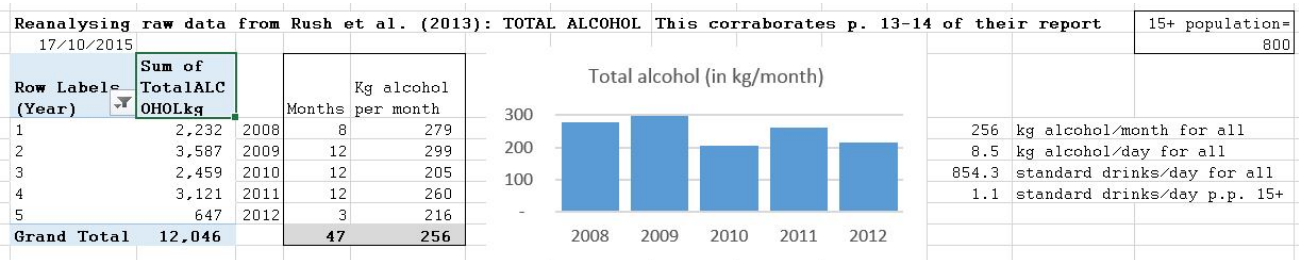# Postscript

The corresponding author of the Rush et al. (2013) report is Professor Elaine Rush of AUT. She kindly made available to me her database of food, alcohol and smoking items collected from the 2008-2012 cargo manifests of shipments from Samoa to Tokelau. I was able to import these data into an Excel spreadsheet and construct pivot tables from them. This allowed me to assess the quality of the initial analysis, as well as the comprehensiveness of data coverage. The news is not good at all.

Re-evaluating data analysis

The raw datafile on which the Rush et al study is based, was reanalysed for quantities of alcohol, food and cigarettes to try and explain some major discrepancies with my own study of 2014 data.

Alcohol

By re-analysing the raw alcohol data, I was able to produce a summary table and graph that is very similar to the graph presented in the Rush report; this supports their conclusion that adult Tokelauans (15 years and over) have on average on standard drink every day. The figure is of a similar order of magnitude as my own tentative analysis of alcohol use, which however needs further verification of spirits in particular (see Appendix Y). This will raise the actual average drinking rate considerably.

Reanalysing raw data from Rush et al. (2013): TOTAL ALCOHOL This corraborates p. 13-14 of their report						15+ population= 800

17/10/2015

Row Labels (Year)	Sum of TotalALCOHOLkg		Months	Kg alcohol per month
1	2,232	2008	8	279
2	3,587	2009	12	299
3	2,459	2010	12	205
4	3,121	2011	12	260
5	647	2012	3	216
Grand Total	12,046		47	256

Total alcohol (in kg/month)

256	kg alcohol/month for all
8.5	kg alcohol/day for all
854.3	standard drinks/day for all
1.1	standard drinks/day p.p. 15+

Food

Initially I entered the numbers for top food items from the Rush report (p.8) in a spreadsheet to compare with my own data, on a monthly import basis. My expectation was that our monthly consumption figures should be of the same order of magnitude. I then found very large discrepancies for flour, potatoes, onions, corned beef, butter, sausages and eggs (highlighted in yellow below).
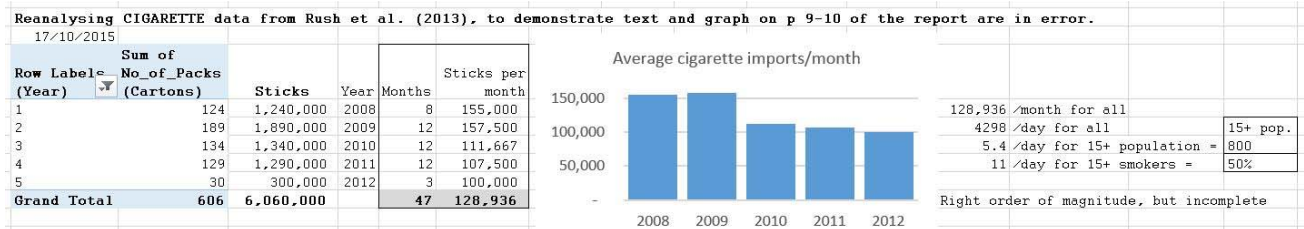
17/10/2015	JJ 2015 12 months	Rush et al 2013 47 months	Average monthly imports (tonnes)			
Food item (by rank)	tonnes	tonnes	JJ 2015 2014	Rush 2013 2008-12	Comparison to 2014 data	Corrected Rush data
Rice	62.4	181	5.2	3.9	74%	74%
Chicken	62.7	175	5.2	3.7	71%	71%
Brown sugar	49.4	114	4.1	2.4	59%	59%
Flour	25.6	735	2.1	15.6	734%	73%
Potatoes	17.3	711	1.4	15.1	1047%	105%
Onions	8.0	235	0.7	5.0	752%	75%
Corned beef	13.1	402	1.1	8.6	784%	78%
Lamb	13.4	104	1.1	2.2	198%	198%
Oranges	3.4	10	0.3	0.2	76%	76%
Apples	3.0	10	0.3	0.2	84%	84%
Butter	3.0	131	0.2	2.8	1119%	112%
All sausages combined	13.4	724	1.1	15.4	1378%	138%
Pumpkin [not in stores]	0.4	10	0.0	0.2	690%	690%
Eggs: 136,620 units of 50 g average	6.8	285	0.6	6.1	1065%	107%
Ice cream	0.0	141	0.0	3.0	n/a	n/a

