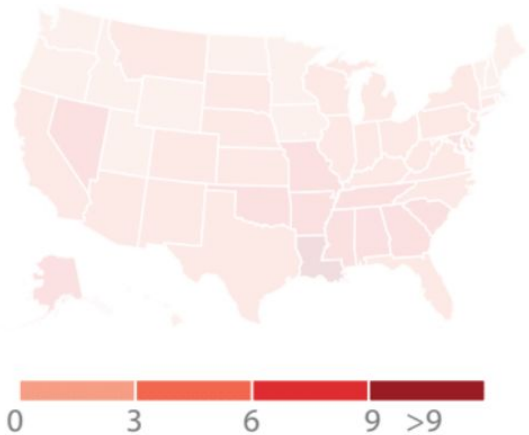


(Source: FBI Uniform Crime Reports)

Structure

Homicides

Taux par 100 000 habitants (2015)

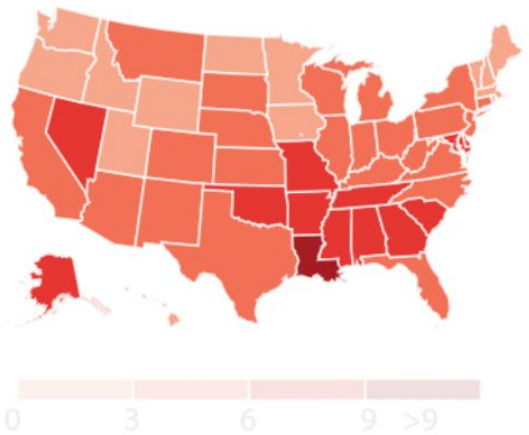


(Source: FBI Uniform Crime Reports)

Contenu

Homicides

Taux par 100 000 habitants (2015)



(Source: FBI Uniform Crime Reports)

Encore une fois*!

Graphique complet

Homicides

Taux par 100 000 habitants (2015)

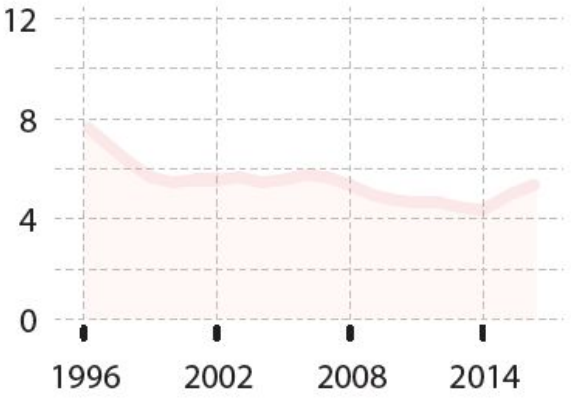
(Source: FBI Uniform Crime Reports)

Point de comparaison : Le taux d'homicides au Canada était de 1,68 par 100 000 habitants en 2015

Structure

Homicides

Taux par 100 000 habitants (2015)



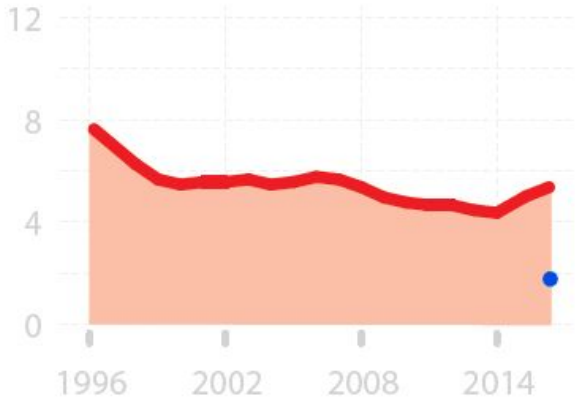
(Source: FBI Uniform Crime Reports)

Point de comparaison : Le taux d'homicides au Canada était de 1,68 par 100 000 habitants en 2015

Contenu

Homicides

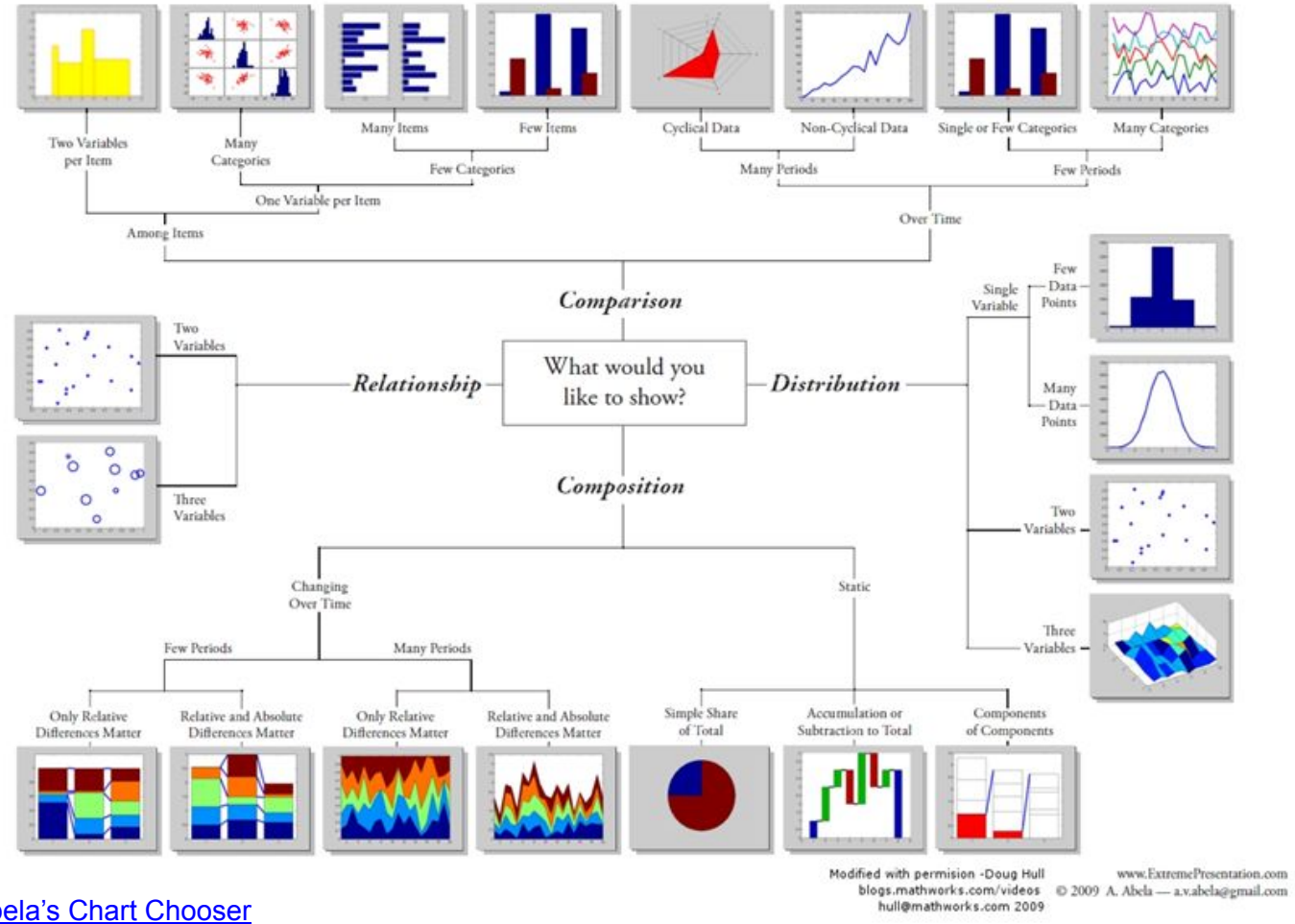
Taux par 100 000 habitants (2015)



(Source: FBI Uniform Crime Reports)

