I. The Hypothesis

H_0: There is no association between the classification of the numbers of patients who kept their appointments and the classification of the sex of the patients,

versus

H_1: There is association between the classification of the numbers of patients who kept their appointments and the classification of the sex of the patients.

$H_0: P_M = P_F$ vs $H_1: P_M \neq P_F$

2. *The assumption:* Contingency table

3. *The α – level:* $\alpha = 0.05$

4. *The test statistic:*

$$\chi^2 = \sum_{all\ cells} \frac{(O-E)^2}{E}$$

5. *The critical region:* Reject H_0: if $\chi^2 \geq \chi^2_{0.95}(1) = 3.84$

6. *The result:* $\chi^2 = 0.86$

7. *The conclusion:* Accept H_0

Since $\chi^2 = 0.86 < 3.84$

TABLE 1—Distribution of Percentage of Kept and Broken Appointments According to Selected Patient Characteristics

Patient Characteristic	N	% Kept (N = 2,683)	% Not Kept (N = 489)
Sex[1]			
Male	1,109	85.39	14.61
Female	2,063	84.15	15.86
Age[2]			
< 45	2,683	83.00	17.00
45+	489	90.37	9.63
Ethnicity[3]			
Puerto Rican	2,206	81.46	18.54
White	837	91.52	8.48
Black	129	93.02	6.98
Payment Mechanism[4]			
Welfare	2,229	83.40	16.60
Non-Welfare	943	87.38	12.62
TOTAL	3,172	84.58	15.42

[1] X^2 = 0.54; df = 1; $p > .05$
[2] X^2 = 24.22; df = 1; $p < .05$
[3] X^2 = 53.94; df = 2; $p < .05$
[4] X^2 = 0.05; df = 1; $p > .05$

AJPH November 1977, Vol. 67, No. 11

Age	Kept Appt		Didn't keep		Total
	n	%	n	%	
<45	2,227	83%	456	17.00	2,683
45+	442	90.37	47	9.63	489
Total	2,669		503		3,172

In other tables 2,683 489

Cell	O	E	(O-E)	$(O-E)^2$	$(O-E)^2/E$
1	2,227	2,257.54	-30.54	932.69	0.41
2	456	425.46	30.54	932.69	2.19
3	442	411.46	30.54	932.69	2.27
4	47	77.54	-30.54	932.69	12.03
Total	3,172	3,172	0		$\chi^2 = 16.90$

I. The Hypothesis

H_0: There is no association between the classification of the number of patients who kept their appointments and the classification of the age of the patients,

versus

H_1: There is association between the classification of the numbers of patients who kept their appointments and the classification of the age of the patients.

$H_0: P_Y = P_O$ vs $H_1: P_Y \neq P_O$

2. *The assumption:* Contingency table

3. *The* α *– level:* $\alpha = 0.05$

4. *The test statistic:*

$$\chi^2 = \sum_{all\,cells} \frac{(O-E)^2}{E}$$

5. *The critical region:* Reject H_0: if $\chi^2 \geq \chi^2_{0.95}(1) = 3.84$

6. *The result:* $\chi^2 = 16.90$

7. *The conclusion:* Reject H_0

Since $\chi^2 = 16.90 > 3.84$

TABLE 1—Distribution of Percentage of Kept and Broken Appointments According to Selected Patient Characteristics

Patient Characteristic	N	% Kept (N = 2,683)	% Not Kept (N = 489)
Sex[1]			
Male	1,109	85.39	14.61
Female	2,063	84.15	15.88
Age[2]			
< 45	2,683	83.00	17.00
45+	489	90.37	9.63
Ethnicity[3]			
Puerto Rican	2,206	81.46	18.54
White	837	91.52	8.48
Black	129	93.02	6.98
Payment Mechanism[4]			
Welfare	2,229	83.40	16.60
Non-Welfare	943	87.38	12.62
TOTAL	3,172	84.58	15.42

[1] $X^2 = 8.54$; df = 1; $p > .05$
[2] $X^2 = 24.22$; df = 1; $p < .05$
[3] $X^2 = 53.94$; df = 2; $p < .05$
[4] $X^2 = 8.05$; df = 1; $p > .05$

Ethnicity	Kept appt		Didn't keep		Total
	n	%	n	%	
Puerto Rican	1,797	81.46	409	18.54	2,206
White	766	91.52	71	8.48	837
Black	120	93.02	9	6.98	129
Total	2,683		489		3,172

