

A thick blue wavy line that curves across the top of the page, separating the header from the main content.

# STEM: My first year as a STEM Ambassador

Jo Bunnnett

RSS September 2018

# Outline

- All about me
- STEM – what it means to me
- My experiences



# All about me

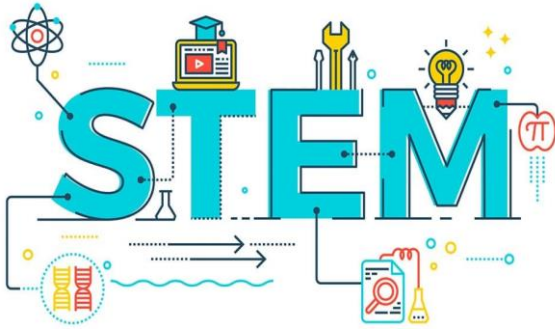
BSc in Mathematics (2014)

MSc in Statistics with  
Applications in Medicine  
(2016)

Statistician for NHS  
Blood and Transplant  
(2016) – only 2 years  
into my statistical  
career

Joined as a STEM  
Ambassador in  
October 2017 –  
still new, still  
learning





**STEM Ambassadors** are volunteers from a wide range of science, technology, engineering and mathematics (**STEM**) related jobs and disciplines across the UK. They offer their time and enthusiasm to help bring **STEM** subjects to life and demonstrate the value of them in life and careers.

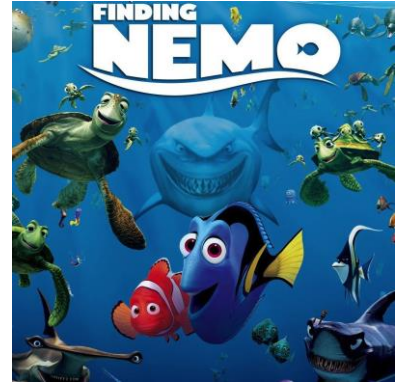


# Why I became a STEM Ambassador

Maths Tutor



“Without mathematics there  
would be no Finding Nemo”  
Vanessa Styles University of  
Sussex



We   
Maths

What can I do with Maths?  
What can I not do with Maths?!



# What I have done



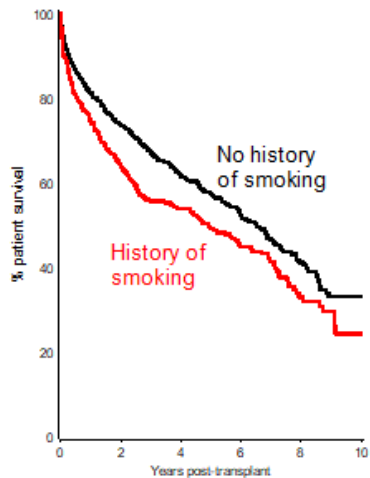
REDMAIDS'  
HIGH SCHOOL  
FOR GIRLS | BRISTOL



# What I have done

### Effect of donor smoking on survival after lung transplantation

- Using data on lungs transplants 199



### Enquiries - Health

|           | 0-1 | 2-3 | 4-5 | 6-7 | 8 |
|-----------|-----|-----|-----|-----|---|
| Monday    | 11  | 5   | 6   | 6   |   |
| Tuesday   | 4   | 9   | 12  | 3   |   |
| Wednesday | 7   | 10  | 14  | 10  |   |
| Thursday  | 9   | 5   | 14  | 6   |   |
| Friday    | 7   | 12  | 4   | 8   |   |
| Saturday  | 6   | 15  | 7   | 14  |   |
| Sunday    | 6   | 12  | 10  | 5   |   |

|           | 0-1 | 2-3 | 4-5 | 6-7 | 8 |
|-----------|-----|-----|-----|-----|---|
| Monday    | 6   | 6   | 4   | 12  |   |
| Tuesday   | 6   | 10  | 8   | 9   |   |
| Wednesday | 3   | 9   | 20  | 10  |   |
| Thursday  | 9   | 8   | 4   | 14  |   |
| Friday    | 8   | 11  | 9   | 5   |   |
| Saturday  | 5   | 13  | 9   | 7   |   |
| Sunday    | 8   | 9   | 8   | 8   |   |

