

SECULAR TRENDS IN BMI AND SMOKING STATUS OF FIRST-TIME VISITORS TO GUERNSEY CHEST AND HEART 1974-2010¹

SUMMARY

Analysis of screening record data from Chest and Heart LBG has shown that, comparing first time visitors to the service in 1975-79 to first time visitors in 2005-09, there has been a significant increase in mean BMI and a significant decrease in smoking.

1. ABOUT THIS REPORT

In April 2011 the HSSD Ethics Committee considered and gave approval to a study which would examine secular trends in the BMI and smoking status of visitors to the local charity Guernsey Chest and Heart LBG over the period 1974–2010. This report details the results of that study.

2. INTRODUCTION AND CONTEXT

Rising levels of obesity are a concern both internationally and locally and smoking remains a big problem for Guernsey, with smoking-related mortality accounting for a substantial proportion of island deaths. In order to make the best possible provision for preventing and treating obesity and smoking-related ill-health, in line with the political responsibilities of the HSSD, the Public Health directorate is taking steps to obtain robust data from a variety of sources so that the prevalence of those conditions can be gauged.

Data held by Guernsey Chest and Heart LBG had been identified as a rich potential source of information about obesity and smoking habits of the Guernsey population, both now and in the past.

Chest and Heart LBG is a charity operating in Guernsey which has offered free primary health screening to islanders since 1974. Any individual over the age of 25 can self-refer for a health check. Over 20,000 individuals have now been screened, many of those having attended as repeat visitors in response to five-yearly recalls.

Screening at Chest and Heart LBG consists of a comprehensive health questionnaire, ECG and lung capacity tests, height and weight measurements and a measurement of blood pressure, all of which are taken or measured in-clinic by a nurse. Blood sugar and cholesterol levels are checked from urine and blood samples. The health questionnaire, though added to over time, has always included a question on smoking status (Do you smoke — Y/N?).

¹ Initially it was intended to analyse screening records for the period 1974-2010. In the event, however, analysis focussed on records for the period 1975-2009. See methodology note on this point.

3. **AIM**

The aim of the study was:

- To establish the secular trend in BMI and smoking status of first-time visitors to Guernsey Chest and Heart LBG, between 1974 and 2010².

The working null hypothesis for the study was that:

- There is no difference in the BMI or smoking status of first time visitors to Guernsey Chest and Heart LBG in 2010 compared to 1974³. Any apparent difference is due to chance.

4. **METHODS**

This study involved the analysis of existing electronic records that are held in a Microsoft Access database by Chest and Heart LBG. Data covering the study period of interest was extracted to MS Excel, cleaned to eliminate duplicate records and blank entries, and then exported to SPSS Version 19 for analysis.

BMI scores, as calculated from raw weight and height data, were categorised into the weight status categories given by the National Obesity Observatory: <18.5 = underweight; 18.5–24.9 = healthy weight; 25–29.9 = overweight; 30–39.9 = obese.

Visitor ages were grouped in categories beginning 0–24, thereafter continuing as five-year bands, and finishing with the category 75+.

Year of first visit was grouped into five year bands and data for 1974, 2010 and 2011 were excluded, leaving a dataset for 1975–2009, a period of 35 years.

