



**Antibiotic Resistance
Knowledge
Survey Results:
Comparison of the
1999 and 2000 Surveys**

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Forward

Antibiotic Resistance Knowledge Survey Results: Comparison of the 1999 and 2000 Surveys is a publication featuring the comparison of findings from two surveys of residents of the Fargo/Moorhead metropolitan area, one completed in Fall 1999 and the other completed in Fall 2000. The Fall 1999 survey served as the baseline for a larger study that focused on improving proper utilization of antibiotics. There were three phases to the overall project. The Fall 1999 survey represented the first phase in which residents' knowledge, attitudes, practices, and beliefs regarding antibiotics resistance and management of respiratory infections were profiled along with residents' health status and their recent history of medical treatment. The survey instrument was obtained from Dr. Edward Belongia, from the Marshfield Medical Research Foundation who is conducting a 5 year study in Wisconsin and Minnesota funded by the Centers for Disease Control to assess both public and clinician education on appropriate antibiotic use. The second phase of the project was a comprehensive educational campaign. All forms of media were used to forward the message of the proper use of antibiotics and the consequences for their misuse. In particular, direct mailing was sent to targeted audiences, public speaking engagements with various community groups were conducted, and public service announcements were presented through television, radio and print media. This survey represents the final phase of the project. Through this survey, the success of the educational campaign was evaluated by taking another generalizable survey and contrasting behavior/beliefs with the baseline data.

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The report to follow presents a comparison of the frequency distributions on each of the survey's questions from the 1999 and the 2000 surveys. These distributions are reported in tabular format showing proportional changes. Each table is accompanied by a bullet summary of the distribution patterns. The survey instrument is included at the end of the report.

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Executive Summary

Introduction.

The following material is divided into two sections. First, a summary of the statistics for the 2000 survey is provided. Second, comparisons are made between the 1999 and 2000 surveys.

The comparisons across surveys focus on significance tests. Four comments are in order. First, the significance tests were done after deleting Do Not Know/Refused/Missing responses. Excluding the latter makes it easier to tell if there was a true attitude, belief, behavior, or knowledge change with respect to the response options at the heart of each question. Second, significance tests were done for all relevant comparisons (excluding the demographics from each survey), so the likelihood of Type I errors (finding something significant when it is not) is actually higher than reported in the individual tables. This suggests the need for some caution in interpreting significant results unless researchers make some adjustments in line with future analyses. Third, significance tests are sensitive to sample size. Some tests are based on the entire sample and others are based on subgroups. Small differences often prove significant in the first case, while some noticeable differences do not prove significant in the latter case. Finally, it is left to the reader to decide if a given statistically significant difference is also substantively important.

Profile of Respondents to the 2000 Survey

Current Health Status.

- The majority of respondents reported that they viewed their health as either very good or excellent.

Most Recent Visit for Respiratory Illness.

- Most respondents had not seen a doctor for a respiratory illness within the prior 12 months. Among those who had seen a doctor (N = 134), respondents were sick an average of 6.8 days prior to their visit; they most often reported cough and runny nose as their symptoms; and they had visited their doctor for respiratory illnesses between 1 and 3 times during this time period. The type of doctor most often seen for their respiratory illness was a family doctor. The two most frequent diagnoses were sinus infection and cold or flu. A sizable majority of these respondents evaluated their visit positively along the following dimensions: a) satisfaction with the care they received; b) time spent by the doctor in answering questions; and c) clarity of explanations concerning diagnosis and treatment plans.
- Several questions asked respondents, who had seen their doctor for a respiratory illness in the last 12 months, to discuss the role of antibiotics during their most recent visit. Before they saw the doctor, most reported they believed an antibiotic was needed for their respiratory illness. A majority of respondents said they had not asked the doctor for antibiotics, but a majority also said they had been prescribed antibiotics. A large majority reported their doctor had not discussed antibiotic-resistant germs or superbugs. Among respondents who had not been prescribed an antibiotic, most agreed with this outcome, and half said the doctor had explained why an antibiotic had not been prescribed.

Antibiotic Use and Perceptions.

- A variety of questions probed respondents' use of antibiotics, their knowledge of antibiotics, and their perceptions about the appropriate use of antibiotics. Very few respondents reported using an antibiotic in the last 6 months without first consulting a doctor. Similarly, very few reported being started on an antibiotic by a doctor over the phone without an office visit. Once they were prescribed antibiotics, most reported finishing their prescription.
- Several questions also assessed respondents' knowledge about specific aspects of antibiotic use. A large majority believed the cause of cold, cough, and flu illnesses are viruses, but only a slight majority believed antibiotics were for use only to treat bacterial infections. Roughly three-quarters of respondents said antibiotics never or almost never should be used for sore throat (not caused by strep), a cold, or a cough without fever. In contrast, a third or fewer said antibiotics never or almost never should be used for middle ear infection, a secondary bacterial infection, or runny nose with yellow or green mucous.
- Finally, several general questions were asked about antibiotic use for colds, cough, or flu symptoms. With these symptoms in mind, very few said they would ask their doctor in the future for antibiotics, that their friends would think they should be taking antibiotics, that failure to do so would result in being sick for a longer time, and/or they would change doctors if their doctor did not prescribe antibiotics. Finally, roughly two-thirds agreed or strongly agreed that a hard-to-treat infection is more likely to develop when antibiotics are taken when they are not needed.

Antibiotic-Resistant Infections or Superbugs.

- A series of potential sources of information about superbugs were provided to respondents. Roughly a third or less reported hearing about superbugs from any of the following sources in descending order: a) television stories or programs; b) magazine articles; c) newspaper articles; d) a doctor's office; or e) via the internet (among those with access to the internet). If they had heard about superbugs from these sources, a majority said the information they had received increased their concern and a third to nearly a half said this information made it more likely they would ask their doctor about the necessity of antibiotic use. Most thought it was likely or very likely superbugs will be a significant hazard in Fargo-Moorhead in the next 10 years.

Children and Antibiotics.