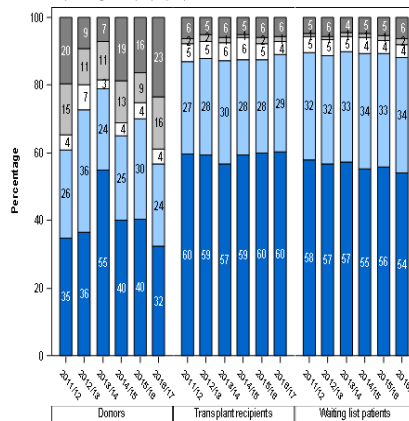
  

|           | 0-1 | 2-3 | 4-5 | 6-7 | 8 |
|-----------|-----|-----|-----|-----|---|
| Monday    | 8   | 12  | 6   | 5   |   |
| Tuesday   | 5   | 6   | 11  | 10  |   |
| Wednesday | 10  | 4   | 9   | 12  |   |
| Thursday  | 9   | 11  | 11  | 12  |   |
| Friday    | 6   | 7   | 6   | 10  |   |
| Saturday  | 8   | 6   | 11  | 9   |   |
| Sunday    | 4   | 6   | 13  | 3   |   |

study of a prospective registry. Lancet (2012) 380, No.9843, p747-755

### Coding

Figure 2 Deceased donors, transplant recipients and patients on the waiting list (excluding White people), 1 April 2011 - 31 March 2017



```

/*Figure*/
ods html close;
ods graphics on /reset height=12.5cm
width=18.3cm border=off imagfmt=emf
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ods listing style=mystyle gpath="F:\Stats &
Audit\Shared\ODT Services\BAME\year3.\NOT
PDA\Figures";
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Deceased donors, transplant recipients and
patients on the waiting list";
title2 h=10pt j=left f=arial "
(excluding White people), 1 April %eal(%year1.-
1) - 31 March %year2.";
footnote;
proc sgpanel data=dec_all_tot2 dattmap=attmap;
*sganno=anno3;
format pct 3.;
panelby group / layout=columnlattice onepanel
noborder colheaderpos=bottom novarnam;
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lineattr=(color=black) attrid=A;
scatter x=fyear y=ys / markerchar=pct
markercharattr=(size=9 color=black);
scatter x=fyear y=ys1/markerchar=pct
markercharattr=(size=9 color=white);
scatter x=fyear y=ys2/markerchar=pct
markercharattr=(size=9 color=white);
keylegend 'a'/position=right;
rowaxis offsetmin=0 label= 'Percentage'
LABELATTRS=(size=9pt weight= bold family =
"arial");
colaxis display=(nolabel) valueattr=(size=8pt)
fitpolicy=rotate labelattr=(family = "arial");
format ethnic. group. group. fyear fyr.;
run;
    
```

“If you are a patient on the lung transplant list, you are more likely to die if you continue waiting for a lung from a non-smoking donor than if you have a lung from a smoking donor”

### Effect of donor smoking on survival after lung transplantation

Blood and Transplant

- Using data on lungs transplants 1999 - 2010



- Poorer survival if donor had history of smoking

- However

**risk of death waiting for lung from non-smoking donor**

**> risk of death if accept lung from smoking donor**

**(p = 0.0004)**

- Patients can make an informed choice
- Published in the Lancet

*Bonser RS et al. Effect of donor smoking on survival after lung transplantation: a cohort study of a prospective registry. Lancet (2012) 380 , No.9843, p747-755*



# Redmaids' High School

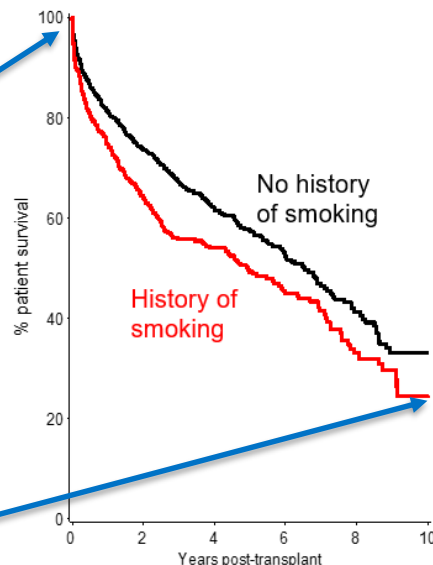
- Remove all the unnecessary technical jargon – but keep the message the same

0 years = everyone alive

10 years = 25% alive in red group, 35% in black group

## Effect of donor smoking on survival after lung transplantation

- Using data on lungs transplants 1999 - 2010



risk of death waiting for lung from non-smoking donor



risk of death if accept lung from smoking donor

- Highlight statistics can be presented in many ways
- Statistician's job is to explain their findings to non-statistician –
- Simple information is important to highlight issues quickly