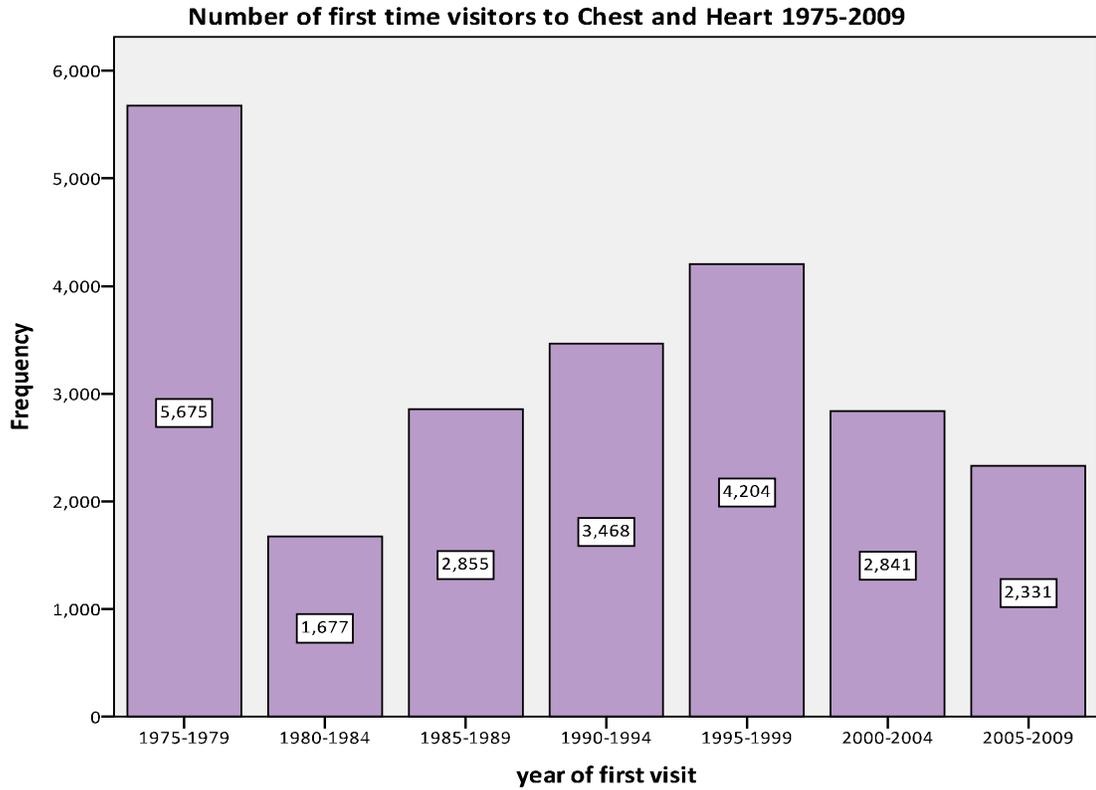
5. **RESULTS**

Between 1975 and 2009 there were 23,051 first time visitors to Chest and Heart LBG.

² See footnote 1.

³ See footnote 1.

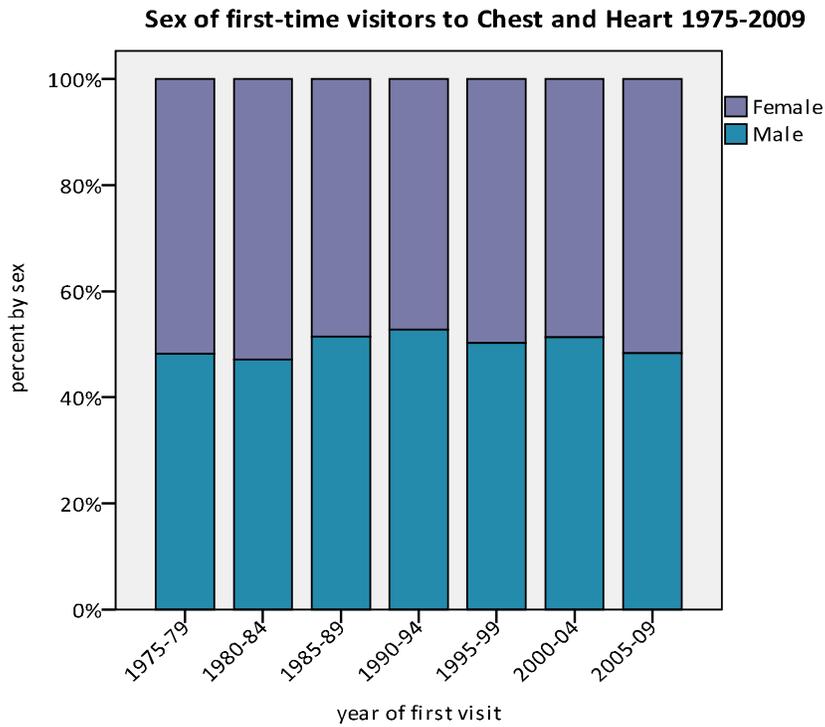
Figure 1.



In the early years of the service, the number of first time visitors was high. Numbers have since reduced reflecting the fact that many screenings are now for repeat visitors.

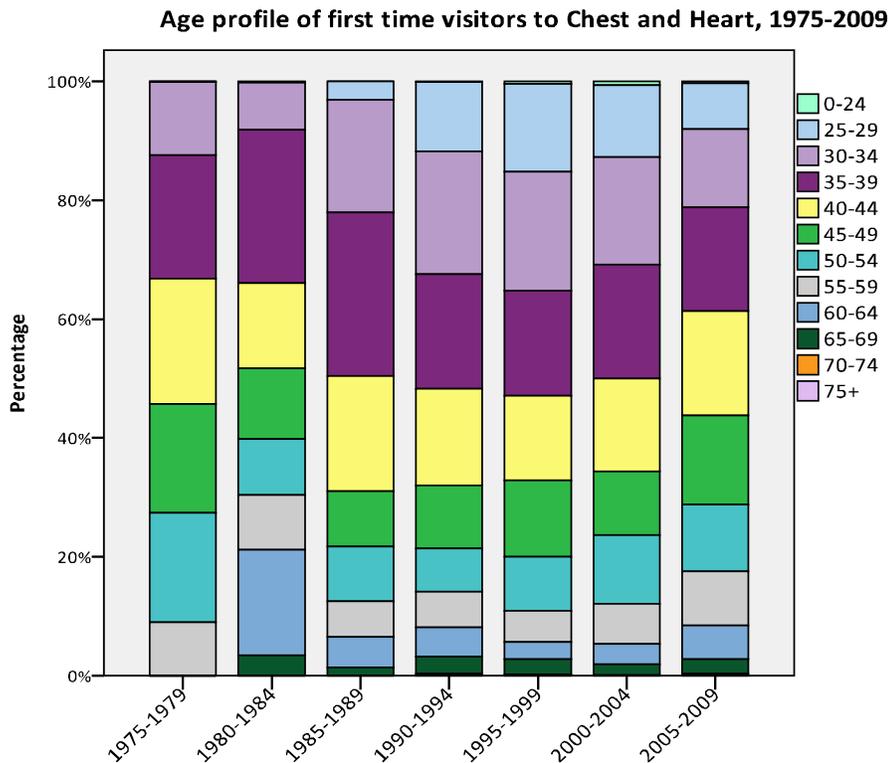
There have been approximately equal numbers of male and female first time visitors to the service over the study period.