- Only a minority of respondents (N = 190) had children under 18 in their household. Most of these respondents had children between the ages of 5 and 17, and most were either the mother or stepmother to the children in the household. Finally, most said it was the mother or stepmother that decided if the child should go to the doctor.
- These same respondents were asked a number of questions focusing on the use of antibiotics for their children. Seventeen percent or fewer agreed or strongly agreed with any of the following statements: a) in the future, they may ask their child's doctor for an antibiotic when their child has cough, cold, or flu symptoms, b) most of their friends think that their child should take an

antibiotic; c) their child will be sick for a longer period if he or she does not receive an antibiotic; and/or d) their child will be taken to another doctor if his or her doctor does not prescribe an antibiotic. In contrast, substantial percentages (two-fifths to two-thirds) agreed or strongly agreed with the following statements: a) they know if their child needs an antibiotic before they take him or her to the doctor; and b) their child is more likely to develop an infection that is hard to treat if he or she takes antibiotics when they are not needed.

Demographics.

- A variety of background characteristics were measured. Most respondents were employed for wages, were covered by individual or employer-sponsored health insurance, and had partial coverage with a co-payment. In addition, most were between 25 and 50 years old, Caucasian, female, and a plurality were college graduates.

Comparisons of the 1999 and 2000 Surveys

Current Health Status.

- There was no significant difference in the self-reported health status of respondents over time.

Most Recent Visit for Respiratory Illness.

- Roughly the same percentage of respondents in both surveys had seen their doctor for a respiratory illness in the last 12 months.
- Among those who had seen their doctor in the last 12 months for a respiratory illness, there were no significant differences in most aspects of their visit and their perceptions of it. Specifically, there were no significant differences in any of the following aspects of the visit: a) average days sick prior to their visit; b) the most frequently reported symptoms; c) their satisfaction with their medical care; d) their satisfaction with the time spent by the doctor; d) the perceived clarity of their doctor's explanations; e) their sense that they knew in advance whether they needed antibiotics; f) the likelihood that the doctor discussed superbugs; g) the likelihood that respondents would ask for antibiotics in the future for cold, cough, or flu symptoms; h) the diagnoses they received; i) the type of doctor they saw; j) the likelihood they were prescribed an antibiotic; k) the likelihood the doctor explained why they did not receive an antibiotic, if they did not; and l) the frequency they had seen a doctor in the last 12 months for respiratory illness.
- Only one significant difference emerged for this group of respondents. Respondents in the 2000 survey were significantly more likely to state they should have received an antibiotic if they had not been prescribed one.

Antibiotic Use and Perceptions.

- Very few respondents in either survey had received a new, antibiotic prescription in the last 6 months from a doctor over the phone without an office visit.

- There were no significant differences over time in respondents' perceptions of the appropriateness of antibiotics for each of the following: a) middle ear infection; b) sore throat not caused by strep; c) a cold; d) a cough without a fever; e) runny nose with yellow or green mucous; or f) a secondary bacterial infection. Respondents also did not differ over time in their tendency to believe that most cold, cough, and flu illnesses are caused by viruses.
- The proportion of respondents who agreed or strongly agreed with each of the following statements remained the same over time: a) they would ask their doctor for an antibiotic in the future for cough, cold, or flu symptoms; b) their friends think they should be taking an antibiotic for these symptoms; c) not taking an antibiotic will result in being sick for a longer time; d) they will go to a different doctor if the current doctor does not prescribe an antibiotic; and e) they know before seeing a doctor whether they should be receiving an antibiotic.
- Significantly fewer 2000 respondents said they had taken an antibiotic in the last 6 months without first consulting a doctor.
- Significantly more 2000 respondents reported taking all of their antibiotics when they were prescribed.
- Significantly more 2000 respondents professed the following beliefs: a) antibiotics are used to treat only bacterial infections; and b) a hard-to-treat infection is more likely to develop when antibiotics are taken when they are not needed.

Antibiotic-Resistant Infections or Superbugs.

- Respondents did not differ over time in the likelihood they had heard about superbugs from magazine articles, newspaper articles, at a doctor's office, or via the internet (among those who had access to the internet).
- Significantly fewer 2000 respondents reported hearing about superbugs from television stories or programs.
- Respondents were significantly more likely in 2000 to say superbugs will be a significant health hazard in Fargo-Moorhead in the next 10 years.

Children and Antibiotics.

- There was little difference over time in the proportion of respondents who had children under 18 in their household, who had children between 5 and 17; who said that the mother/stepmother decided whether a child should go to the doctor; and who said that they were the mother/stepmother of the children under 18 in the household.

- Among those who did have children under 18 in their household, there was no significant difference over time in the proportion reporting that they agreed or strongly agreed with the following statements: a) most of their friends think their child should take an antibiotic for cough, cold, or flu symptoms; b) their child will be sick for a longer time if he or she does not receive an antibiotic for these symptoms; c) their child will be taken to another doctor if his or her doctor does not prescribe an antibiotic; d) they knew before seeing the doctor whether an antibiotic was needed; e) their child is more likely to develop an infection that is hard to treat if he or she takes antibiotics when they are not needed; and f) they will ask their child's doctor for an antibiotic in the future when their child has cough, cold, or flu symptoms.

Detailed Summary of Results

PROFILE OF RESPONDENTS TO THE 2000 SURVEY

Introduction.

The findings presented below summarize the results of the 2000 survey. The results of the 1999 survey were profiled in an earlier report. The results are presented by topic and by table number within topics. Some results pertain to the entire sample and others only to subgroups. These distinctions are noted with subheadings within each topic division.

Current Health Status.

- All Respondents (N = 507):
 - Most respondents said their health was very good or excellent (57 percent) (Table 1).

Most Recent Visit for Respiratory Illness.