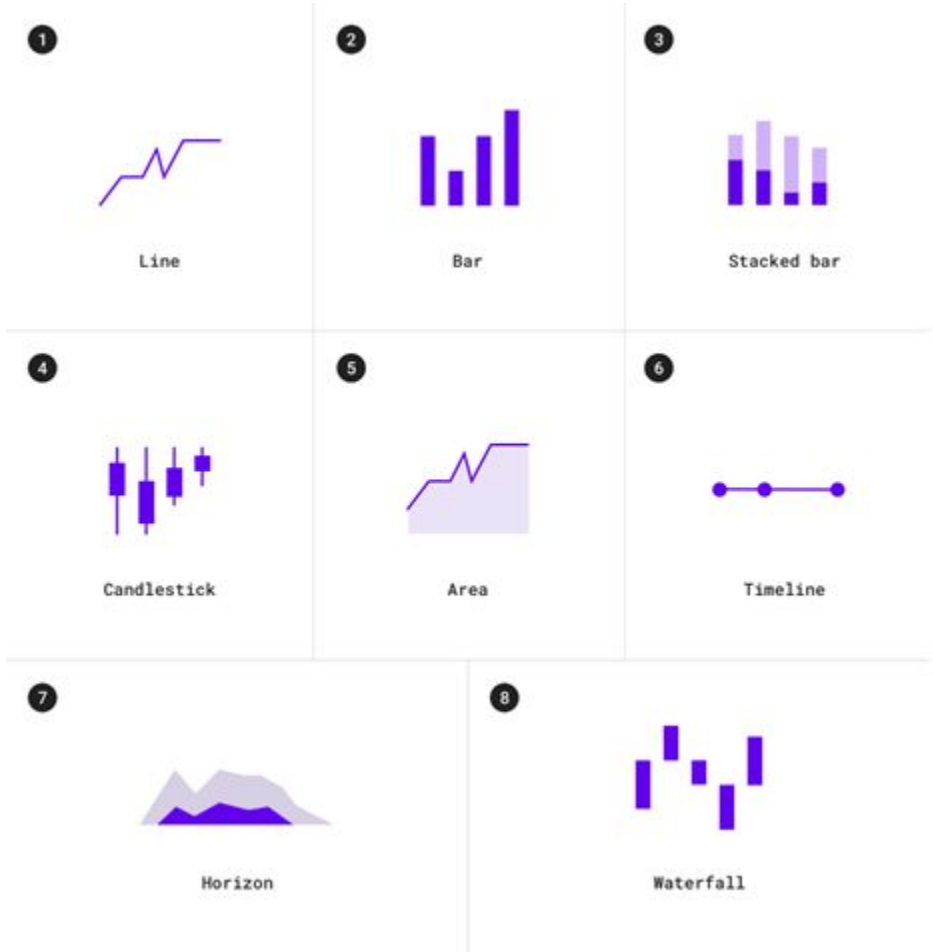
⇦ **Annotation**

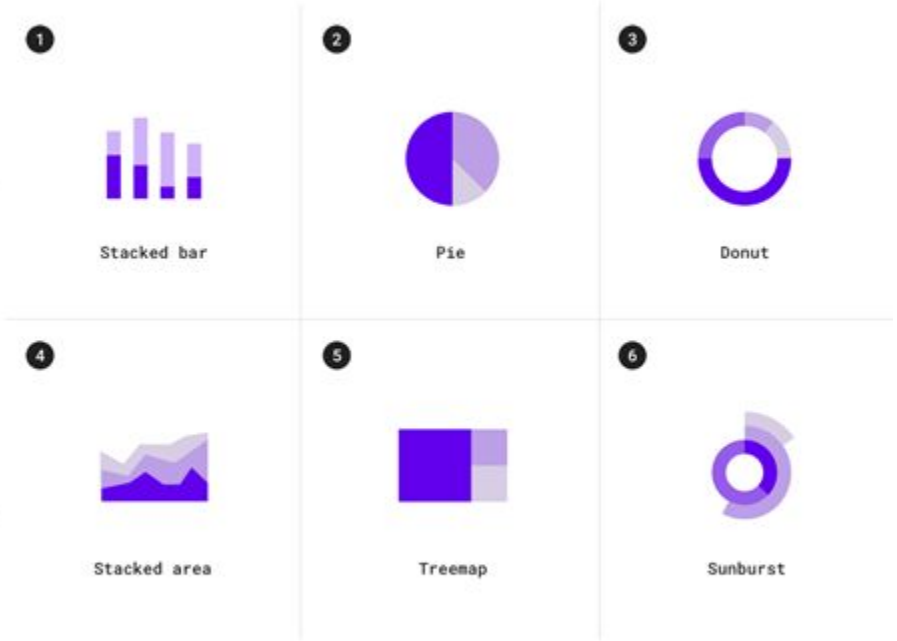
Quel graphique utiliser?



basé sur : [Andrew Abela's Chart Chooser]

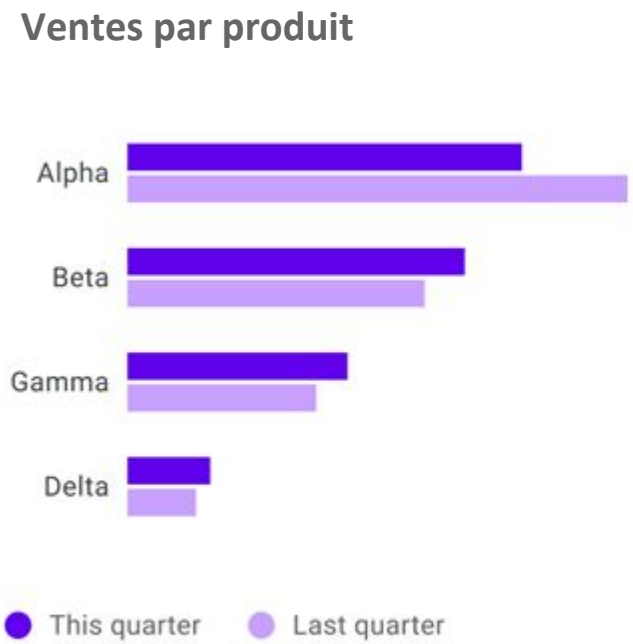
Autres exemples plus détaillés

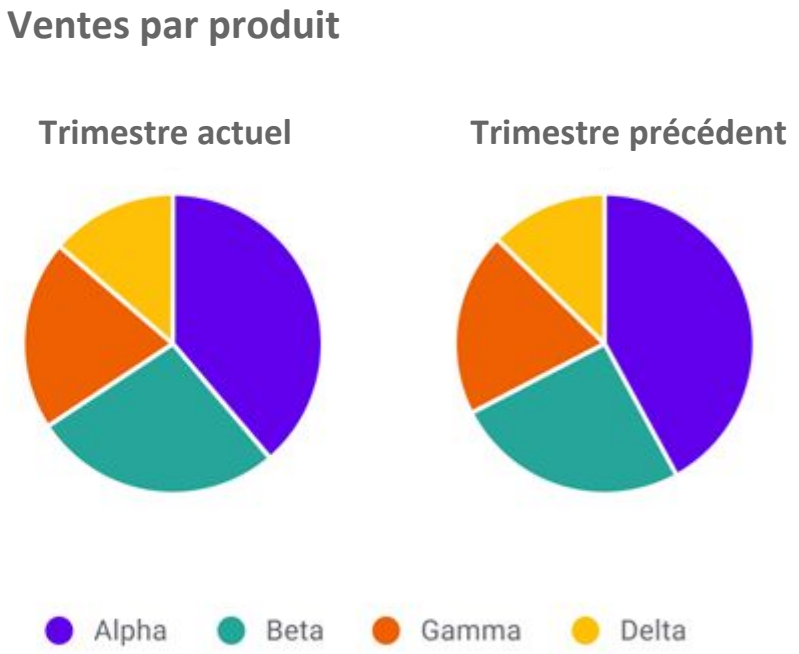


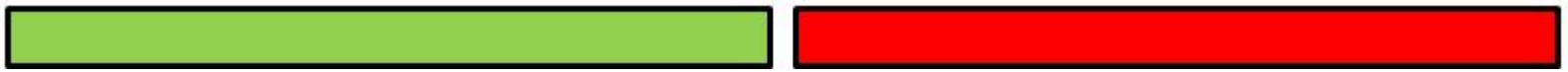


Google : [A Data Visualization Guide]