Figure 2.



The age profile of first time visitors during each five-year period from 1975–2009 is shown below. After initially focussing on visitors aged 30–59, the service extended the offer of screening to both older and younger individuals.

Figure 3.



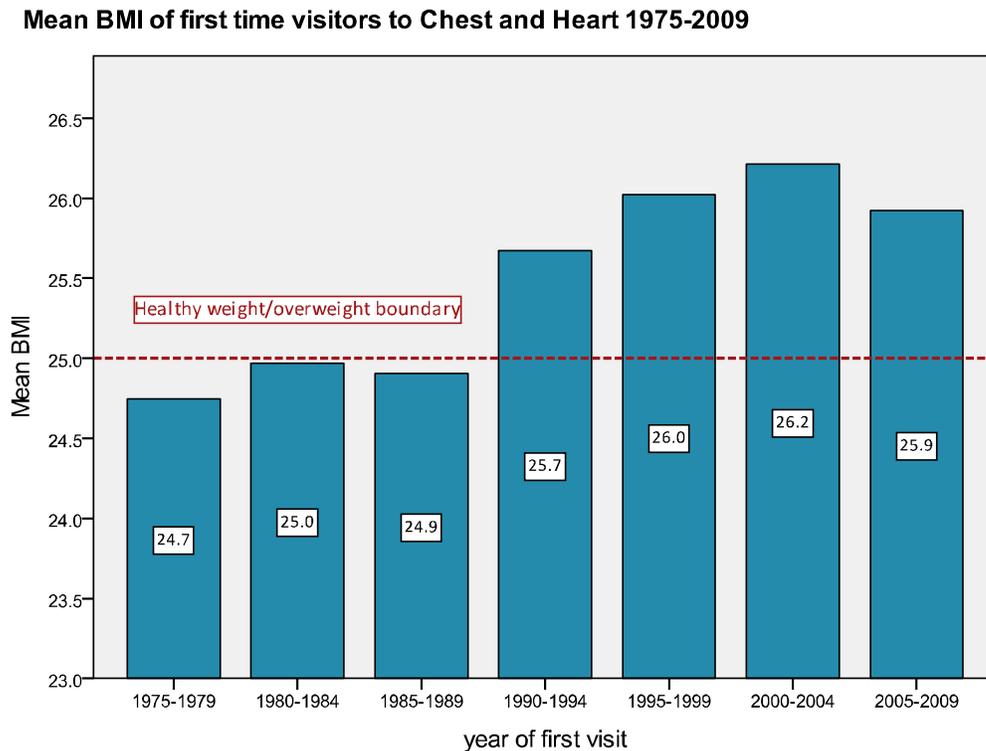
The number of people attending Chest and Heart LBG as a proportion of those who would be eligible to attend has been estimated at approximately 22%. This figure was arrived at by comparing the total number of visitors (first time and recall) in 2006–09 with the average Guernsey population aged 25–69 for the same four-year period⁴.

5.1 **BMI**

The mean BMI of first time visitors to Chest and Heart LBG was 24.7 in 1975–79, increased to 26.2 in 2000–04, and then dropped slightly to 25.9 in 2005–09. In each five-year period since 1990–94 mean BMI has been above 25 kg/m², which is to say, within the overweight category (Figure 4)

⁴ Total visitor number kindly provided by Chest and Heart LBG. Population figures were Guernsey-only, source: States Policy Council Annual Population Bulletins.