- All Respondents (N = 507):
 - Most said it had been more than 12 months since they had seen a doctor for a respiratory illness (60 percent) (Table 2).
- Respondents Who Had Seen Their Doctor in the Last 12 Months for a Respiratory Infection (N = 134):
 - Respondents were sick an average of 6.8 days before they went to see the doctor (Appendix Table 1).
 - The two most frequently reported symptoms were cough (74 percent) and sore throat (61 percent) (Table 3).
 - A large majority agreed or strongly agreed with each of the following statements about their most recent visit to the doctor for a respiratory illness:
 - ✓ They were satisfied with the medical care they received (79 percent) (Table 4).
 - ✓ The doctor spent enough time answering all their questions (79 percent) (Table 5).
 - ✓ The doctor gave a clear explanation of the diagnosis and treatment plan of their respiratory illness (74 percent) (Table 6).
 - ✓ Before seeing a doctor, they believed an antibiotic was needed for their respiratory illness (60 percent) (Table 7).

- Most indicated the doctor had not mentioned antibiotic-resistant germs or superbugs (80 percent) (Table 8).
- Most said they had not asked the doctor for antibiotics during their most recent visit (80 percent) (Table 9).
- The two most frequent diagnoses were sinus infection (24 percent) and cold or flu (21 percent) (Table 10).
- Most had gone to a family practice doctor (74 percent) (Table 11).
- Most had been prescribed an antibiotic during their most recent visit (62 percent) (Table 12).
- Among those who had not been prescribed an antibiotic:
 - ✓ Most agreed they should not have been prescribed an antibiotic (71 percent) (Table 13).
 - ✓ Half said the doctor had explained why an antibiotic was not prescribed (50 percent) (Table 14).
- Most who had seen a doctor in the last 12 months for a respiratory illness indicated they had done so between 1 and 3 times (87 percent) (Table 15).

Antibiotic Use and Perceptions.

➤ All Respondents (N = 507):

- The vast majority reported they had not taken an antibiotic in the past 6 months without first consulting a doctor (97 percent) (Table 16).
- Similarly, the vast majority indicated they had not been started on antibiotics in the last 6 months by a doctor over the telephone without an office visit (97 percent) (Table 17).
- The percentage of respondents stating antibiotics were always or almost always needed for each of several different diagnoses were as follows:
 - ✓ middle ear infection (42 percent) (Table 18).
 - ✓ sore throat not caused by strep (5 percent) (Table 19).
 - ✓ a cold (3 percent) (Table 20).
 - ✓ a cough without a fever (2 percent) (Table 21).
 - ✓ runny nose with yellow or green mucous (22 percent) (Table 22).

- ✓ a secondary bacterial infection (23 percent) (Table 23).
- Most said they always finished all of their antibiotics when prescribed (78 percent) (Table 24).
- Most believed the causes of cold, cough, and flu illnesses are viruses (78 percent) (Table 25).
- A slight majority believed antibiotics such as penicillin are used to treat only bacterial infections (52 percent) (Table 26).
- The percentage of respondents stating they agreed or strongly agreed with a variety of statements about antibiotic use for cough, cold, or flu symptoms were as follows:
 - ✓ They would ask their doctor for an antibiotic in the future for these symptoms (13 percent) (Table 27).
 - ✓ Most of their friends think they should take an antibiotic for such symptoms (14 percent) (Table 28).
 - ✓ Not taking an antibiotic will result in being sick for a longer time (15 percent) (Table 29).
 - ✓ They will go to another doctor if their current doctor does not prescribe an antibiotic (4 percent) (Table 30).
 - ✓ They know if they need an antibiotic before seeing a doctor (39 percent) (Table 31).
 - ✓ A hard-to-treat infection is more likely to develop when antibiotics are taken when they are not needed (68 percent) (Table 32).

Antibiotic-Resistant Infections or Superbugs.

➤ All Respondents (N = 507):

- The percentage of respondents who reported they had heard about antibiotic-resistant infections, or superbugs, from each of several different sources were as follows (Table 33):
 - ✓ television stories or programs (36 percent)
 - ✓ magazine articles (35 percent)
 - ✓ newspaper articles (28 percent)
 - ✓ a doctor's office (12 percent)
 - ✓ via the internet (4 percent among those with internet access).

- Follow-up questions were added to the 2000 survey for those who indicated they had learned about superbugs from any given source. One set of questions asked about perceived change in level of concern after receiving this information, and the other set of questions asked whether they were more likely to ask their doctor about the necessity of using antibiotics after receiving this information.
 - ✓ Percentage who said their concern increased after receiving information about superbugs from (Table 34):
 - magazine articles (62 percent)
 - via the internet (62 percent among those with internet access)
 - television stories or programs (60 percent)
 - newspaper articles (58 percent)
 - a doctor's office (53 percent)
 - ✓ Percentage who said they were more likely to ask their doctor about the necessity of antibiotic use after receiving information about superbugs from (Table 35):
 - via the internet (46 percent among those with internet access)
 - a doctor's office (42 percent)
 - television stories or programs (40 percent)
 - magazine articles (35 percent)
 - newspaper articles (33 percent).
- Most thought it was moderately likely or very likely that antibiotic-resistant infections, or superbugs, will be a significant health hazard in Fargo-Moorhead in the next 10 years (58 percent) (Table 36).

Children and Antibiotics.

- All Respondents (N = 507):
 - Most respondents stated they did not have children under the age of 18 in their household (62 percent) (Table 37).
- Respondents who did have children under 18 in their household (N = 190 or less depending on missing data).
 - Most had children between 5 and 17 years old (83 percent) (Table 38).
 - Most said the mother/stepmother decided if the child should go to the doctor (72 percent) (Table 39).

- The percentage of respondents who agreed or strongly agreed with each of several statements about antibiotics for cough, cold, or flu symptoms were as follows:
 - ✓ Most of their friends think their child should take an antibiotic for these symptoms (17 percent) (Table 40).
 - ✓ Their child will be sick for a longer period if he or she does not receive an antibiotic for such symptoms (14 percent) (Table 41).
 - ✓ Their child will be taken to another doctor if his or her doctor does not prescribe an antibiotic (7 percent) (Table 42).
 - ✓ They know if their child needs an antibiotic before they take him or her to the doctor (42 percent) (Table 43).
 - ✓ Their child is more likely to develop an infection that is hard to treat if he or she takes antibiotics when they are not needed (65 percent) (Table 44).
 - ✓ In the future, they may ask their child's doctor for an antibiotic when their child has cough, cold, or flu symptoms (17 percent) (Table 45).
- Most respondents indicated they were either the mother or the stepmother to the children in the household (55 percent) (Table 46).