Quelques pratiques à adopter et à éviter







La mise en récit grâce aux données

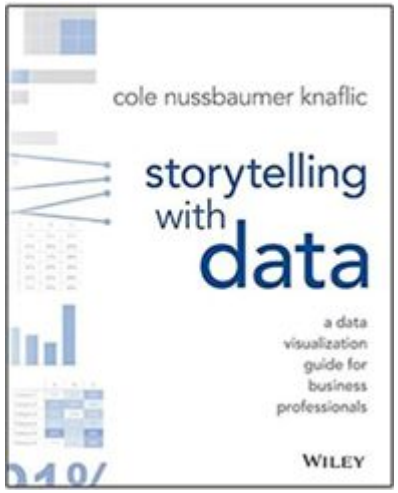
Comprendre le contexte

Sélectionner des éléments visuels efficaces

Éliminer l'encombrement

Attirer l'attention sur des éléments précis

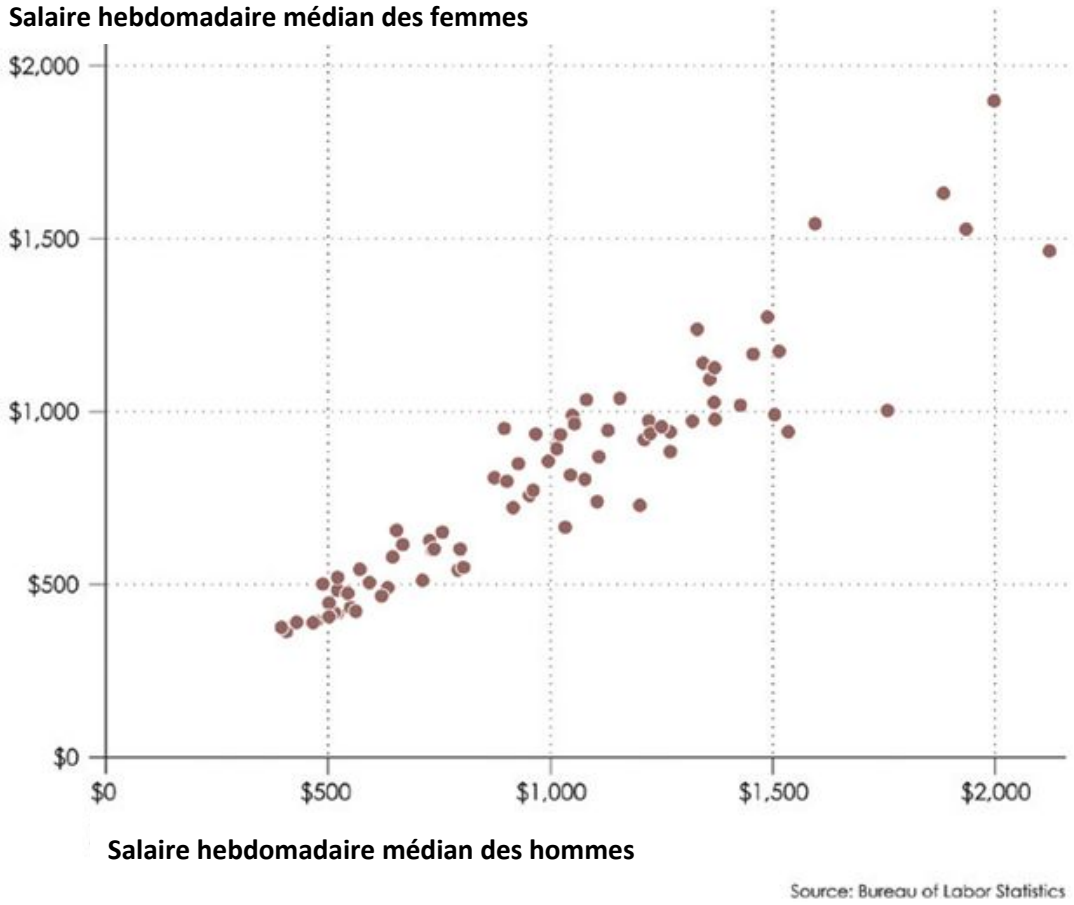
Raconter une histoire



http://www.storytellingwithdata.com/

Choisir le visuel approprié

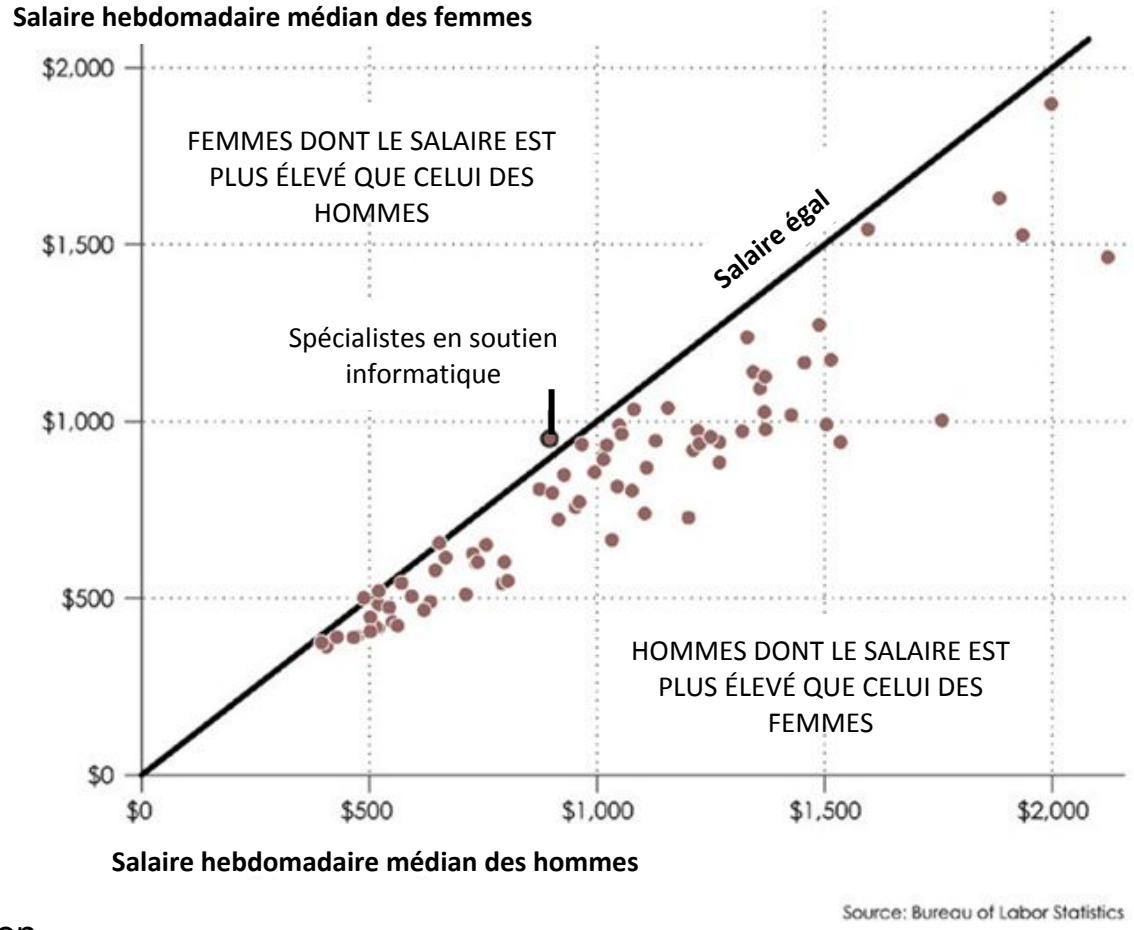
Écart de rémunération entre les sexes en 2011



[Yau 2013]