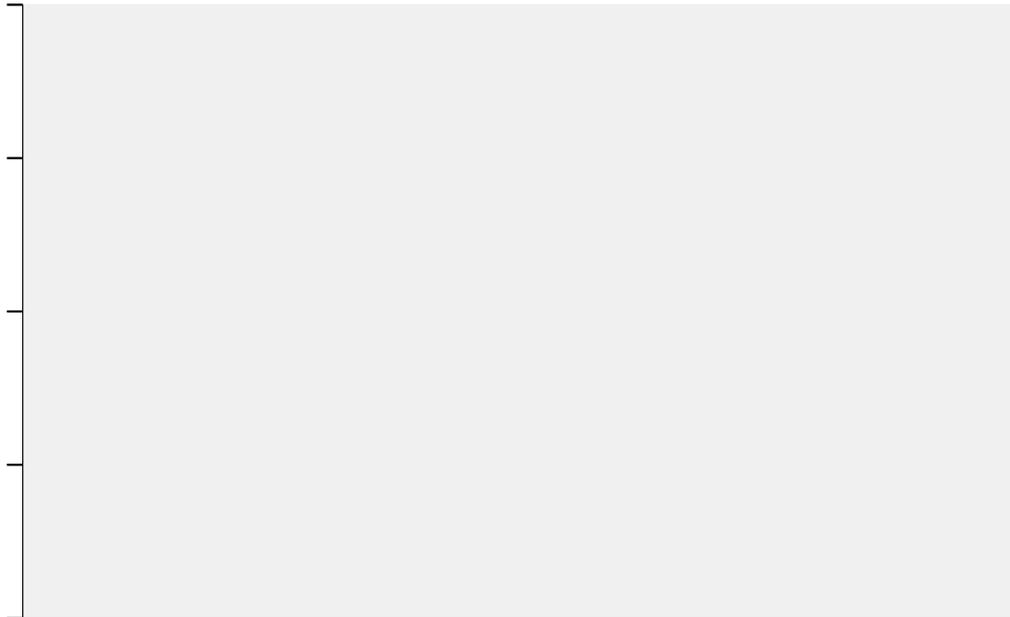
Figure 4.



A Univariate Analysis of Variance test was applied to evaluate the difference in mean BMI in the first and last of the five-year intervals of the study period. After removing the effects of age and sex, the difference was found to be highly significant ($F= 103.657$, $p < 0.001$). The null hypothesis, stated above, is thus rejected and we conclude that the observed increase in visitor mean BMI from 1975–79 to 2005–09 is a real and significant difference.

The proportion of first time visitors who were obese changed in the same way as mean BMI: There was an increase from 6.5% to 17.7% between 1975–79 and 2000–04, then a slight reduction, to 15.1%, in 2005–09.

Figure 5.



The same general trend — a rise followed by a reduction in the most recent five-year period — was seen for both men and women, though women contributed more towards the overall proportion of obese visitors until 1995–99, and men thereafter.

Figure 6.

Obesity among first time visitors to Chest and Heart 1975-2009, by sex.