Cell	O	E	(O-E)	$(O-E)^2$	$(O-E)^2/E$
1	1,797	1,865.92	-68.92	4,749.97	2.55
2	409	340.08	68.92	4,749.97	13.97
3	766	707.97	58.03	3,367.48	4.76
4	71	129.03	-58.03	3,367.48	26.10
5	120	109.11	10.89	118.59	1.09
6	9	19.89	-10.89	118.59	5.96
Total	3,172	3,172	0		$\chi^2 = 54.43$

I. The Hypothesis

H_0: There is no association between the classification of the number of patients who kept their appointments and the classification of the ethnicity of the patients,

versus

H_1: There is association between the classification of the numbers of patients who kept their appointments and the classification of the ethnicity of the patients.

2. *The assumption:* Contingency table

3. *The α – level:* $\alpha = 0.05$

4. *The test statistic:*

$$\chi^2 = \sum_{all\,cells} \frac{(O-E)^2}{E}$$

5. *The critical region:* Reject H_0: if $\chi^2 \geq \chi^2_{0.95}(2) = 5.99$

6. *The result:* $\chi^2 = 54.43$

7. *The conclusion:* Reject H_0
Since $\chi^2 = 54.43 > 5.99$

A Cross-National Trial of Brief Interventions with Heavy Drinkers

ABSTRACT

WHO Brief Intervention Study Group

Introduction

21 - 22

TABLE 1—Adjusted Means and Analysis of Covariance Results for Primary Outcome Measures from Eight Cross-National Study Centers, WHO Brief Interventions with Heavy Drinkers Trial

	Control Condition, Mean	Simple Advice Condition, Mean	Brief Counseling Condition, Mean	F: Condition	F: Center	F: Condition × Center
Male patients						
Average daily consumption	6.29	5.18	5.29	11.12***	5.39***	1.31
Intensity	11.23	10.01	10.16	5.36**	4.01***	1.23
Female patients						
Average daily consumption	3.80	3.39	2.99	0.72	1.71	2.74*
Intensity	6.83	6.27	5.96	1.14	3.64*	2.13

Note. Sample sizes were as follows: control group, 404 men and 84 women; simple advice group, 392 men and 111 women; and brief counseling group, [illegible] men and 100 women.
*P < .05; **P < .01; ***P < .001.

TABLE 2—Percentages of Male and Female Patients Who Increased, Decreased, or Remained at the Same Level of Alcohol Consumption

	Average Daily Consumption: Control	Average Daily Consumption: Simple Advice	Average Daily Consumption: Brief Counseling	Intensity of Drinking: Control	Intensity of Drinking: Simple Advice	Intensity of Drinking: Brief Counseling
Male patients						
Decreased	29.0	40.8	40.3	32.9	43.5	46.4
No change	54.5	53.1	50.3	48.6	47.8	42.1
Increased	16.5	6.1	9.3	18.4	8.7	11.5
Female patients						
Decreased	35.7	43.2	45.1	29.8	42.3	51.0
No change	58.3	48.6	50.0	59.5	43.2	41.2
Increased	6.0	8.1	4.9	10.7	14.4	7.8

Note. Sample sizes were as follows: control group, 407 men and 84 women; simple advice group, 392 men and 111 women; and brief counseling group, [illegible] men and 102 women.

Table 2. AJPH July 1996, Vol 86 p951 Consumption levels for Males

	% of patients			Number of Patients			
	Control	Simple Advice	Brief Counseling	Control	Simple Advice	Brief Counseling	Total
Decreased	29.0	40.8	40.3	118	160	186	464
No Change	54.5	53.1	50.3	222	208	232	662
Increased	16.5	6.1	9.3	67	24	43	134
Total	100	100	99.9	407	392	461	1260

Cell	O	E	O - E	$(O-E)^2$	$(O-E)^2/E$
1	118	149.88	-31.88	1016.29	6.78
2	160	144.36	15.64	244.75	1.70
3	186	169.77	16.23	263.59	1.55
4	222	213.84	8.16	66.64	0.31
5	208	205.96	2.04	4.18	0.02
6	232	242.21	-10.21	104.20	0.43
7	67	43.28	23.72	562.44	12.99
8	24	41.69	-17.69	312.90	7.51
9	43	49.03	-6.03	36.32	0.74
Total	1260	1260	0.00	$\chi^2 =$	32.03

I. The Hypothesis

H_0: There is no association between the classification of the number of patients according to their change in alcohol consumption and the treatment they received

versus

H_1: There is association between the classification of the numbers of patients according to their change in alcohol consumption and the treatment they received.