Demographics.

- All Respondents (N = 507):
 - Most respondents were:
 - ✓ employed for wages (58 percent) (Table 47).
 - ✓ covered by individual or employer-sponsored health insurance (77 percent) and had coverage with a co-payment (65 percent) (Tables 48 and 49, respectively).
 - ✓ 25 to 50 years old (52 percent) (Table 50).
 - ✓ Caucasian (94 percent) (Table 51).
 - ✓ female (60 percent) (Table 52).
 - ✓ college graduates (39 percent, a plurality) (Table 53).

COMPARISONS OF THE 1999 AND 2000 SURVEYS

Introduction.

The following material is an itemized summary of comparisons between the 1999 and 2000 surveys. The summary is organized first by topic. Second, within each topic area, the results are then organized by sample size (i.e., some findings are based on all respondents and other results pertain only to some subgroups of respondents). Third, within the relevant sample grouping, the results are organized by the absence or presence of a significant difference by survey year. This organizational structure should aid the reader in finding patterns of significant results by topic.

Each finding includes two pieces of information. First, selected percentages are used to illustrate the nature of the comparison. The percentages are rounded to the nearest whole number and the first percentage is always from the 1999 survey. Following a slash, the pertinent percentage from the 2000 survey is presented. This format also holds true for the N's (number of respondents). Second, each item is identified by table number. The tables follow this detailed summary of the results. The reader will note that the tables are not always in order in the following summary. This is due to the organizational structure described above.

Current Health Status.

- All Respondents (Ns = 501/507):

Respondents **did not differ** significantly over time...

- ...in their self-reported health status. The vast majority of respondents reported their health to be good, very good, or excellent in both surveys (92 percent/90 percent) (Table 1).

Most Recent Visit for Respiratory Illness.

- All Respondents (Ns = 501/507):

Respondents **did not differ** significantly over time...

- ...in the timing of their most recent visit. Roughly a quarter of the respondents in both surveys (30 percent/26 percent) reported seeing a doctor for a respiratory infection within the last 12 months (Table 2).
- Respondents Who Had Seen Their Doctor in the Last 12 Months for a Respiratory Infection (Ns = 148/134):

Respondents **did not differ** significantly over time...

- ...in the average days they were sick before they saw the doctor (6.1 days/6.8 days) (Appendix Table 1). Note: The average number of days respondents were sick was incorrectly reported as 12.8 in the 1999 report.
- ...in the most frequently reported symptoms prior to their visit. Most reported a cough (73 percent/74 percent) and/or a sore throat (68 percent/61 percent) (Table 3).
- ...in satisfaction with their medical care during their most recent visit to the doctor. Most agreed or strongly agreed that they were satisfied (81 percent/79 percent) (Table 4).
- ...in agreement the doctor had spent enough time answering their questions. Most agreed or strongly agreed that enough time was spent (83 percent/79 percent) (Table 5).
- ...in agreement their doctor had given a clear explanation of the diagnosis and treatment plan. Nearly three-quarters (76 percent/74 percent) in both surveys either agreed or strongly agreed (Table 6).
- ...in their belief, prior to going to a doctor, an antibiotic was needed for their illness. Most agreed or strongly agreed they knew this in advance (66 percent/60 percent) (Table 7).
- ...in the reported frequency of their doctor speaking to them about antibiotic resistant germs or superbugs. Fewer than one-fifth of the respondents to either survey (18 percent/19 percent) said their doctor had discussed antibiotics/superbugs (Table 8).
- ...in their reported tendency to ask their doctor for antibiotics during their most recent visit. Roughly one-fifth of the respondents in both surveys (21 percent/16 percent) asked this question (Table 9).
- ...in their diagnoses. Most respondents to both surveys were diagnosed with sinus infection (29 percent/24 percent), bronchitis (21 percent/16 percent), or cold or flu (18 percent/21 percent) (Table 10).
- ...in the type of doctor they saw. Two-thirds or more in each survey saw a family practice doctor (66 percent/74 percent) (Table 11).
- ...in the reported likelihood that they were prescribed an antibiotic. Most indicated the doctor had prescribed an antibiotic during their most recent visit (71 percent/62 percent) (Table 12).

- ...in their reports the doctor had clearly explained why they did not get an antibiotic, if the doctor did not prescribe one (Ns = 40/48). Most indicated the doctor had explained this (65 percent/50 percent) (Table 14).
- ...the frequency of doctor visits for a respiratory illness in the last 12 months. Very few respondents who had seen a doctor in the prior 12 months for a respiratory infection had done so 4 or more times (9 percent/8 percent) (Table 15).

Respondents **did differ** significantly over time...

- ...in their belief they should have been prescribed an antibiotic if they were not (Ns = 40/48). More 2000 respondents indicated they believed that they should have been prescribed an antibiotic (8 percent/23 percent) (Table 13).

Antibiotic Use and Perceptions.

- All Respondents (Ns = 501/507):

Respondents **did not differ** significantly over time...

- ...in reporting they had received an antibiotic prescription in the past 6 months by a doctor over the phone without an office visit (excluding refills or switching antibiotics when the first one did not work). Virtually no respondents reported this happening in either survey (3 percent/2 percent) (Table 17).
- ...in stating antibiotics were always or almost always needed
 - ✓ for a middle ear infection (42 percent/42 percent) (Table 18).
 - ✓ for a sore throat not caused by strep (5 percent/5 percent) (Table 19).
 - ✓ for a cold (3 percent/3 percent) (Table 20).
 - ✓ for a cough without a fever (2 percent/2 percent) (Table 21).
 - ✓ for a runny nose with yellow or green mucous (21 percent/22 percent) (Table 22).
 - ✓ for a secondary bacterial infection (27 percent/23 percent) (Table 23).
- ...in the belief most cold, cough, and flu illnesses are caused by viruses (75 percent/78 percent) (Table 25).