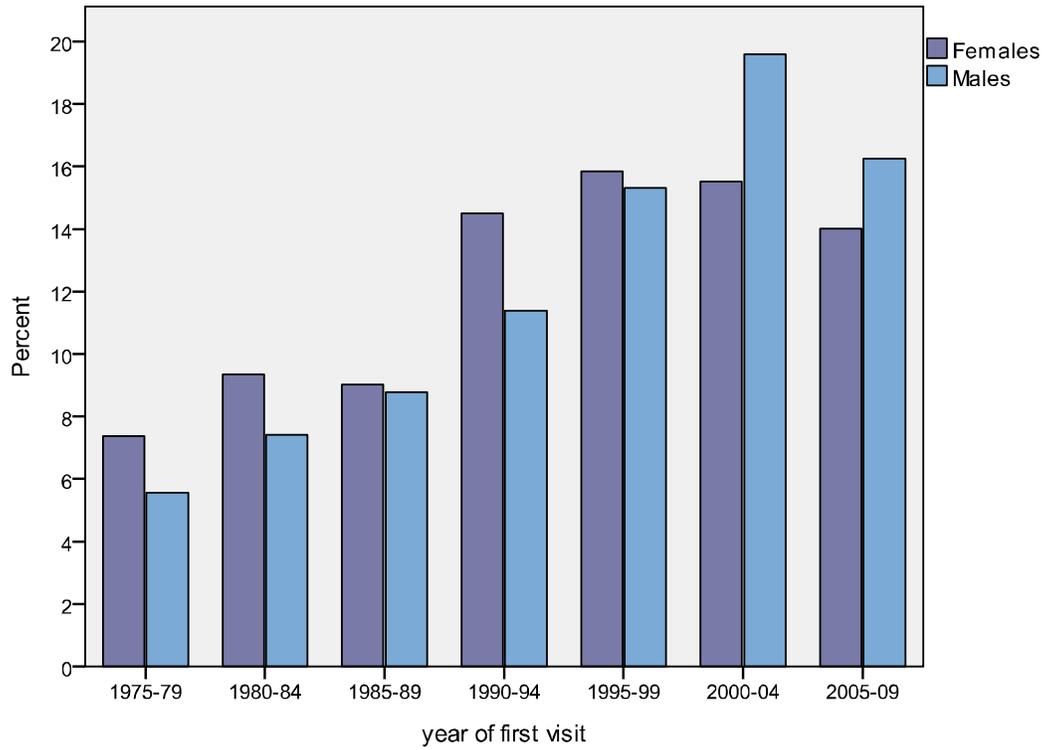
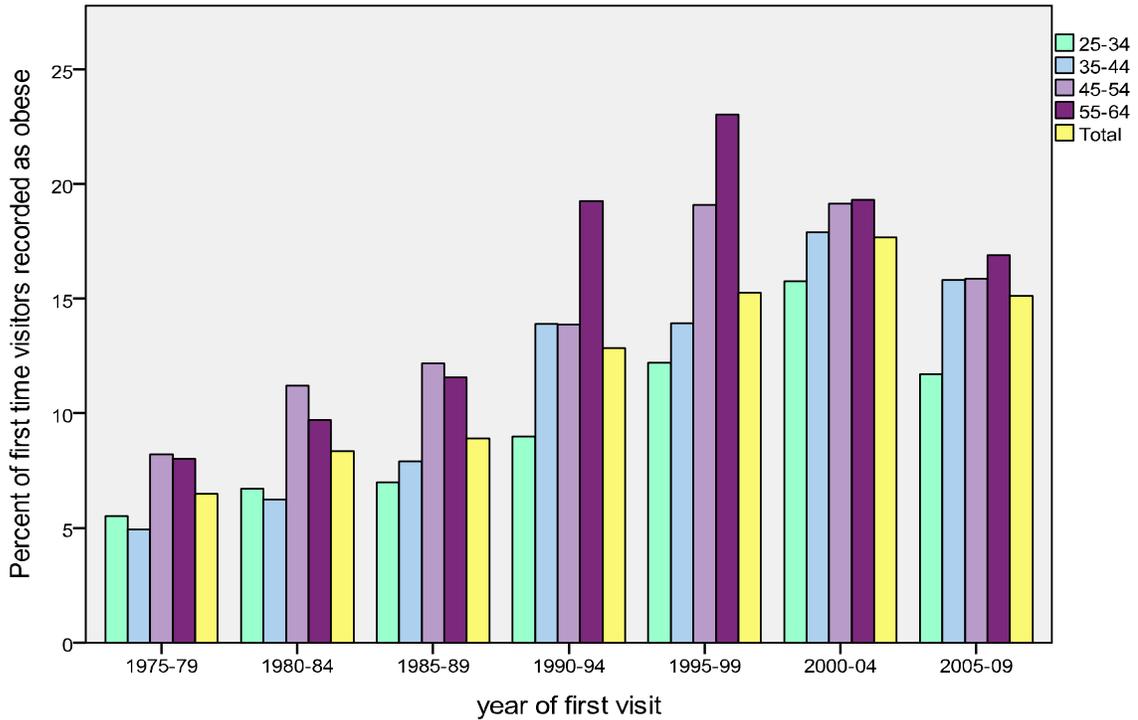


Figure 7 shows that the trend was also the same for all age-groups. Obesity levels have been higher among the older visitors compared to younger visitors in all five-year periods, though the difference has become less marked since 2000–2004.

Figure 7.

Obesity among first time visitors to Chest and Heart 1975-2009, by age (% of total)