2. *The assumption:* Contingency table

3. *The α – level:* $\alpha = 0.05$

4. *The test statistic:*

$$\chi^2 = \sum_{all\ cells} \frac{(O-E)^2}{E}$$

5. *The critical region:* Reject H_0: if $\chi^2 \geq \chi^2_{0.95}(4) = 9.49$

6. *The result:* $\chi^2 = 32.03$

7. *The conclusion:* Reject H_0

Since $\chi^2 = 32.03 > 9.49$

TABLE 3—Percentages of Male Patients Reporting Abstinence, Hazardous Drinking, and Alcohol-Related Problems in 6-Month Period prior to Intervention and following Exposure to Three Study Conditions

	Control (n = 403), %	Simple Advice (n = 387), %	Brief Counseling (n = 471), %	χ^2
Completely abstinent[a]				
Pretest	0	0	0	. . .[b]
Posttest	2	5	8	
Daily or almost daily drinking[c]				
Pretest	19	18	19	8.7*
Posttest	23	16	14	
Above recommended weekly limit[d]				
Pretest	77	78	74	7.2*
Posttest	65	57	57	
"Hazardous" daily consumption[e]				
Pretest	67	69	68	11.0**
Posttest	58	49	47	
At least one recent complaint				
Pretest	50	54	56	1.5
Posttest	39	35	40	
At least one recent problem				
Pretest	32	37	39	3.6
Posttest	37	28	35	

Note. Chi-square analyses were used to test for significant associations between treatment group and outcome status for each variable. Outcome was defined dichotomously, with posttest status as a criterion. Chi-square tests were performed on the posttest frequencies for each dichotomous outcome variable.

[a]Patient reported no drinking during previous 6-month period.

[b]Not calculated because of small cell sizes.

[c]Patient reported drinking 28 to 31 days per month.

[d]For men, no more than 3-4 standard drinks per day, no more than 4-5 days per week (approximately 24 cL ethanol per week or 3.4 cL ethanol per day).

[e]40 g (4.30 cL) average daily consumption.

*$P < .05$. **$P < .01$.

Table 3, AJPH July 1996, Vol 86 p952   Hazardous daily consumption, Males Posttest

	%			Number			
Posttest	Control	Simple Advice	Brief Counselling	Control	Simple Advice	Brief Counselling	Total
Yes	58	49	47	234	190	221	645
No	42	51	53	169	197	250	616
Total	100	100	100	403	387	471	1261

Cell	O	E	O-E	$(O-E)^2$	$(O-E)^2/E$
1	234	206.13	27.87	776.51	3.77
2	190	197.95	-7.95	63.20	0.32
3	221	240.92	-19.92	396.64	1.65
4	169	196.87	-27.87	776.51	3.94
5	197	189.05	7.95	63.20	0.33
6	250	230.08	19.92	396.64	1.72
Total	1261	1261.00	0.00		11.74

I. The Hypothesis

H_0: There is no association between the classification of the number of patients according to their posttest hazardous alcohol consumption and the treatment they received.

versus

H_1: There is association between the classification of the numbers of patients according to their posttest hazardous alcohol consumption and the treatment they received.

2. *The assumption:* Contingency table

3. *The α – level:* $\alpha = 0.05$

4. *The test statistic:*

$$\chi^2 = \sum_{all\,cells} \frac{(O-E)^2}{E}$$

5. *The critical region:* Reject H_0: if $\chi^2 \geq \chi^2_{0.95}(2) = 5.99$

6. *The result:* $\chi^2 = 11.74$

7. *The conclusion:* Reject H_0

Since $\chi^2 = 11.74 > 5.99$

Heart Rate as a Predictor of Mortality: The MATISS Project

METHODS

FIGURE 1—Map of Italy delineating the area covered by the MATISS Project.