## Enquiries - Heatmaps

| 2013/14   |      |     |     |     |     |       |       |       |       |       |       |       |       |
|-----------|------|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|-------|-------|
|           | Hour |     |     |     |     |       |       |       |       |       |       |       |       |
|           | 0-1  | 2-3 | 4-5 | 6-7 | 8-9 | 10-11 | 12-13 | 14-15 | 16-17 | 18-19 | 20-21 | 22-23 | TOTAL |
| Monday    | 11   | 5   | 6   | 6   | 7   | 7     | 5     | 1     | 2     | 2     | 1     | 5     | 58    |
| Tuesday   | 4    | 9   | 12  | 3   | 7   | 5     | 3     | 2     | 0     | 3     | 6     | 3     | 57    |
| Wednesday | 7    | 10  | 14  | 10  | 6   | 3     | 4     | 1     | 0     | 0     | 5     | 2     | 63    |
| Thursday  | 9    | 5   | 14  | 6   | 7   | 4     | 2     | 2     | 0     | 1     | 1     | 3     | 54    |
| Friday    | 7    | 12  | 4   | 8   | 7   | 6     | 1     | 2     | 0     | 3     | 1     | 3     | 54    |
| Saturday  | 6    | 15  | 7   | 14  | 4   | 5     | 3     | 2     | 2     | 5     | 3     | 4     | 70    |
| Sunday    | 6    | 12  | 10  | 5   | 8   | 4     | 6     | 1     | 3     | 0     | 0     | 7     | 62    |
|           |      |     |     |     |     |       |       |       |       |       |       |       | 418   |

| 2014/15   |      |     |     |     |     |       |       |       |       |       |       |       |       |
|-----------|------|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|-------|-------|
|           | Hour |     |     |     |     |       |       |       |       |       |       |       |       |
|           | 0-1  | 2-3 | 4-5 | 6-7 | 8-9 | 10-11 | 12-13 | 14-15 | 16-17 | 18-19 | 20-21 | 22-23 | TOTAL |
| Monday    | 6    | 8   | 4   | 12  | 5   | 8     | 4     | 2     | 1     | 1     | 5     | 1     | 57    |
| Tuesday   | 6    | 10  | 8   | 9   | 7   | 6     | 2     | 5     | 3     | 3     | 5     | 7     | 71    |
| Wednesday | 3    | 9   | 20  | 10  | 4   | 3     | 2     | 5     | 1     | 4     | 2     | 6     | 69    |
| Thursday  | 9    | 8   | 4   | 14  | 6   | 3     | 11    | 3     | 3     | 2     | 3     | 2     | 68    |
| Friday    | 8    | 11  | 9   | 5   | 5   | 5     | 5     | 3     | 2     | 0     | 2     | 5     | 60    |
| Saturday  | 5    | 13  | 9   | 7   | 5   | 9     | 6     | 3     | 3     | 3     | 2     | 6     | 71    |
| Sunday    | 8    | 9   | 8   | 8   | 6   | 6     | 4     | 2     | 1     | 0     | 4     | 3     | 59    |
|           |      |     |     |     |     |       |       |       |       |       |       |       | 466   |

| 2015/16   |      |     |     |     |     |       |       |       |       |       |       |       |       |
|-----------|------|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|-------|-------|
|           | Hour |     |     |     |     |       |       |       |       |       |       |       |       |
|           | 0-1  | 2-3 | 4-5 | 6-7 | 8-9 | 10-11 | 12-13 | 14-15 | 16-17 | 18-19 | 20-21 | 22-23 | TOTAL |
| Monday    | 8    | 12  | 6   | 5   | 3   | 5     | 4     | 2     | 2     | 4     | 2     | 3     | 56    |
| Tuesday   | 5    | 6   | 11  | 10  | 6   | 13    | 8     | 4     | 5     | 1     | 4     | 1     | 74    |
| Wednesday | 10   | 4   | 9   | 12  | 6   | 8     | 9     | 5     | 3     | 2     | 2     | 2     | 72    |
| Thursday  | 9    | 11  | 11  | 12  | 3   | 13    | 6     | 4     | 3     | 6     | 1     | 4     | 83    |
| Friday    | 6    | 7   | 6   | 10  | 10  | 2     | 5     | 4     | 3     | 3     | 1     | 3     | 60    |
| Saturday  | 8    | 6   | 11  | 9   | 3   | 12    | 8     | 4     | 6     | 2     | 2     | 4     | 75    |
| Sunday    | 4    | 6   | 13  | 3   | 6   | 3     | 2     | 5     | 6     | 3     | 2     | 6     | 59    |
|           |      |     |     |     |     |       |       |       |       |       |       |       | 476   |