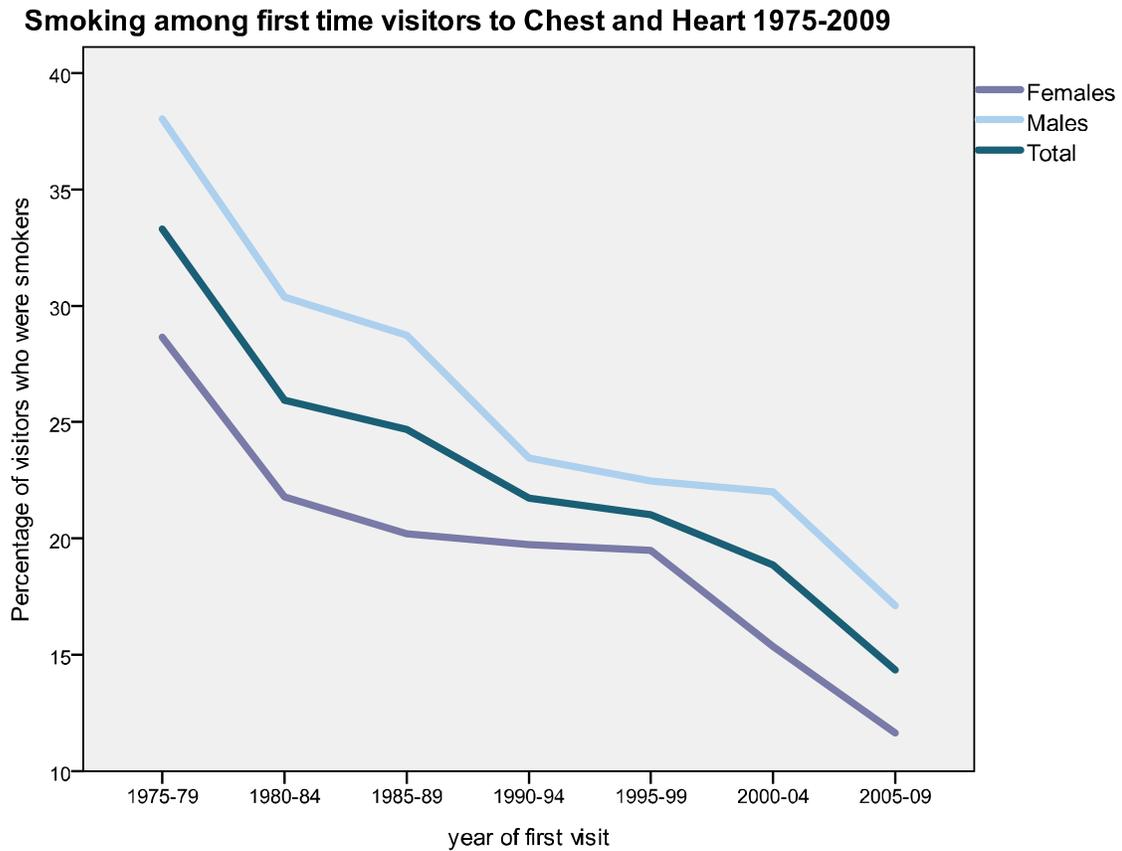


5.2 Smoking Status

The proportion of first time visitors to Chest and Heart who self-identified as smokers fell from a high of 33.3% in 1975–79 to 14.3% in 2005–09. A Chi-Square test, used to evaluate this reduction, gave a highly significant result ($\chi^2 = 296.076$, $df = 2$, $p < 0.001$), hence we reject the null hypothesis that the difference was due to chance.

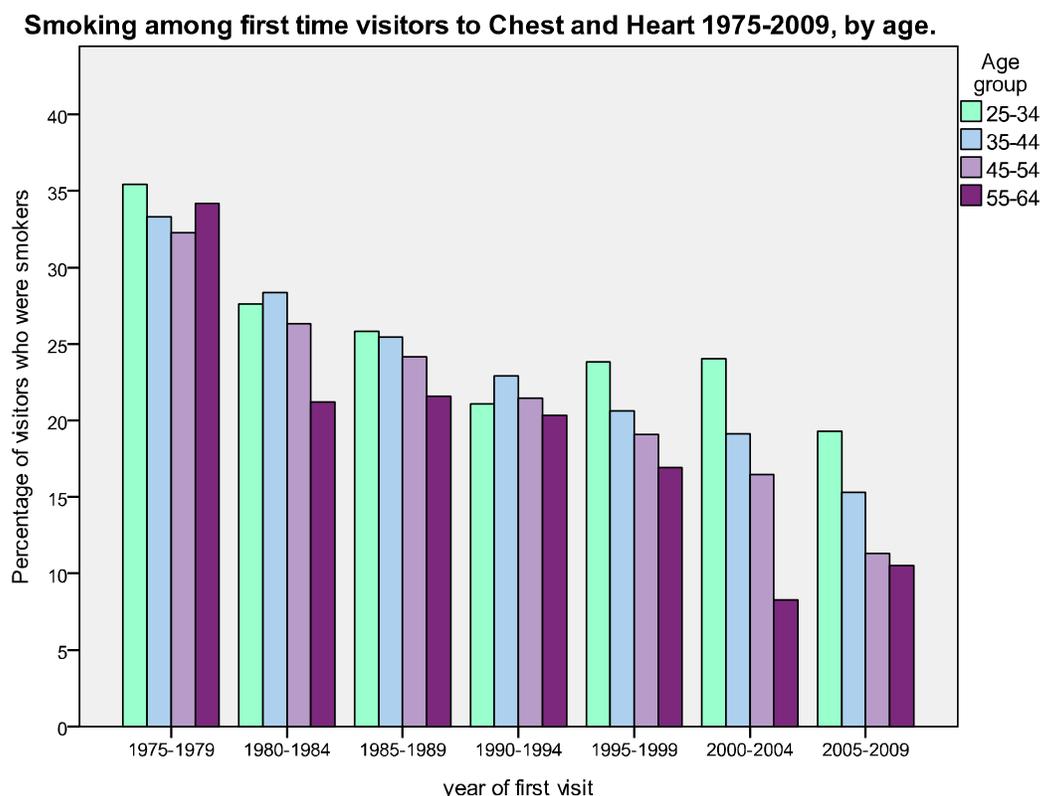
The trend — a steady fall from each five-year interval to the next — was seen in both men and women and was the same for all age groups (Figures 8 and 9).