- ...in reporting they agreed or strongly agreed with each of the following statements:
 - ✓ They would ask their doctor for an antibiotic in the future when they have cough, cold, or flu symptoms (14 percent/13 percent) (Table 27).
 - ✓ Their friends think they should take an antibiotic for cough, cold, or flu symptoms (14 percent/14 percent) (Table 28).
 - ✓ Not taking an antibiotic will result in being sick for a longer time (17 percent/15 percent) (Table 29).
 - ✓ They will go to another doctor if their current doctor does not prescribe an antibiotic for cough, cold, or flu symptoms (5 percent/4 percent) (Table 30).
 - ✓ They know if they need an antibiotic before seeing a doctor for cough, cold, or flu symptoms (41 percent/39 percent) (Table 31).

Respondents **did differ** significantly over time...

- ...in taking an antibiotic in the past 6 months without first consulting a doctor. Fewer 2000 respondents had done this (6 percent/3 percent) (Table 16).
- ...in reporting they always take all of their antibiotics when they are prescribed. More 2000 respondents indicated they did this (73 percent/78 percent) (Table 24).
- ...in the belief antibiotics such as penicillin are used to treat only bacterial infections. More 2000 respondents held this belief (44 percent/52 percent) (Table 26).
- ...in the belief a hard-to-treat infection is more likely to develop when antibiotics are taken when they are not needed. More 2000 respondents agreed or strongly agreed with this statement (54 percent/68 percent) (Table 32).

Antibiotic-Resistant Infections or Superbugs.

➤ All Respondents (Ns = 501/507):

Respondents **did not differ** significantly over time...

- ...in the likelihood they reported hearing about antibiotic-resistant infections or superbugs from (Table 33):
 - ✓ magazine articles (32 percent/35 percent),
 - ✓ newspaper articles (29 percent/28 percent),
 - ✓ at a doctor's office (12 percent/12 percent),
 - ✓ and/or via the internet (6 percent/4 percent, among those with internet access).

Respondents **did differ** significantly over time...

- ...in the likelihood they reported hearing about antibiotic-resistant infections or superbugs from (Table 33):
 - ✓ television stories or programs. Fewer 2000 respondents reported hearing about superbugs from TV (41 percent/36 percent).
- ...in the belief antibiotic-resistant infections or superbugs will be a significant health hazard in Fargo-Moorhead in the next 10 years. More 2000 respondents indicated this was very likely (25 percent/31 percent) (Table 36).

Children and Antibiotics.

➤ All Respondents (Ns = 501/507):

Respondents **did not differ** significantly over time...

- ...in the percentage with children under 18 in their household (35 percent/38 percent) (Table 37).

➤ Respondents with children under 18 in their household (Ns = 175/190 or less depending on missing data).

Respondents **did not differ** significantly over time...

- ...in the proportions with children between 5 and 17 (77 percent/83 percent) (Table 38).
- ...in the person who decided whether the child should go to the doctor. Most reported the mother/stepmother decided this (64 percent/72 percent) (Table 39).

- ...in reporting they agreed or strongly agreed with each of the following statements:
 - ✓ Most of their friends think their child should take an antibiotic for cough, cold, or flu symptoms (15 percent/17 percent) (Table 40).
 - ✓ Their child will be sick for a longer time if he or she does not receive an antibiotic for cough, cold, or flu symptoms (17 percent/14 percent) (Table 41).
 - ✓ Their child will be taken to another doctor if his or her doctor does not prescribe an antibiotic for cough, cold, or flu symptoms (5 percent/7 percent) (Table 42).
 - ✓ They know their child needs an antibiotic before they take him or her to a doctor for cough, cold, or flu symptoms (46 percent/42 percent) (Table 43).
 - ✓ Their child is more likely to develop an infection that is hard to treat if he or she takes antibiotics when they are not needed (57 percent/65 percent) (Table 44).
 - ✓ They will ask their child's doctor for an antibiotic in the future when their child has cough, cold, or flu symptoms (21 percent/17 percent) (Table 45).
- ...in the proportion who reported being the mother or stepmother to the children under 18 in the household (57 percent/55 percent) (Table 46).

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Introduction

Study Objectives

The purpose of this study was two-fold. First, we wanted a profile of respondents' knowledge, attitudes, practices, and beliefs regarding antibiotic resistance and management of respiratory infections along with their health status and recent history of medical treatment. Second, we wished to determine whether a series of concerted efforts to educate the public and the medical community about potential overuse of antibiotics would significantly improve knowledge about antibiotics and/or alter related attitudes and practices.

These goals were accomplished through two, virtually identical, but independent, telephone surveys before and after the media campaign. The media campaign involved direct mailing to targeted audiences, public speaking engagements with various community groups, and public service announcements in newspapers and on television, radio, and billboards.

Methodology

The surveys were conducted by trained interviewers and supervised by staff at the North Dakota State Data Center using the Center for Social Research at North Dakota State University. The sampling design was developed based on housing units. Interviewers requested to speak with an adult member (18 years of age or older) of each household contacted. If the time of contact was not convenient for the respondent, a follow-up contact was requested. Respondents were informed that the survey was conducted on behalf of the Dakota Medical Foundation and the NDSU College of Pharmacy.

Residents of Fargo, North Dakota were randomly sampled in the fall of 1999 (October 4 – 12). The survey lasted 13 minutes on average with a refusal rate of 43.1 percent. Residents were contacted in the evening between the hours of 6pm and 9pm. The final sample included 501 respondents.

The second survey was done by telephone in the fall of 2000 (September 25 – October 4). Residents of Fargo, North Dakota were randomly sampled and contacted in the evening between the hours of 6pm and 9pm. The survey lasted 14 minutes, on average. Residents were The final sample size was 507. The refusal rate was 52.7 percent.

The demographic profile of the second survey is virtually identical to the first survey across multiple characteristics. The samples are comparable.