Tokelau import shipments 2008Q2 (top) - 2014Q4
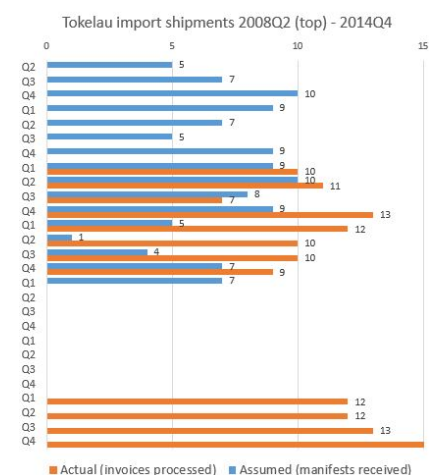
From a subsequent comparison with the raw data supplied, it became clear that the listed values for these 7 foodstuffs (8 if we include icecream) had been reported by Rush et al (2013) with an error in the place of the decimal point, effectively inflating their values by a factor 10. Clearly no rational conclusions and recommendations could and should be made from such erroneous tabling of data.

Cigarettes

My re-analysis of the raw cigarette data obtained produced the following a summary table and graph. While the shape of the graphs is the same, I could not achieve any similarity to the cigarette values reported in the Rush report. Even allowing for the mistake that a box of cigarettes was taken to include 50 times 10 cigarettes - it is in fact 50 times 10 packs of 20 cigarettes - it is unclear how the cigarette values (5,000/month in 2008, 2,000/month in 2012) in that report were obtained.

Reanalysing CIGARETTE data from Rush et al. (2013), to demonstrate text and graph on p 9-10 of the report are in error.

17/10/2015

Row Labels (Year)	Sum of No_of_Packs (Cartons)	Sticks	Year	Months	Sticks per month
1	124	1,240,000	2008	8	155,000
2	189	1,890,000	2009	12	157,500
3	134	1,340,000	2010	12	111,667
4	129	1,290,000	2011	12	107,500
5	30	300,000	2012	3	100,000
Grand Total	606	6,060,000		47	128,936

Average cigarette imports/month

128,936	/month for all	
4298	/day for all	15+ pop.
5.4	/day for 15+ population =	800
11	/day for 15+ smokers =	50%

Right order of magnitude, but incomplete

The 2005 STEPS survey (http://www.who.int/chp/steps/tokelau/en/) shows that in 2005 of all 15- to 64-year-olds (844 in 2006 census), 59.3% smoked daily, an average of 13.7 cigarettes a day: so that's 0.593*844*13.7*365=2.5 million cigarettes per annum or 209,000 per month. That's the same number as I was able to analyse from stores invoice summaries for 2011 (unpublished data).

From the 2014 STEPS survey (WHO unpublished) it can be calculated that 18- to 69-year-olds alone smoked 2.1 million cigarettes or 175,000 per month, which is higher than any year shown in the above table reanalysing Rush et al (2013) cigarette data. My own study indicates that cigarette imports in 2014 alone are of the order of 3 million sticks or 250,000 per month.

So instead of a decrease in the smoking of cigarettes over the period 2008-2012, the indications are that smoking has not changed much; and if indeed it has, there is rather an increase to report.

Evaluating completeness of data collection

From the above we can deduce that the cigarette data in Rush et al (2013), even if correctly analysed, must be incomplete. This statement is further supported by looking at the number of shipments in 2010 and 2011: Rush et al. analysed 34 and 17 cargo manifests for these respective years, whereas my summaries of stores invoices indicate 41 shipments took place in both years. No verification of shipment numbers was done against an alternative source, such as from Tokelau or Samoa Customs.

My own comparison of stores invoices with available shipping manifests for 2014 shows that missing out *a single* cargo manifests can account for 7 percent of cigarette imports in one year. Hence missing out at least half the relevant documentation for 2011 (see bargraph, overleaf) is bound to produce unacceptably incorrect results.

Conclusion

In summary, the Rush et al. (2013) study suffers from very serious flaws in terms of data collection, analysis, and conclusion: the most serious problem being a presumed reduction of food and alcohol intake as well as cigarette smoking over the years investigated (2008-2012). From my reanalysis it is clear that no such reduction has taken place, but that the data collection for the latter years is simply incomplete. Presumed excess energy intake from 8 key food items was based on transcription errors.

Under no circumstance should the 2013 report as it stands be used as a basis for policy development and for formal publication in the scientific/medical literature.