Figure 8.



Males were more likely to be smokers throughout the study period but there has been a bigger reduction in smoking among women than among men. Smoking among men reduced from 38% to 17.1% (a 20.9 percentage point drop, or 55% reduction), whereas smoking among women reduced from 28.7% to 11.7% (a 17.1 percentage point drop, or 59% reduction).

Figure 9.



The magnitude of smoking reduction was proportional to age, the older visitors experiencing bigger reductions in smoking compared with younger visitors. The greatest reduction, among those aged 55–64, was a 23 percentage point drop between 1975–79 and 2005–09 from 34% to 11%. The smallest reduction, among those aged 25–34, was a 17 percentage point drop, from 36% to 19%. This suggests that younger visitors have been less likely to give up smoking compared with their older peers over the study period.

6. **DISCUSSION**

6.1 **BMI/Obesity**

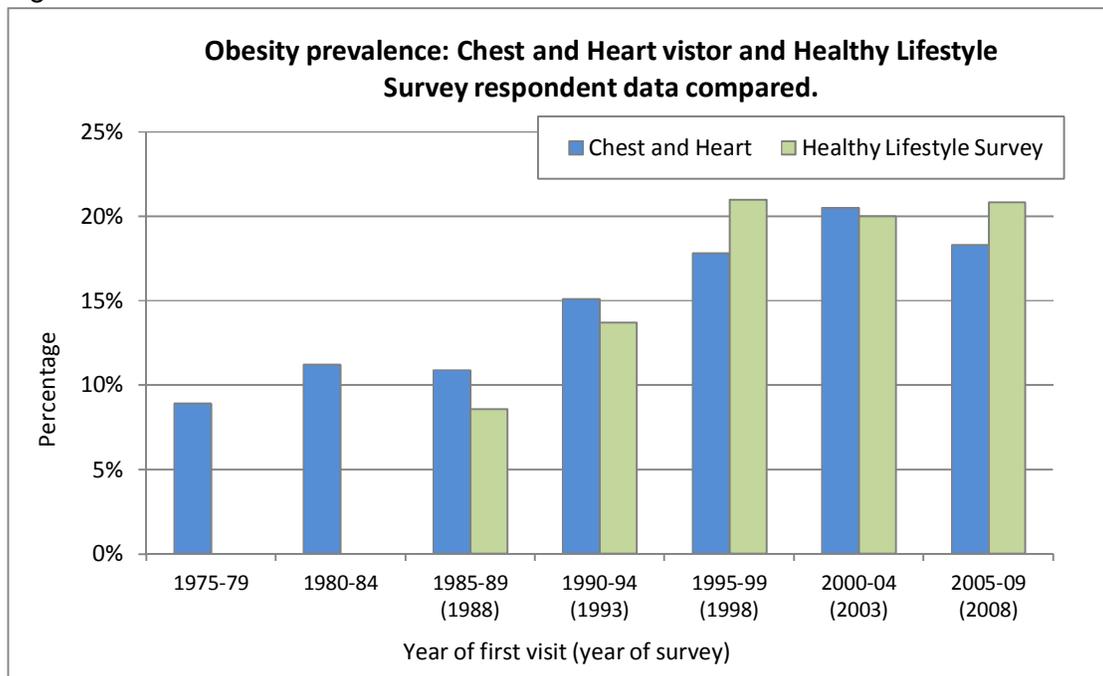
The increase in obesity prevalence among Chest and Heart visitors mirrors an increase postulated for the general population of Guernsey, as gauged from Lifestyle Surveys carried out every five years since 1988 (Figure 10⁵). We do not have information from the earliest lifestyle surveys about the age/sex profile of the survey respondents, and data from the surveys are self-reported by the survey respondents in contrast to the Chest and Heart data which are collected in-person by a clinician. These factors make it difficult to assess the validity of comparisons drawn between the two sources of data. Assuming for the moment that they are comparable, however, one might comment that obesity prevalence was slightly

⁵ For this Figure only, the weight status of each Chest and Heart visitor was recalculated to match the BMI categories, now superseded, that were used in the Lifestyle Surveys. Categories were as follows: In men <20 = underweight, 20–24.99 = healthy weight, 25–29.99 = overweight, >30 = obese; In women <20 = underweight, 20–23.79 = healthy weight, 23.8–28.59 = overweight, >28.6 = obese.

higher among Chest and Heart visitors than it was in the general population up until 1990–94, after which service visitors experienced obesity levels that were either less than, or about the same as, those of the general population.