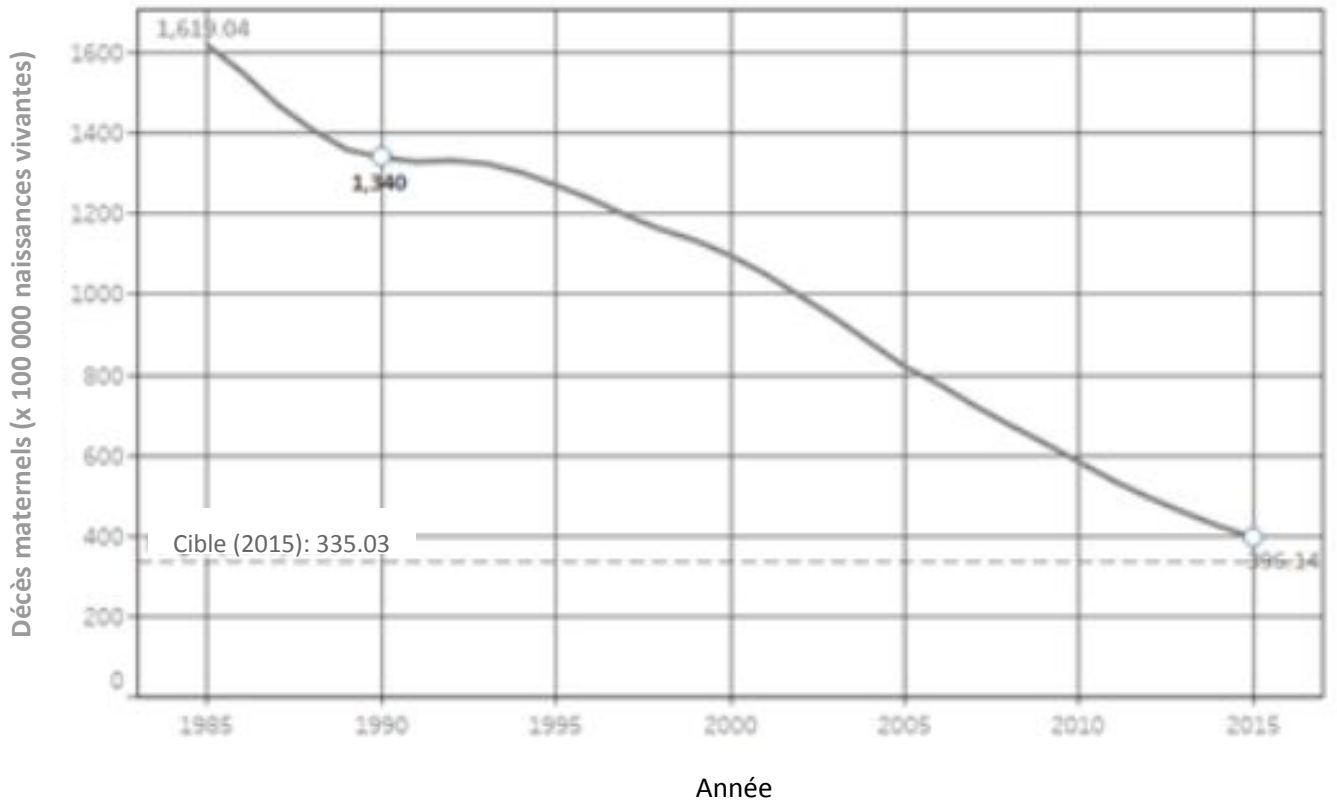
Apporter des améliorations!

Écart de rémunération entre les sexes en 2011



Éliminer l'encombrement : avant

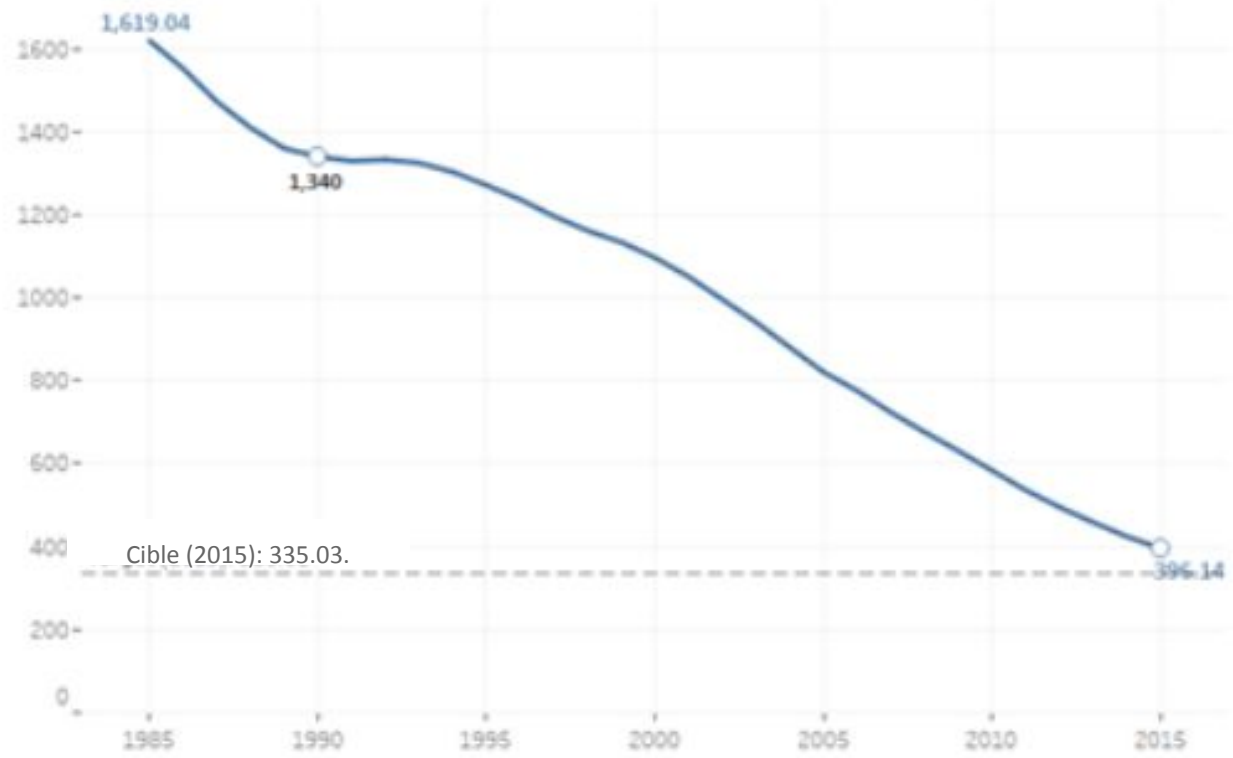
Série chronologique du taux de mortalité maternelle, référence 1990 et cible 2015



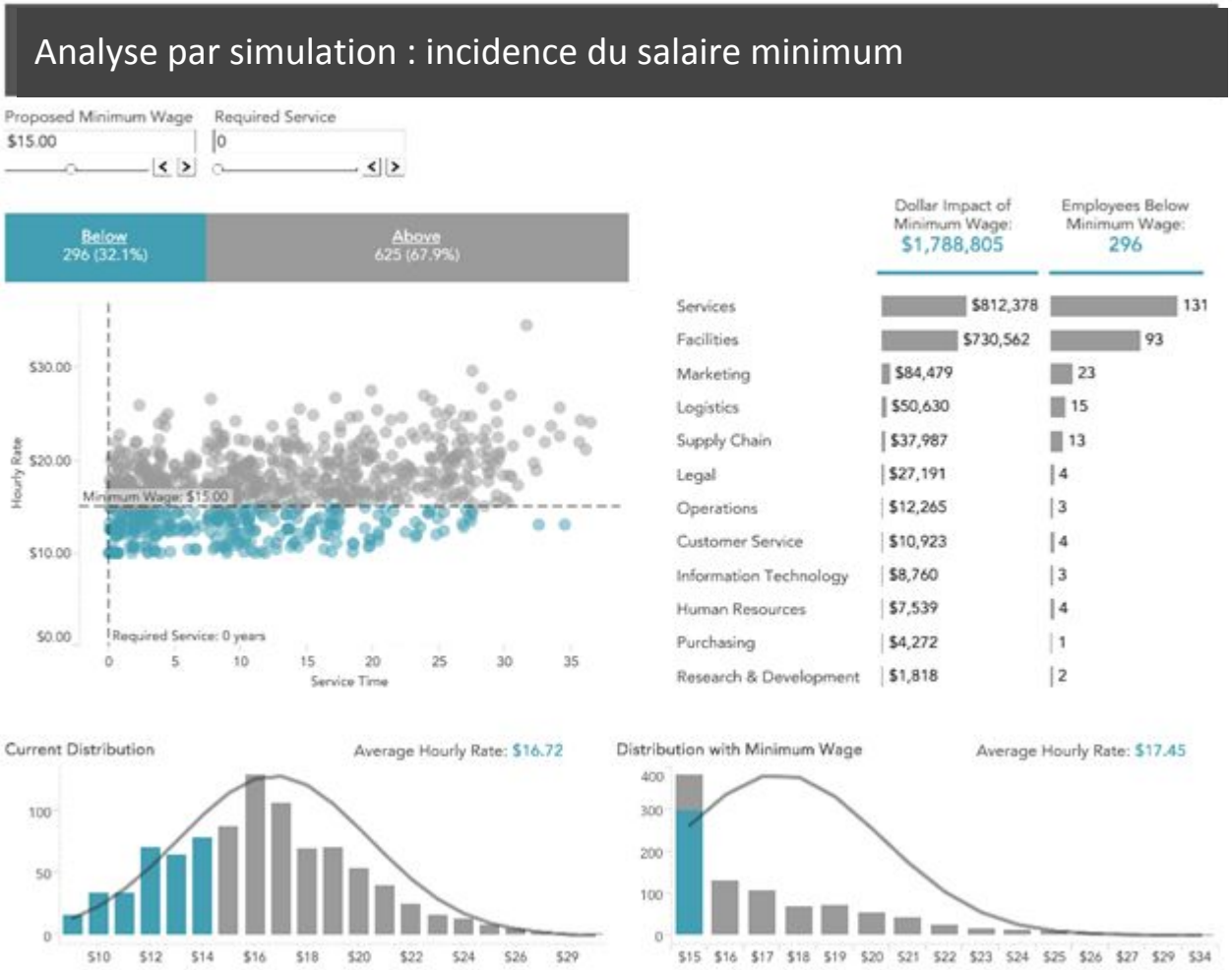
Après

Série chronologique du taux de mortalité maternelle, référence 1990 et cible 2015