The survey instrument was obtained from Dr. Edward Belongia at the Marshfield Medical Research Foundation. That Foundation is conducting a five-year study in Wisconsin and Minnesota funded by the Centers for Disease Control. The intent is to assess both public and clinician education on appropriate antibiotic use and also to determine the impact of similar media campaigns.

The general topic areas addressed by both surveys included the following:

- Current health status.
- The nature of respondents' most recent visit for respiratory illness.
- Antibiotic use and perceptions.
- Antibiotic-resistant infections or superbugs.
- Children and antibiotics.
- Demographics

In addition, several questions were added by the present researchers to the second survey. These questions explored the following issues:

- For respondents who indicated they had heard about antibiotic resistant infections or superbugs from specified media (e.g., magazines), they were asked if this knowledge resulted in a change in their level of concern.
- These same respondents were also asked if this information altered the likelihood they would ask their doctor about the necessity of using antibiotics.

Survey Results

CURRENT HEALTH STATUS

- In 1999, nearly 92 percent of respondents stated their health was good to excellent. In 2000, that percentage dropped slightly to 89.9 percent (Table 1).

Table 1. Health Status

Response:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
Poor	4	0.8	8	1.6	0.8
Fair	37	7.4	43	8.5	1.1
Good	187	37.3	166	32.7	-4.6
Very Good	203	40.5	192	37.9	-2.6
Excellent	70	14.0	98	19.3	5.3
Total	501	100.0	507	100.0	

MOST RECENT DOCTOR VISIT FOR RESPIRATORY ILLNESS

- The majority of respondents in 1999 (65.1 percent) and a slightly smaller majority in 2000 (59.8 percent) stated that it had been more than 12 months since they had last gone to a doctor for a respiratory illness (cough, cold, flu, sore throat, sinus infection, or ear infection) (Table 2).
- Respondents in 2000 who went to the doctor less than a year ago were sick for an average of 6.8 days before they went to see the doctor for a respiratory illness. Respondents in 1999 were sick for an average of 6.1 days before seeing a doctor (Appendix Table 1).

Table 2. Time Since Last Doctor Visit for a Respiratory Illness

Time:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Less Than 1 Month Ago	28	5.6	22	4.3	-1.3
1-3 Months Ago	27	5.4	17	3.4	-2.0
4-6 Months Ago	37	7.4	39	7.7	0.3
7-12 Months Ago	56	11.2	56	11.0	-0.2
More Than 12 Months Ago	326	65.1	303	59.8	-5.3
Do Not Know/Refused	27	5.4	70	13.8	8.4
Total	501	100.1	507	100.0	

*Percentages do not total 100 due to rounding.

- As compared with 1999 respondents, a smaller percentage of 2000 respondents who had been to the doctor in the past 12 months for a respiratory illness had the following symptoms: a fever (38.1 percent), green/yellow mucous in the nose (42.5 percent), a runny nose (56.7 percent), or a sore throat (61.2 percent) (Table 3 - Appendix Table 2).

Table 3. Symptoms During Last Doctor Visit (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Symptoms	Respondents				Proportional Change
	1999		2000		
	n (n=148)	%	n (n=134)	%	
Cough	108	73.0	99	73.9	0.9
Fever	65	43.9	51	38.1	-5.8
Runny Nose	89	60.1	76	56.7	-3.4
Green/Yellow Mucous in the Nose	72	48.6	57	42.5	-6.1
Sore Throat	101	68.2	82	61.2	-7.0

- Of the respondents who had been to the doctor in the past 12 months for a respiratory illness, a smaller proportion of 2000 respondents (36.6 percent) than 1999 respondents (50.7 percent) strongly agreed that they were satisfied with the medical care they received during their most recent visit to the doctor for a respiratory illness (Table 4).

Table 4. Agreement with: I Was Satisfied With Medical Care During Last Visit (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%*	
Strongly Disagree	4	2.7	8	6.0	3.3
Disagree	6	4.1	5	3.7	-0.4
Neither Disagree nor Agree	18	12.2	14	10.4	-1.8
Agree	45	30.4	57	42.5	12.1
Strongly Agree	75	50.7	49	36.6	-14.1
Do Not Know/Refused	0	0.0	1	0.7	0.7
Total	148	100.1	134	99.9	

*Percentages do not total 100 due to rounding.

- Of the respondents who had been to the doctor in the past 12 months for a respiratory illness, a smaller percentage of 2000 respondents (42.5 percent) than 1999 respondents (54.1 percent) strongly agreed that the doctor spent enough time answering all their questions during their most recent visit to the doctor for a respiratory illness (Table 5).

Table 5. Agreement with: Doctor Spent Enough Time Answering Questions (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Strongly Disagree	4	2.7	5	3.7	1.0
Disagree	5	3.4	9	6.7	3.3
Neither Disagree nor Agree	16	10.8	12	9.0	-1.8
Agree	42	28.4	49	36.6	8.2
Strongly Agree	80	54.1	57	42.5	-11.6
Do Not Know/Refused	1	0.7	2	1.5	0.8
Total	148	100.1	134	100.0	

*Percentages do not total 100 due to rounding.

- Of the respondents who had been to the doctor in the past 12 months for a respiratory illness, a smaller percentage of 2000 respondents (38.8 percent) than 1999 respondents (45.9 percent) strongly agreed that the doctor gave a clear explanation of the diagnosis and treatment plan of their respiratory illness during their most recent visit to the doctor (Table 6).

Table 6. Agreement with: Doctor Gave a Clear Explanation of the Diagnosis and Treatment Plan (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
Strongly Disagree	4	2.7	3	2.2	-0.5
Disagree	10	6.8	12	9.0	2.2
Neither Disagree nor Agree	19	12.8	19	14.2	1.4
Agree	45	30.4	47	35.1	4.7
Strongly Agree	68	45.9	52	38.8	-7.1
Do Not Know/Refused	2	1.4	1	0.7	-0.7
Total	148	100.0	134	100.0	

- Of the respondents who had been to the doctor in the past 12 months for a respiratory illness, a smaller percentage of 2000 respondents (30.6 percent) than 1999 respondents (40.5 percent) strongly agreed that before seeing a doctor, they believed an antibiotic was needed for their respiratory illness (Table 7).