There is anecdotal evidence that people who seek out services such as the Chest and Heart health check show greater concern for their own health, and are possibly healthier, than people who do not seek out such services — the so-called “worried well”. If visitors to Chest and Heart are indeed more motivated about their own health, then the reversal of the increase in obesity prevalence seen in the most recent study period — which the Lifestyle Survey does not show for the general population — could indicate that health promotion advice, e.g. about the risks of high BMI or the benefits of healthy eating, has been taken on board, and put into action, more often by this motivated subset of the population.

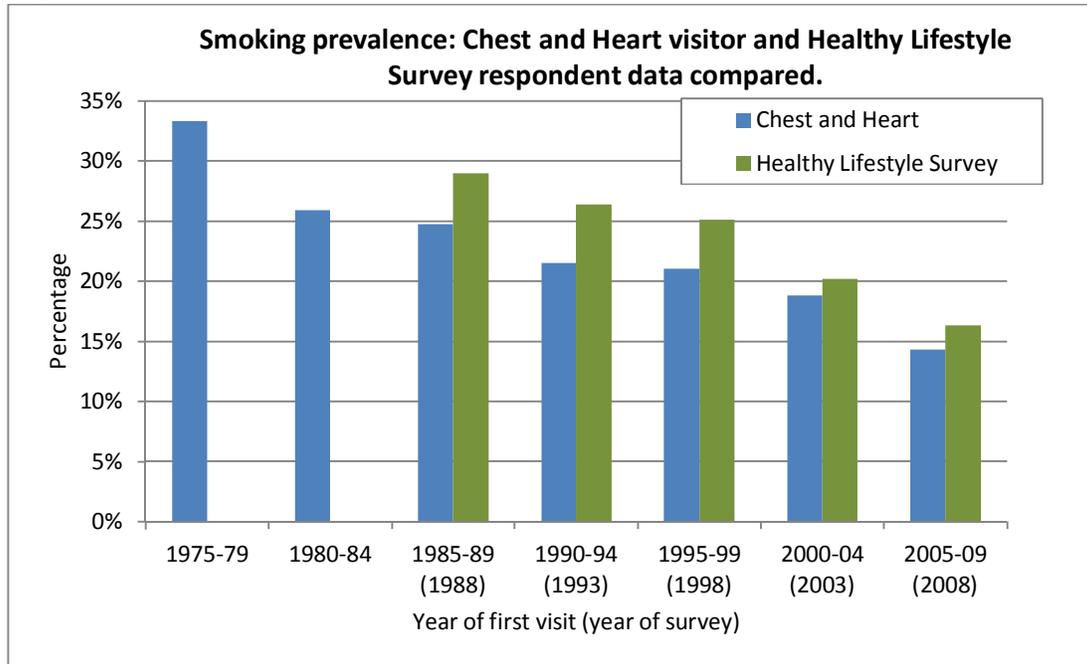
Figure 10.



6.2 Smoking

The decrease in the number of smokers among first time Chest and Heart visitors over time also supports findings from the Lifestyle Surveys (Figure 11).

Figure 11.



While, again, we must be cautious about the comparability of the datasets due to the unknown age and sex profiles of the Lifestyle Survey respondents, the results would seem, at face value, to suggest that smoking was always less prevalent among Chest and Heart visitors than it was in the general population. If true, this too supports the idea that visitors to the service during the study period showed greater concern for their health, in this case by making a healthier lifestyle choice (the decision not to smoke) more frequently, than did members of the general population.

7. SUMMARY OF KEY MESSAGES

- The mean BMI of first time visitors to the Chest and Heart service in 2005–09 was significantly higher than the mean BMI of first time visitors in 1975–79.
- The proportion of first time visitors to the Chest and Heart service who were smokers was significantly less in 2005–09 than it was in 1975–79.
- Insofar as broad secular trends are concerned, these results mirror findings from Lifestyle Surveys of the general population of Guernsey carried out between 1988 and 2008.

8. RECOMMENDATIONS FOR FURTHER WORK

- Based upon the results obtained in the current study, further analyses of the Chest and Heart dataset are recommended in order to answer the following questions:
 1. Do the trends in BMI, obesity prevalence and smoking prevalence over the study period change or stay the same when all Chest and Heart screening records (subsequent as well as first time) are analysed?

2. At the population level, is there a correlation between BMI and smoking status of first time visitors?
 3. Using linked data for individuals who have attended Chest and Heart LBG more than once, is there a significant change in the BMI of visitors who are screened at least once as smokers but who subsequently stopped smoking?
- An exploration of the question 'who attends Chest and Heart, and why?' would also benefit future studies as this could increase our knowledge of how representative or otherwise Chest and Heart visitors are likely to be of the general Guernsey population.

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