Décès maternels (x 100 000 naissances vivantes)



Attirer l'attention sur des éléments précis



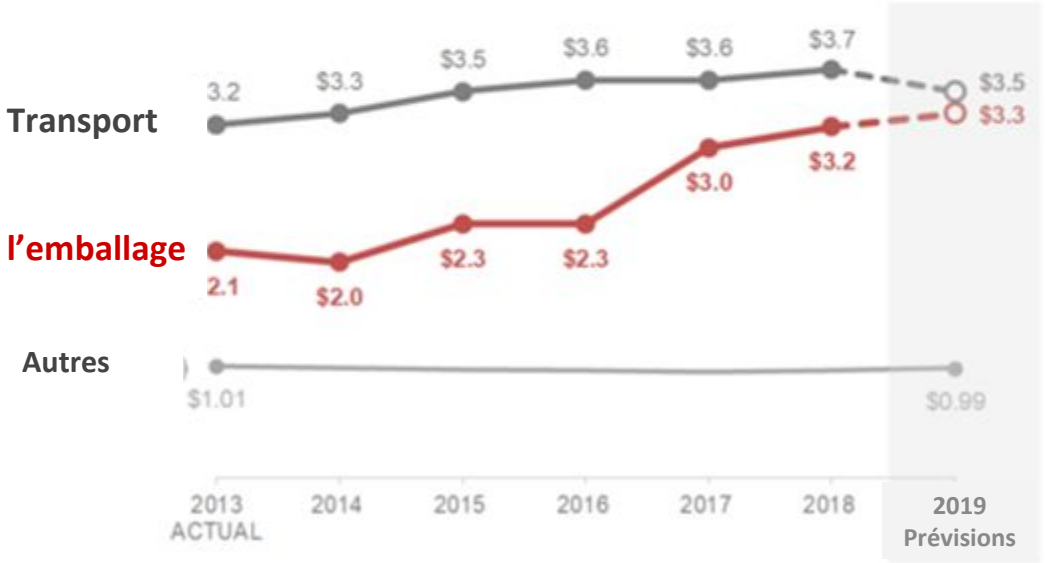
Données tabulaires

BRM 12.2018 Monthly Review		Données réelles						Prévisions			
		FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	Q12019	Q22019	Q32019	Q42019
FPS		**21.9**	**13.9**	**12.8**	**12.3**	**14.9**	**12.9**	**15.6**	**19**	**19.2**	**12.3**
SG&A Variable %		**30.50%**	**23.50%**	**22.90%**	**24.50%**	**21.00%**	**24.30%**	**33.70%**	**25.90%**	**23.60%**	**22.90%**
Transport	Actual	$3.2	$3.3	$3.5	$3.6	$3.6	$3.7	$0.93	$0.93	$0.93	$0.93
	Budget	$3.22	$3.32	$3.52	$3.62	$3.62	$3.72	$0.93	$0.94	$0.89	$0.91
	%	**99.38%**	**99.40%**	**99.43%**	**99.45%**	**99.45%**	**99.46%**	**99.43%**	**98.43%**	**103.43%**	**101.43%**
L'emballage	Actual	$ 2.05	$ 1.95	$ 2.30	$ 2.30	$ 2.99	$ 3.18	$0.75	$0.79	$0.82	$0.95
	Budget	**$ 2.08**	**$ 1.98**	**$ 2.33**	**$ 2.33**	**$ 3.02**	**$ 3.21**	**$0.8**	**$0.8**	**$0.8**	**$0.8**
	%	98.56%	98.48%	98.71%	98.71%	99.01%	99.07%	90.91%	95.76%	99.39%	115.15%
Other variable	Actual	$1.01	$0.99	$0.98	$0.97	$0.96	$0.97	$0.97	$0.97	$0.97	$0.97
Capital charges	Actual	0.20	0.41	0.73	0.02	0.35	0.69	0.78	0.11	0.33	0.88
Inventory	Actual	0.6	0.87	0.95	0.32	0.62	0.15	0.56	0.51	0.04	0.40
Non-interest bearing	Actual	0.8	0.79	0.09	0.42	0.89	0.07	0.58	0.54	0.84	0.15
Sales overhead	Actual	45%	40%	83%	33%	57%	18%	57%	63%	9%	84%
Service level fines	Actual	39%	10%	9%	45%	28%	68%	17%	51%	34%	61%
WTL-SLA	Actual	109%	4%	40%	13%	3%	36%	44%	44%	43%	94%

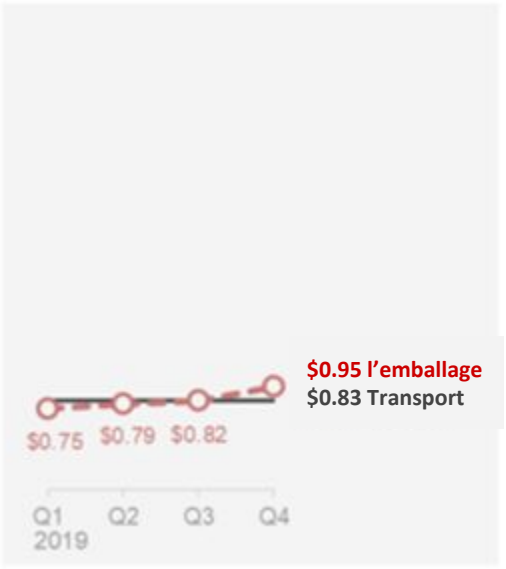
Comparativement aux graphiques

Coûts de l'emballage en nette augmentation: Depuis 2016, les coûts d'emballage ont augmenté à un rythme plus élevé que les autres coûts variables. En 2019, nous prévoyons qu'ils s'apparenteront à ceux du transport, lesquels ont toujours représenté nos dépenses d'exploitation les plus élevées.
En tenant compte de la demande saisonnière du quatrième trimestre, **nous prévoyons que les coûts d'emballage dépasseront les dépenses prévues au budget** si ces tendances se maintiennent. **Discutons des prochaines étapes à suivre.**

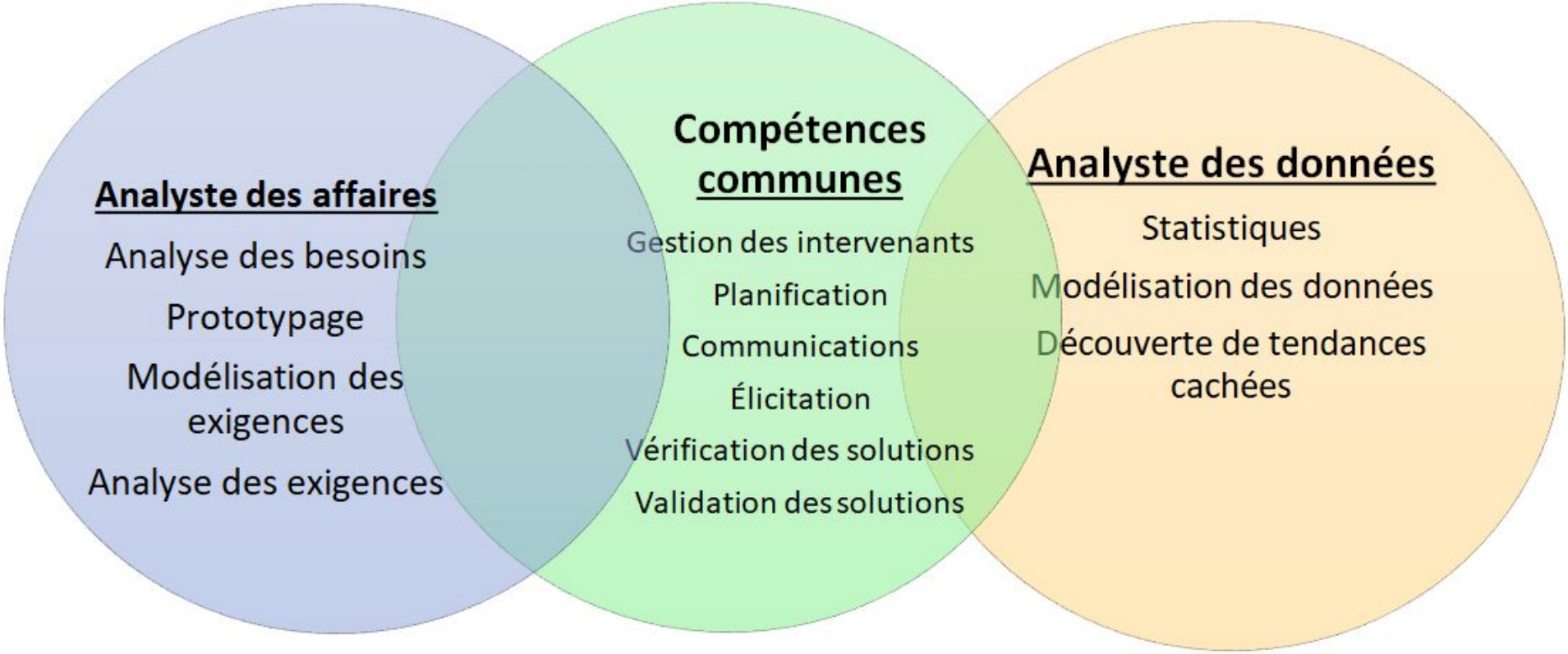
Coûts variables au fil du temps
EN MILLIERS DE DOLLARS ($)