Table 7. Agreement with: Prior to Seeing the Doctor a Belief Existed That an Antibiotic Was Needed for This Illness (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Strongly Disagree	13	8.8	9	6.7	-2.1
Disagree	14	9.5	26	19.4	9.9
Neither Disagree nor Agree	18	12.2	12	9.0	-3.2
Agree	37	25.0	39	29.1	4.1
Strongly Agree	60	40.5	41	30.6	-9.9
Do Not Know/Refused	6	4.1	7	5.2	1.1
Total	148	100.1	134	100.0	

*Percentages do not total 100 due to rounding.

- Of the respondents who had been to the doctor in the past 12 months for a respiratory illness, the percentage of respondents who stated the doctor had spoken with them about antibiotic resistant germs or superbugs was slightly higher in 2000 (18.7 percent) than in 1999 (17.6 percent) (Table 8).

Table 8. Whether the Doctor Spoke of Antibiotic Resistant Germs, or Superbugs (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%*	
Yes	26	17.6	25	18.7	1.1
No	116	78.4	107	79.9	1.5
Do Not Know/Refused	6	4.1	2	1.5	-2.6
Total	148	100.1	134	100.1	

*Percentages do not total 100 due to rounding.

- Of the respondents who had been to the doctor in the past 12 months, the percentage of respondents who stated they had asked their doctor for antibiotics during their most recent visit was slightly smaller in 2000 (16.4 percent) than in 1999 (20.9 percent) (Table 9).

Table 9. Whether Respondent Asked Doctor for an Antibiotic (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
Yes	31	20.9	22	16.4	-4.5
No	115	77.7	107	79.9	2.2
Do Not Know/Refused	2	1.4	5	3.7	2.3
Total	148	100.0	134	100.0	

- Of the respondents who had been to the doctor during the past 12 months for a respiratory illness, a smaller percentage of 2000 respondents than 1999 respondents were diagnosed with strep throat (3.0 percent versus 12.2 percent), bronchitis (15.7 percent versus 20.9 percent), or a sinus infection (23.9 percent versus 29.1 percent) (Table 10 - Appendix Table 3).

Table 10. Respondents' Diagnoses (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Diagnoses:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Sinus Infection	43	29.1	32	23.9	-5.2
Bronchitis	31	20.9	21	15.7	-5.2
Cold or Flu	26	17.6	28	20.9	3.3
Strep Throat	18	12.2	4	3.0	-9.2
Ear Infection	6	4.1	7	5.2	1.1
Other**	19	12.8	30	22.4	9.6
Do Not Know/Refused	5	3.4	12	9.0	5.6
Total	148	100.1	134	100.0	

*Percentages do not total 100 due to rounding.

**Complete listing of other diagnoses is located in Appendix Table 3.

- Of the respondents who had been to the doctor in the past 12 months for a respiratory illness, a larger percentage of 2000 respondents (73.9 percent) than 1999 respondents (66.2 percent) had seen a family practice doctor. However, a smaller percentage of 2000 respondents than 1999 respondents had seen a physician assistant/nurse practitioner (1.5 percent versus 10.1 percent) or an urgent/emergency care doctor (6.7 percent versus 13.5 percent) (Table 11 - Appendix Table 4).

Table 11. Type of Doctor Respondent Saw (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Type of Doctor:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Family Practice Doctor	98	66.2	99	73.9	7.7
Pediatrician	0	0.0	4	3.0	3.0
Urgent or Emergency Care Doctor	20	13.5	9	6.7	-6.8
Physician Assistant or Nurse Practitioner	15	10.1	2	1.5	-8.6
Other**	12	8.1	18	13.4	5.3
Do Not Know/Refused	3	2.0	2	1.5	-0.5
Total	148	99.9	134	100.0	

*Percentages do not total 100 due to rounding.

**Complete listing of other doctors is located in Appendix Table 4.

- Of the respondents who went to the doctor in the past 12 months for a respiratory illness, a smaller percentage of 2000 respondents (61.9 percent) than 1999 respondents (70.9 percent) had been prescribed an antibiotic during their most recent visit to the doctor (Table 12).

Table 12. Whether Doctor Prescribed an Antibiotic (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%*	
Yes	105	70.9	83	61.9	-9.0
No	40	27.0	48	35.8	8.8
Do Not Know/Refused	3	2.0	3	2.2	0.2
Total	148	99.9	134	99.9	

*Percentages do not total 100 due to rounding.

- Of the respondents who went to the doctor in the past 12 months for a respiratory illness and were not prescribed an antibiotic during their most recent visit, a significantly larger percentage of 2000 respondents (22.9 percent) than 1999 respondents (7.5 percent) believed they should have been prescribed an antibiotic (Table 13).

Table 13. Whether Antibiotics Should Have Been Prescribed (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Response:	Respondents				Proportional Change*
	1999		2000		
	n	%	n	%	
Yes	3	7.5	11	22.9	15.4
No	35	87.5	34	70.8	-16.7
Do Not Know/Refused	2	5.0	3	6.3	1.3
Total	40	100.0	48	100.0	

*Significance at $p < .05$

- Of the respondents who went to the doctor in the past 12 months for a respiratory illness and were not prescribed an antibiotic during their most recent visit, a smaller percentage of 2000 respondents (50.0 percent) than 1999 respondents (65.0 percent) stated the doctor explained why an antibiotic was not needed (Table 14).

Table 14. Whether Doctor Explained Why an Antibiotic Was Not Needed (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%*	
Yes	26	65.0	24	50.0	-15.0
No	13	32.5	21	43.8	11.3
Do Not Know/Refused	1	2.5	3	6.3	3.8
Total	40	100.0	48	100.1	

*Percentages do not total 100 due to rounding.

- The majority of 1999 (90.5 percent) and 2000 (86.5 percent) respondents who had been to the doctor in the past 12 months for a respiratory illness saw a doctor 1 to 3 times (Table 15 - Appendix Table 5).