DISCUSSION

Table. Percent with and without diabetes within heart groups

	Heart Rate (Beats/Min)				
Diabetes	< 60	60 - 69	70 - 79	80 - 89	≥ 90
Yes	4.3	3.4	7.1	7.8	9.3
No	95.7	96.6	92.9	92.2	90.7
Total	100	100	100	100	100

Source: AJPH 2001, Vol 91, No.8 page: 1260

Table. Number with and without diabetes within heart groups

	Heart Rate (Beats/Min)					
Diabetes	< 60	60 - 69	70 - 79	80 - 89	≥ 90	Total
Yes	28	29	34	14	9	114
No	614	807	443	167	88	2,119
Total	642	836	477	181	97	2,233

Chi-Square Worksheet

Cell	O	E	(O-E)	$(O-E)^2$	$(O-E)^2/E$
1	28	32.78	-4.78	22.848	0.70
2	29	42.68	-13.68	187.14	4.38
3	34	24.35	9.65	93.123	3.82
4	14	9.24	4.76	22.658	2.45
5	9	4.95	4.05	16.403	3.31
6	614	609.22	4.78	22.848	0.04
7	807	793.32	13.68	187.14	0.24
8	443	452.65	-9.65	93.122	0.20
9	167	171.76	-4.76	22.658	0.13
10	88	92.05	-4.05	16.403	0.18
Total	2,233	2,233	0		15.45

I. The Hypothesis

H_0: There is no association between the classification of the number of patients according to their heart rate category and this classification of their diabetes status.
versus

H_1: There is association between the classification of the numbers of patients according to their heart rate category and this classification of their diabetes status

2. *The assumption:* Contingency table

3. *The α – level:* $\alpha = 0.05$

4. *The test statistic:*

$$\chi^2 = \sum_{all\ cells} \frac{(O-E)^2}{E}$$

5. *The critical region:* Reject H_0: if $\chi^2 \geq \chi^2_{0.95}(4) = 9.49$

6. *The result:* $\chi^2 = 15.45$

7. *The conclusion:* Reject H_0

Since $\chi^2 = 15.45 > 9.49$

Module 21: χ^2 For Contingency Tables

This module presents the χ^2 test for contingency tables, which can be used for tests of association and for differences between proportions

MASTER JULY 03/MODULE 21

Contingency Tables

Contingency tables are very common types of tables used to present data. The cells of these tables include numbers that are integers and thus represent counts of something and/or percentages. For our purposes, we can use only those tables that have integers that are counts. If you are interested in analyzing data in a contingency table that includes only percentages in the cells, then you must convert these percentages into counts in order to proceed.

Appointment-Keeping Behavior Re-Evaluated

PHILIP HERTZ, MED, MSPH, AND PAULA L. STAMPS, MS, PHD

Abstract: Many of the traditional approaches to the problem of appointment-keeping behavior have ignored the organizational factors that may be implicated in differentially high broken appointment rates leading to an implicit assumption that low-income and ethnic minority patients will be more likely to break appointments. A case study at a Model Cities Health Center which maintains a kept appointment rate of 85 per cent examined the relationship of broken appointments to age, sex, ethnic background, and payment mechanisms. The results suggest alternative explanations for differentially high broken appointments centering on the role of the institution in reinforcing appointment-keeping behavior. (Am. J. Public Health 67:1033–1036, 1977)

Broken appointment rates in ambulatory care facilities range from 16 per cent to 44 per cent. It is important to decrease the broken appointment rate as much as possible in order to provide for the best utilization of the direct care staff members. Explanations of broken appointment rates have concentrated primarily upon factors related to the patients, with emphasis placed upon demographic characteristics, such as socioeconomic status, race, age, sex, and educational levels, with other factors such as attitudes toward health care and personality factors also noted. Occasionally, additional factors have also been investigated, including the effect of weather and distance, and variables associated with the organization itself such as the appointment system, staffing patterns, and information flow in the organization. Most studies have concluded with acceptance of a primary myth which is that low-income patients do not keep appointments as well as people in middle-class socioeconomic groups. This has been consistently reported by several investigators over the last ten years.[1-15] The conclusion of the relationship between low income and high broken appointments has been proposed for ambulatory care in fee-for-service settings,[7] psychiatric care,[8] and ambulatory care in a pre-paid setting.[9] The magnitude of the differences vary, but in one of the better designed studies, Greenlick contrasted appointment-keeping rates of a pre-paid group and an OEO* Comprehensive Neighborhood Health Care Program that was part of the same medical system. The broken appointment rate for the pre-paid health plan sample was 8 per cent and for the OEO health plan sample 23 per cent.[4]