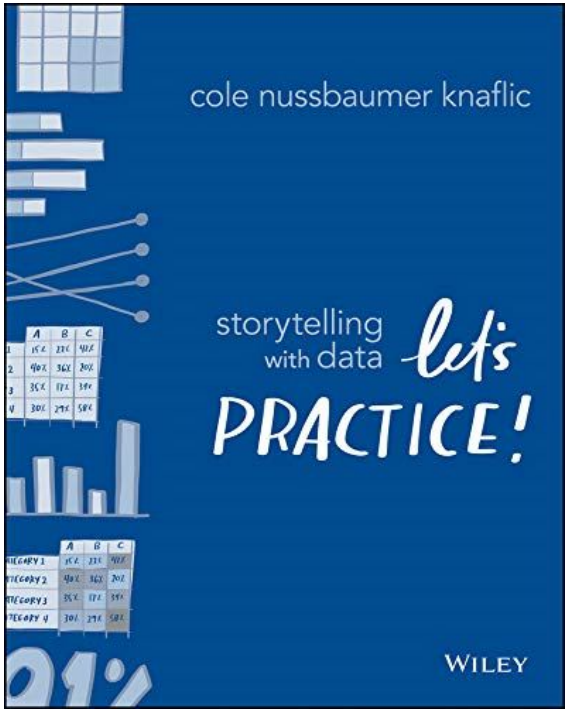
Coûts de l'emballage
EN MILLIERS DE DOLLARS ($)

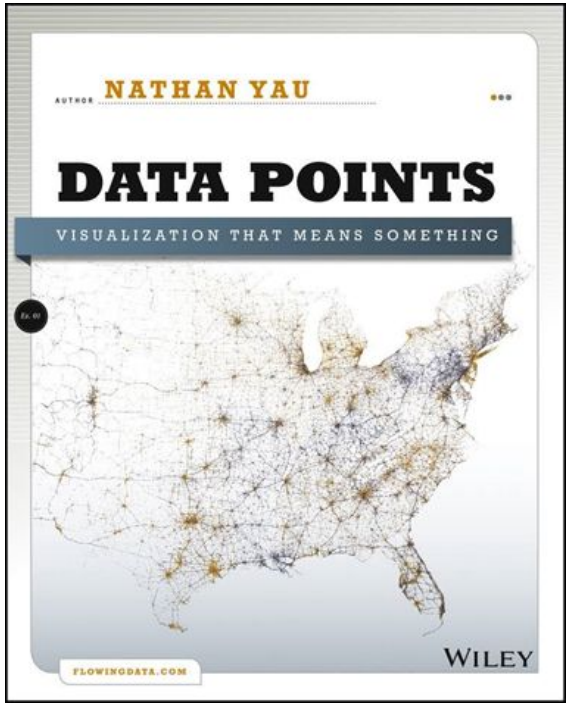


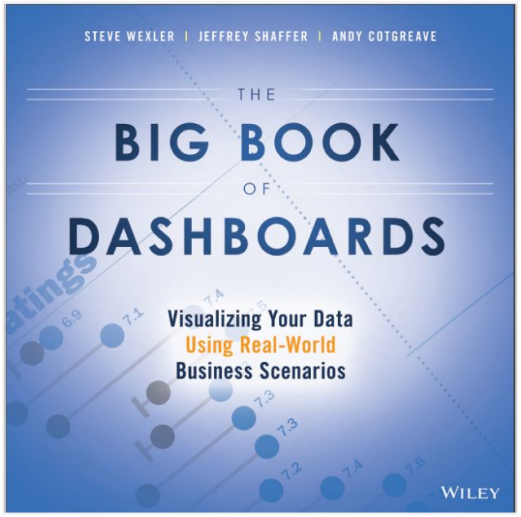
Comparaison entre analyste d'affaires et analyste de données



Lectures pertinentes







Références et liens

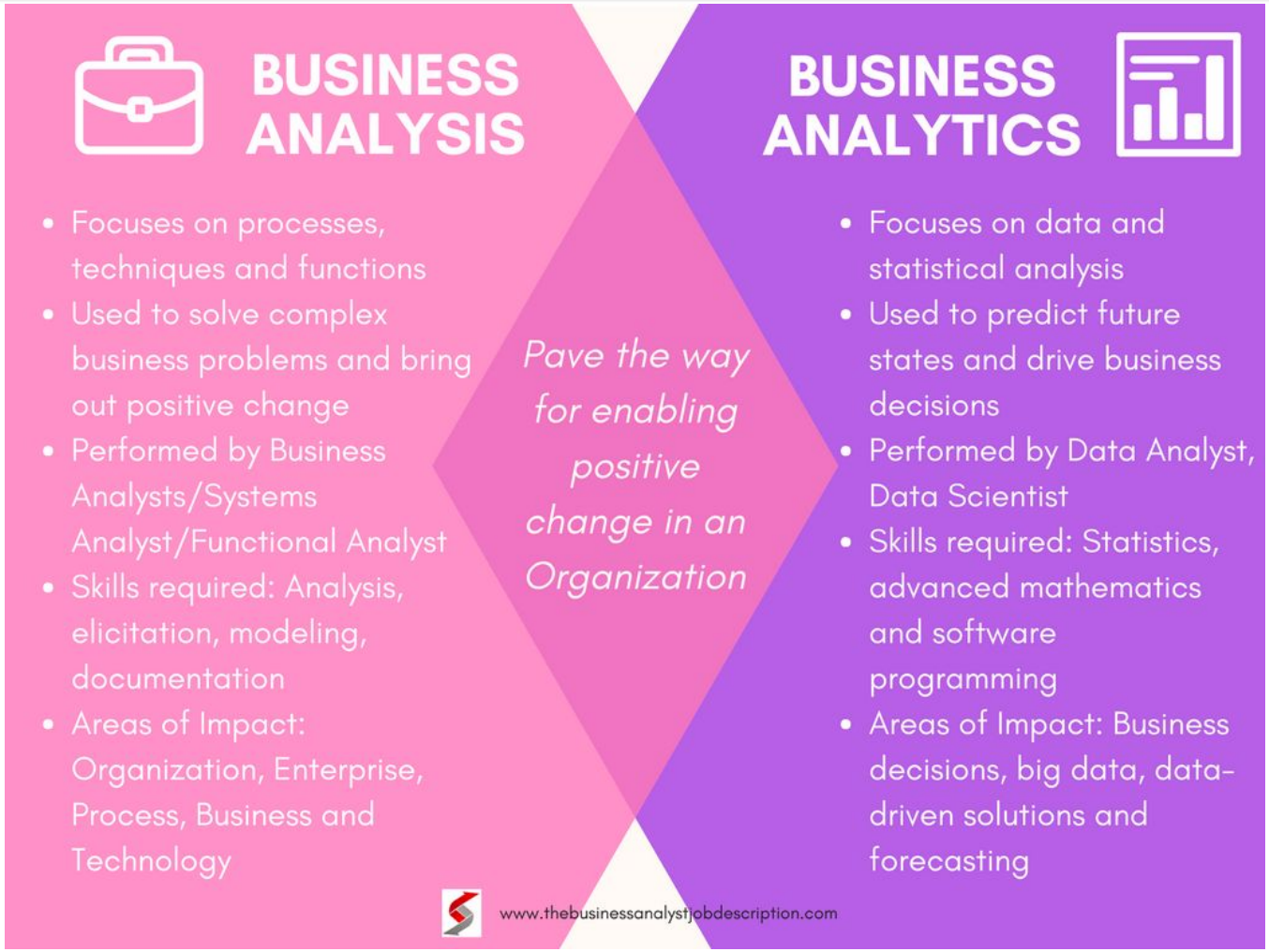
Données de John Snow
https://www.theguardian.com/news/datablog/2013/mar/15/john-snow-cholera-map [en anglais seulement]
Photos de la pompe située sur Broad Street obtenues à partir de Google Maps
Visualisation de rues par l'entremise de Google Maps
On the Trail of an Epidemic – « Change Management »
http://www.ph.ucla.edu/epi/snow/snowcricketarticle.html [en anglais seulement]