- Important to show that we are not all the same
- Gives ideas of what other education paths lead to becoming a statistician

### Our backgrounds



#### Undergrad (BSc)

Maths

Maths and Stats

Stats

Stats and Computing

Maths with management

Mathematical sciences

Natural Sciences

Medical Sciences

#### Postgrad (MSc)

Stats

Stats with management

Biometry

Stats and Maths

Medical Stats

Transfusion and transplantation

#### Placement year

NHSBT

Cadburys

Insurance company

#### Jobs

Maths teacher

Stats consultant

Dancing teacher

Tournament organiser

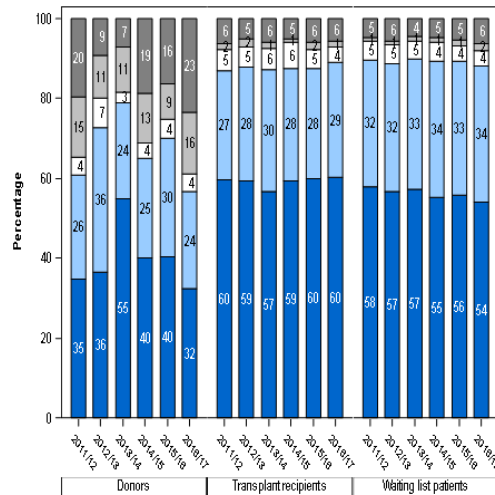




- Appeal to the students computer literacy
- Show that it is not all analytical but also creative
- Again show how to express information simply

## Coding

Figure 2 Deceased donors, transplant recipients and patients on the waiting list (excluding White people), 1 April 2011 - 31 March 2017



```

/*Figure*/
ods html close;
ods graphics on /reset height=12.5cm
width=18.3cm border=off imagefmt=emf
imagenam="Fig2";
ods listing style=mystyle gpath="F:\Stats &
Audit\Shared\ODT Services\BAME\&year3.\NOT
PDA\Figures";
title1 h=10pt j=left f=arial "Figure 2
Deceased donors, transplant recipients and
patients on the waiting list";
title2 h=10pt j=left f=arial "
(excluding White people),1 April %eval(&year1.-
1) - 31 March &year2.";
footnote;
proc sgpanel data=dec_all_tot2 dattmap=attrmap;
*sganno=anno3;
format pct 3.;
panelby group / layout=columnlattice onepanel
noborder colheaderpos=bottom novarname;
highlow x=fyear low=y1 high=y2 / group=ethnic
type=bar name='a' intervalbarwidth= 20
lineattrs=(color=black) attrid=A ;
scatter x=fyear y=ys / markerchar=pct
markercharattrs=(size=9 color=black) ;
scatter x=fyear y=ys1/markerchar=pct
markercharattrs=(size=9 color=white);
scatter x=fyear y=ys2/markerchar=pct
markercharattrs=(size=9 color=white);
keylegend 'a'/position=right;
rowaxis offsetmin=0 label= 'Percentage'
LABELATTRS=(size=9pt weight= bold family =
"arial");
colaxis display=(nolabel) valueattrs=(size=8pt)
fitpolicy=rotate labelattrs=(family = "arial");
format ethnic ethnic. group group. fyear fyr.;
run;
    
```

# Experiences



REDMAIDS'  
HIGH SCHOOL  
FOR GIRLS | BRISTOL



- Students interested how employable they are with their degrees/postgrads. Time limit was difficult, next time cut down content even further.
- Had positive engagement with questions at the end, all biology related i.e. 'Can the same kidney be transplanted more than once'.
- Favourite presentation, had key questions relating to the mathematics. General positive feedback from the school.

# Summary

- Promoting STEM subjects is crucial at all age groups
- Each STEM talk is different and requires adjustment for the specific audience
- Highlight the importance of maths through examples and application
- Cannot wait for my next STEM experience



<https://www.stem.org.uk/>

<https://www.nhsbt.nhs.uk/>

<https://www.odt.nhs.uk/>