Confounding variables with low social class include age, ethnic identification, and educational levels. In general, the conclusion of most studies is that the older the patients the more likely they are to keep an appointment[1-3] and that members of ethnic minorities, especially Blacks and Spanish-speaking are more likely to break appointments.[1, 3, 7, 9, 10] Patients with lower educational levels are generally concluded to be poorer keepers of appointments,[11] although Adler's study did not confirm this relationship for psychiatric patients.[5] Social disorganization of urban families, especially lower-income families, has also been related to poor appointment-keeping behavior.[12]

All of these studies have in common the emphasis upon the failure of the patient to keep an appointment, without analyzing the organizational factors which might be responsible for reinforcing poor appointment-keeping behavior. In those studies where efforts were made to increase the kept appointment rate, some interesting observations have been made with respect to the role of the health facility in broken appointments. Three major factors can be identified as being related to appointment-keeping behavior: physician continuity, communication systems, and type of appointment system. Becker found that physician continuity, i.e., seeing the same physician each time, was positively correlated to appointment-keeping among a group of low-income, mainly Black patients.[13] Increased efforts at communication, including various reminders for missed appointments, also seems to be effective in reducing the broken appointment

*Office of Economic Opportunity.

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patients to see specific requested physicians has been used for some time. Postcard reminders are mailed five days prior to the appointment. In some cases, when the staff deems it necessary, home visits are made to those who break their appointments. Home visits are utilized as many of the patients do not have telephones.

Methodology and Data Collection

Data were collected for the adult medical clinics for a 12-month period of time between April 1, 1974 and March 31, 1975, on number of appointments kept and broken, sex, age, ethnic group, and payment mechanism. Chi-square was utilized at a significance level of 5 per cent to test for the existence of relationships between these variables.

The monthly data for each variable were analyzed. Additionally, a chi-square test on the combined 12 months was calculated. There were a total of 3,172 visits recorded to the adult medical clinic during this time period.

Results

The overall kept appointment rate in the adult medical clinics during the study period was 85 per cent.

Out of the 3,172 adult patient visits, 34 per cent were male and 66 per cent were female. As can be seen from Table 1, there were no significant differences in appointment-keeping behavior between males and females.

The age distribution of the population was broken into two categories using age 44 as the cut-off point. As with other studies,[7-9] the data in Table 1 reveal a tendency for older patients to keep appointments better than younger patients. It should be added that the differences with respect to age are significant for only three months (June, October, and November), but these differences are large enough to contribute to a statistical difference over the entire 12-month period of time.

The majority of the clinic's adult patients are Puerto Rican (69 per cent), with 27 per cent of the patients classified as White and 4 per cent classified as Black. Table 1 also demonstrates that there is a statistical relationship between ethnic group membership and appointment-keeping behavior, with Puerto Ricans having a higher broken appointment rate than either the Whites or Blacks. When these data are analyzed by months, May, June, August, November, February, and March show significant differences. During the months of June and August, neither the appointments secretary nor a bilingual health assistant were present at the Health Center. Both of these persons play key roles in scheduling Spanish-speaking patients. In November, February, and March the adult clinics were changed from their regular night to other evenings and some afternoons in order to accommodate some of the schedules of the physicians. These changes were not adequately conveyed to the non-English speaking patients. The 18.5 per cent broken appointment rate among this group as compared to the 8.5 per cent broken appointment rate among Whites and the 7 per cent broken appointment rate among Blacks appears to be closely associated with these two events. The clinic's failure to fully communicate with the non-English speaking patient population, the erratic staffing of medical clinics, and the changes in the clinic schedules may well have contributed to the higher rates of broken appointments for the Spanish-speaking population. As can be seen from Table 1, these factors did not affect the English-speaking Black and White populations.

Sixty-five per cent of the Health Center's patient population is on Medicaid. As can be seen from Table 1, there is no relationship between Medicaid status and appointment-keeping behavior.

In order to further clarify the relationship of ethnic status and payment mechanism, the three ethnic groups were classified by their payment mechanism. Table 2 shows that there is an association between ethnic group and kept appointments, but this is stronger among those not on Medicaid. This group possesses the same characteristics as the total clinic sample, and thus reflects the same organizational problems that have been previously cited with respect to language problem.