Pourquoi des épidémies comme celle du coronavirus se propagent-elles de manière exponentielle et comment « aplatir la courbe »?
https://www.washingtonpost.com/graphics/2020/health/corona-simulator-french/

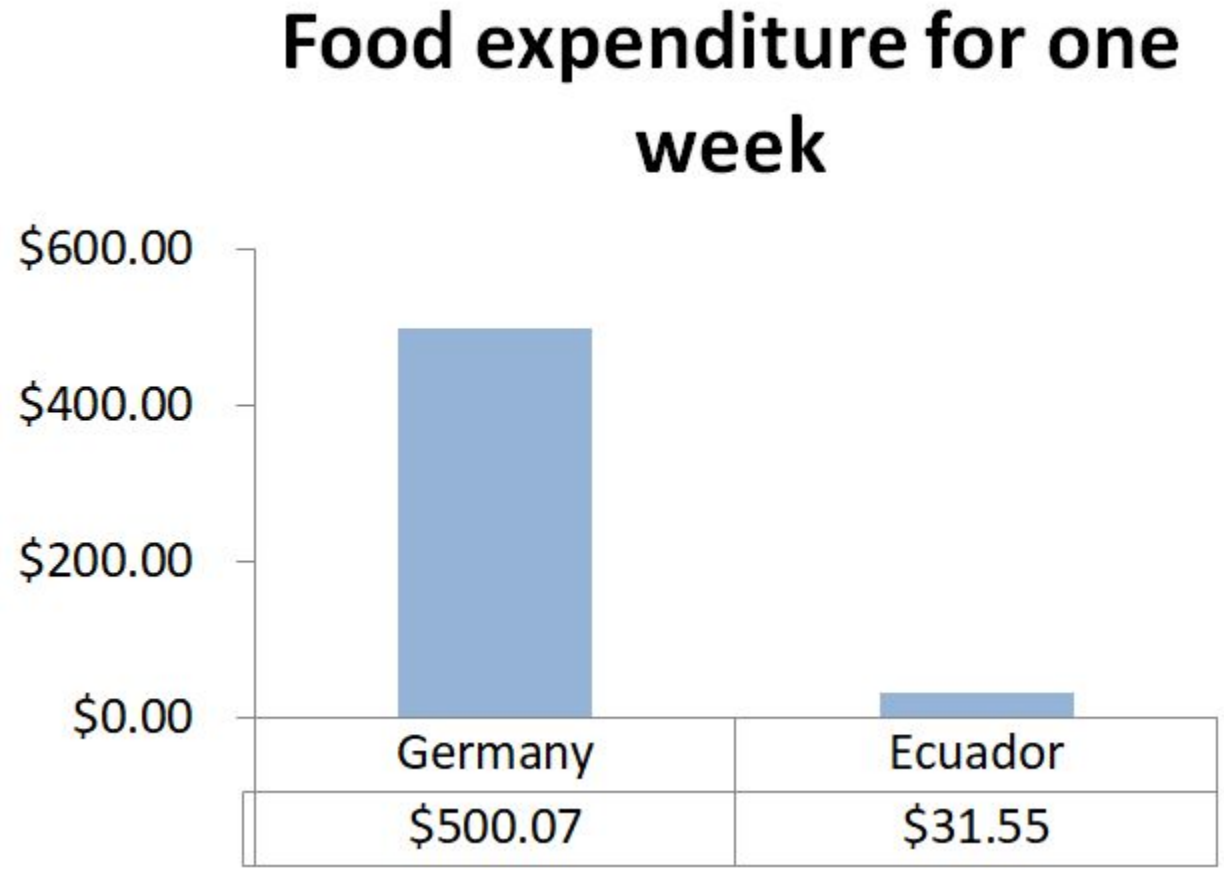
La vague de la grippe [en espagnol seulement]
La COVID-19 selon la couleur de la peau [en anglais seulement]
Les chiffres associés à la COVID-19 au Canada [en anglais seulement]
Manifestants contre le port du masque à Montréal (30 septembre 2020)
Business Analytics vs. Data Analytics: Which is Better for Your Business?
Data Analysis for Business Analysts: Data Management Body of Knowledge
Un grand merci à Alberto Cairo; je tiens notamment à reconnaître l'apport de son livre *How Charts Lie*. Jetez un coup d'œil à son blogue [en anglais seulement] et suivez-le sur Twitter @AlbertoCairo.
Merci beaucoup à l'équipe fantastique de BG Communications International pour la traduction de de cette présentation

Matériel supplémentaire

Comparaison entre analyste commercial et analyste de données



Who is your Audience?



Improve the visualization

Weekly Food Expenditures : Germany

The Melander family of Bargteheide : Food Expenditure for one week : $500.07

Weekly Food Expenditures : Ecuador

The Ayme family of Tingo : Food Expenditure for one week : $31.55

From Snow's Notes

There are certain circumstances bearing on the question which deserve to be mentioned. The workhouse in Poland Street is more than three-fourths surrounded by houses in which deaths from Cholera occurred; yet, out of 535 inmates, only five died of Cholera - the other deaths which took place being those of persons admitted after they were attacked. The workhouse has a pump on the premises in addition to the supply from the Grand Junction Water Works, and the inmates never sent to Broad Street for water. If the mortality in the workhouse had been equal to that in the streets immediately surrounding it on three sides, upwards of 50 inmates would have died. There is a brewery in Broad Street near to the pump, and on perceiving that no brewer's men were registered as being dead of Cholera, I called on Mr. Huggins the proprietor. He informed me that there were above 70 workmen employed in the brewery, and that none of them had suffered from Cholera, at least in a severe form, only two having been indisposed, and that not seriously, [104/105] at the time the disease prevailed. The men are allowed a certain quantity of malt liquor, and Mr. Huggins believes they do not drink water at all, and he is quite certain that they never obtained water from the pump in the street. There is a deep well in the brewery in addition to the New River water.

Name of the occupier or rate-payer.

Resident or non-resident?

Number of rooms in the house.

Average size of each room.

Number of persons (average) inhabiting each room in August 1854.

In what rooms did Cholera occur in August and September last?

How many cases were there?

At what hour did the attack in each case occur?

How are the rooms ventilated?

Do the top sashes let down?

Condition and position of the privy or water-closet.

Is there any common sewer in the street?

Does the main drain of the house communicate directly into the sewer, or into an intercepting cesspool?

Do the drains of the house emit any stench?

What drinking water was used in August last?

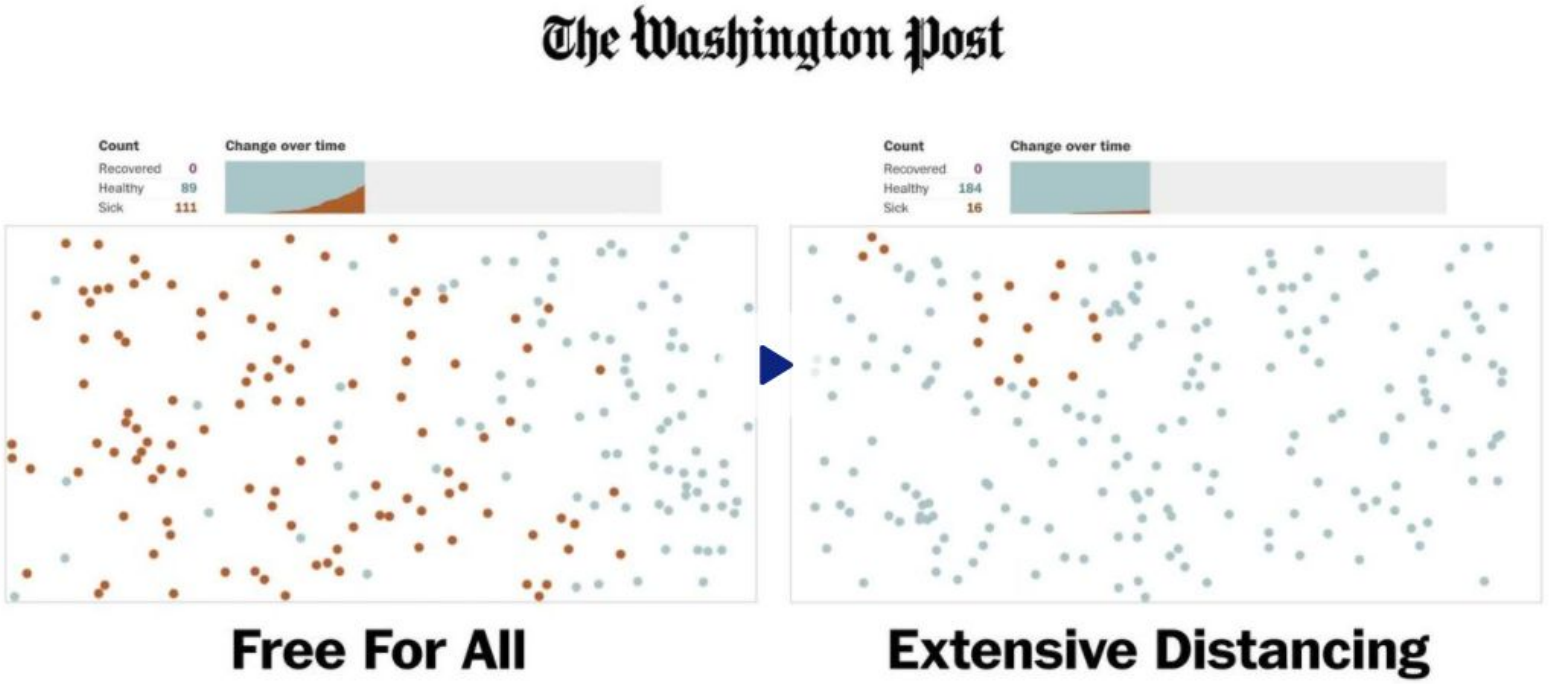
What receptacles exist to contain the supply of water? How often are they cleaned out?

Is the supply sufficient?

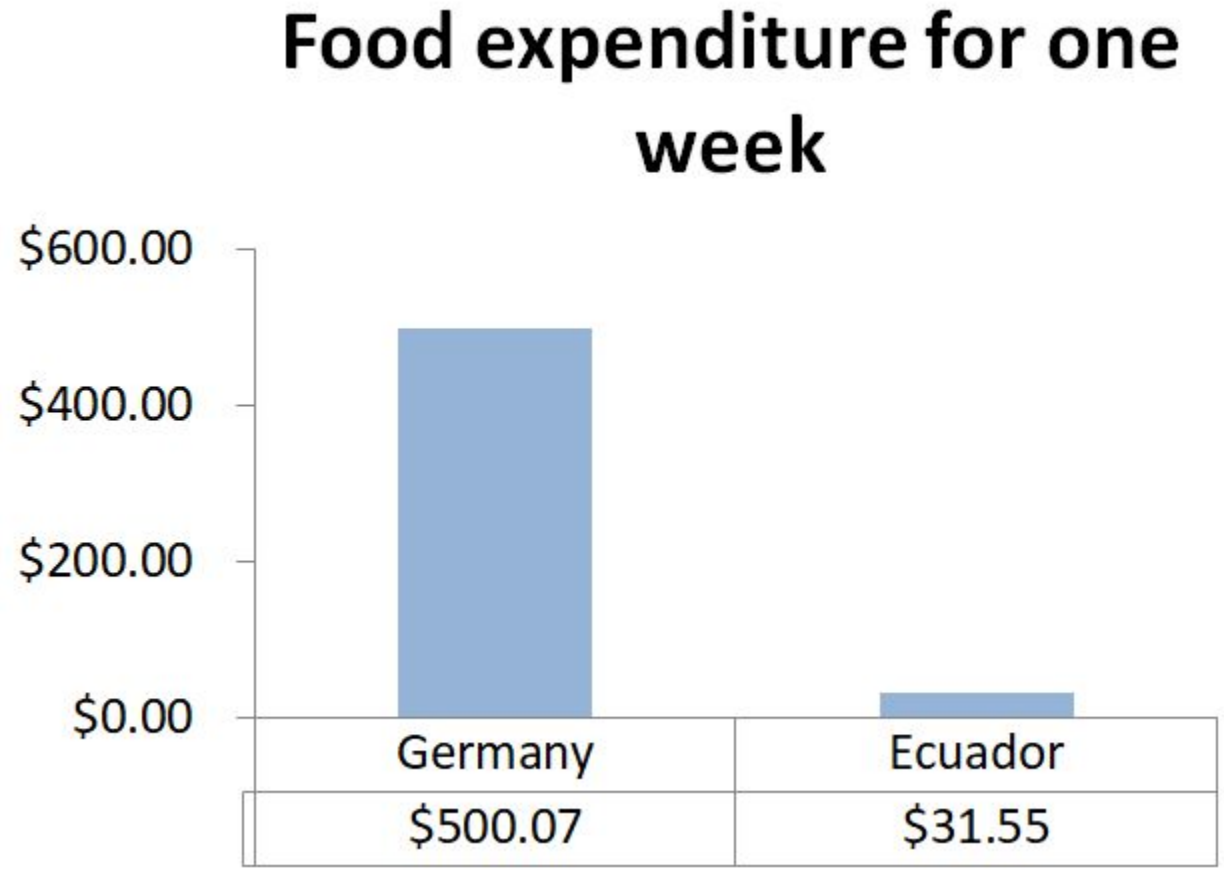
Is the house provided with a receptacle for ashes, dirt, &c.?

How often is it cleaned out?

Matériel supplémentaire



Who is your Audience?



Improve the visualization

Weekly Food Expenditures : Germany

The Melander family of Bargteheide : Food Expenditure for one week : $500.07

Weekly Food Expenditures : Ecuador

The Ayme family of Tingo : Food Expenditure for one week : $31.55

From Snow's Notes

There are certain circumstances bearing on the question which deserve to be mentioned. The workhouse in Poland Street is more than three-fourths surrounded by houses in which deaths from Cholera occurred; yet, out of 535 inmates, only five died of Cholera - the other deaths which took place being those of persons admitted after they were attacked. The workhouse has a pump on the premises in addition to the supply from the Grand Junction Water Works, and the inmates never sent to Broad Street for water. If the mortality in the workhouse had been equal to that in the streets immediately surrounding it on three sides, upwards of 50 inmates would have died. There is a brewery in Broad Street near to the pump, and on perceiving that no brewer's men were registered as being dead of Cholera, I called on Mr. Huggins the proprietor. He informed me that there were above 70 workmen employed in the brewery, and that none of them had suffered from Cholera, at least in a severe form, only two having been indisposed, and that not seriously, [104/105] at the time the disease prevailed. The men are allowed a certain quantity of malt liquor, and Mr. Huggins believes they do not drink water at all, and he is quite certain that they never obtained water from the pump in the street. There is a deep well in the brewery in addition to the New River water.

Name of the occupier or rate-payer.

Resident or non-resident?

Number of rooms in the house.

Average size of each room.

Number of persons (average) inhabiting each room in August 1854.

In what rooms did Cholera occur in August and September last?

How many cases were there?

At what hour did the attack in each case occur?

How are the rooms ventilated?

Do the top sashes let down?

Condition and position of the privy or water-closet.

Is there any common sewer in the street?

Does the main drain of the house communicate directly into the sewer, or into an intercepting cesspool?

Do the drains of the house emit any stench?

What drinking water was used in August last?

What receptacles exist to contain the supply of water? How often are they cleaned out?

Is the supply sufficient?

Is the house provided with a receptacle for ashes, dirt, &c.?

How often is it cleaned out?