TABLE 1—Distribution of Percentage of Kept and Broken Appointments According to Selected Patient Characteristics

Patient Characteristic	N	% Kept (N = 2,683)	% Not Kept (N = 489)
Sex*			
Male	1,109	85.39	14.61
Female	2,063	84.15	15.85
Age*			
< 45	2,683	83.00	17.00
45+	489	90.37	9.63
Ethnicity*			
Puerto Rican	2,206	81.46	18.54
White	837	91.52	8.48
Black	129	93.02	6.98
Payment Mechanism*			
Welfare	2,229	83.40	16.60
Non-Welfare	943	87.38	12.62
TOTAL	3,172	84.58	15.42

*X^2 = [illegible], df = 1; p > .05
*X^2 = [illegible], df = 1; p < .05
*X^2 = [illegible], df = 2; p < .05
*X^2 = [illegible], df = 1; p < .05

Summary and Conclusions

The data presented suggest that the difference in the kept appointment rates of different ethnic groups does not reflect a true ethnic difference in health behavior. For the months when there was no significant difference in appointment-keeping behavior between the White and Puerto Rican population, the appointment staff was present, and there were no changes in clinic days or medical staff. During five of the six months when such differences occurred, it was because of the absence of the bilingual appointment staff, the changes made in clinic days, and the physician

21 - 4

TABLE 1—Distribution of Percentage of Kept and Broken Appointments According to Selected Patient Characteristics

Patient Characteristic	N	% Kept (N = 2,683)	% Not Kept (N = 489)
Sex[1]			
Male	1,109	85.39	14.61
Female	2,063	84.15	15.88
Age[2]			
< 45	2,683	83.00	17.00
45+	489	90.37	9.63
Ethnicity[3]			
Puerto Rican	2,206	81.46	18.54
White	837	91.52	8.48
Black	129	93.02	6.98
Payment Mechanism[4]			
Welfare	2,229	83.40	16.60
Non-Welfare	943	87.38	12.62
TOTAL	3,172	84.58	15.42

[1] X^2 = 8.54; df = 1; $p > .05$
[2] X^2 = 24.22; df = 1; $p < .05$
[3] X^2 = 53.94; df = 2; $p < .05$
[4] X^2 = 8.05; df = 1; $p > .05$

H_0: There is no association between the classification of the numbers of patients who kept their appointments and the classification of the sex of the patients, vs

H_1: There is association between the classification of the numbers of patients who kept their appointments and the classification of the sex of the patients.

Or $\quad H_0$: $P_M = P_F \quad$ vs $\quad H_1$: $P_M \neq P_F$

Where P_M = Proportion of males in population who "kept their appointments,"

P_F = Proportion of females in population who "kept their appointments."

Contingency Tables

Contingency tables have:

r = number of rows, not counting any totals
c = number of columns, not counting any totals
r x c = number of cells

Approach is to compare observed number in each cell with the number expected under the assumption that the null hypothesis of no association is true.

Calculating Expected Numbers

Calculating the number expected in each contingency table cell under the assumption that the null hypothesis is true is, in practice, quite simple. This number is equal to the total for the row the cell is in times the total for the column the cell is in divided by the overall total for the table. You may be interested in working out why this is true; however, it really isn't worth the effort.

The algebraic expression is:

$$E = Expected = \frac{(Row\,Total)(Column\,Total)}{Overall\ Total}$$

Calculating χ^2

The value of the test statistic χ^2 calculated by comparing the observed number (O) to the expected number (E) in each cell according to the following formula:

$$\chi^2 = \sum_{all\ cells} \frac{(O-E)^2}{E}$$

The result of this calculation is then compared to the appropriate value in the tables for the χ^2 distribution. These are in the Table Module 3: The χ^2 Distribution.

Note that you need to look up $\chi^2_{0.95}(df)$ for a test with the α level at $\alpha = 0.05$.

So, for a 2x2 table,

$$df = (2\text{-}1)(2\text{-}1) = 1 \times 1 = 1$$

$$\text{Reject } H_0\text{: if } \chi^2 \geq \chi^2_{0.95}(1) = 3.84$$

Sex	Kept appt		Didn't keep		Total
	n	%	n	%	
Male	947	85.39	162	14.61	1,109
Female	1,736	84.15	327	15.88	2,063
Total	2,683		489		3,172

Cell	O	E	(O-E)	$(O-E)^2$	$(O-E)^2/E$
1	947	938.03	8.97	80.46	0.09
2	162	170.97	-8.97	80.46	0.47
3	1,736	1,744.97	-8.97	80.46	0.05
4	327	318.03	8.97	80.46	0.25
Total	3,172	3,172.00	0		$\chi^2 = 0.86$