Table 15. Number of Times Respondent Saw a Doctor (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Number of Times:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
0 Times	1	0.7	8	6.0	5.3
1 to 3 Times	134	90.5	115	86.5	-4.1
4 to 5 Times	9	6.1	7	5.3	-0.8
6 or More Times	4	2.7	3	2.3	-0.4
Total	148	100.0	133	100.0	

ANTIBIOTIC USE AND PERCEPTIONS

- A slightly smaller percentage of 2000 respondents (3.0 percent) than 1999 respondents (5.8 percent) stated they had taken an antibiotic in the past 6 months without first consulting a doctor (Table 16).

Table 16. Whether Respondent Had Taken an Antibiotic Without Consulting a Doctor

Response:	Respondents				Proportional Change*
	1999		2000		
	n	%	n	%	
Yes	29	5.8	15	3.0	-2.8
No	472	94.2	490	96.6	2.4
Do Not Know/Refused	0	0.0	2	0.4	0.4
Total	501	100.0	507	100.0	

*Significance at $p < .05$

- An approximately equal percentage of 1999 (97.2 percent) and 2000 (97.0 percent) respondents stated that in the past 6 months they had not been given an antibiotic prescription by a doctor over the telephone without an office visit, not including refill prescriptions or switching to a different antibiotic because the first one did not work (Table 17). See Appendix Table 6 for a listing of illnesses for which doctors gave a prescription for antibiotics over the telephone.

Table 17. Whether Doctor Gave an Antibiotic Prescription Over the Telephone

Response:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
Yes	14	2.8	12	2.4	-0.4
No	487	97.2	492	97.0	-0.2
Do Not Know/Refused	0	0.0	3	0.6	0.6
Total	501	100.0	507	100.0	

- An approximately equal percentage of 1999 (41.8 percent) and 2000 (41.9 percent) respondents stated that antibiotics were almost always or always needed for a middle ear infection (Table 18).

Table 18. Frequency of Antibiotic Need for Middle Ear Infection

Frequency:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Never	34	6.8	38	7.5	0.7
Almost Never	27	5.4	26	5.1	-0.3
Sometimes	165	32.9	174	34.3	1.4
Almost Always	111	22.2	126	24.9	2.7
Always	98	19.6	86	17.0	-2.6
Do Not Know/Refused	66	13.2	57	11.2	-2.0
Total	501	100.1	507	100.0	

*Percentages do not total 100 due to rounding.

- An approximately equal percentage of 1999 (70.1 percent) and 2000 (70.6 percent) respondents stated that antibiotics were almost never or never needed for a sore throat not caused by strep (Table 19).

Table 19. Frequency of Antibiotic Need for a Sore Throat Not Caused by Strep

Frequency:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Never	244	48.7	252	49.7	1.0
Almost Never	107	21.4	106	20.9	-0.5
Sometimes	103	20.6	94	18.5	-2.1
Almost Always	18	3.6	12	2.4	-1.2
Always	9	1.8	12	2.4	0.6
Do Not Know /Refused	20	4.0	31	6.1	2.1
Total	501	100.1	507	100.0	

*Percentages do not total 100 due to rounding.

- A slightly smaller percentage of 2000 respondents (78.7 percent) than 1999 respondents (80.3 percent) stated that antibiotics were almost never or never needed for a cold (Table 20).

Table 20. Frequency of Antibiotic Need for a Cold

Frequency:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%*	
Never	305	60.9	331	65.3	4.4
Almost Never	97	19.4	68	13.4	-6.0
Sometimes	73	14.6	79	15.6	1.0
Almost Always	10	2.0	10	2.0	0.0
Always	4	0.8	6	1.2	0.4
Do Not Know/Refused	12	2.4	13	2.6	0.2
Total	501	100.1	507	100.1	

*Percentages do not total 100 due to rounding.

- A slightly smaller percentage of 2000 respondents (76.9 percent) than 1999 respondents (78.3 percent) stated that antibiotics were almost never or never needed for a cough without a fever (Table 21).

Table 21. Frequency of Antibiotic Need for a Cough Without a Fever

Frequency:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Never	298	59.5	298	58.8	-0.7
Almost Never	94	18.8	92	18.1	-0.7
Sometimes	82	16.4	87	17.2	0.8
Almost Always	7	1.4	7	1.4	0.0
Always	2	0.4	4	0.8	0.4
Do Not Know/Refused	18	3.6	19	3.7	0.1
Total	501	100.1	507	100.0	

*Percentages do not total 100 due to rounding.

- A slightly larger percentage of 2000 respondents (26.4 percent) than 1999 respondents (22.6 percent) stated that an antibiotic is never needed for a runny nose with yellow or green mucous (Table 22).

Table 22. Frequency of Antibiotic Need for Runny Nose With Yellow or Green Mucous

Frequency:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Never	113	22.6	134	26.4	3.8
Almost Never	49	9.8	53	10.5	0.7
Sometimes	204	40.7	175	34.5	-6.2
Almost Always	66	13.2	70	13.8	0.6
Always	39	7.8	41	8.1	0.3
Do Not Know/Refused	30	6.0	34	6.7	0.7
Total	501	100.1	507	100.0	

*Percentages do not total 100 due to rounding.

- Similar proportions of respondents in both the 1999 and 2000 surveys (25.0 percent/26.8 percent) stated that antibiotics are almost never or never needed for a secondary bacterial infection (Table 23).

Table 23. Frequency of Antibiotic Need for Secondary Bacterial Infection

Frequency:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Never	71	14.2	77	15.2	1.0
Almost Never	54	10.8	59	11.6	0.8
Sometimes	174	34.7	176	34.7	0.0
Almost Always	76	15.2	65	12.8	-2.4
Always	59	11.8	49	9.7	-2.1
Do Not Know/Refused	67	13.4	81	16.0	2.6
Total	501	100.1	507	100.0	

*Percentages do not total 100 due to rounding.

- There was a significantly higher proportion of respondents in 2000 (77.7 percent) than 1999 (72.9 percent) who said they always finish the full amount of their antibiotics (Table 24).

Table 24. Frequency of Antibiotic Prescription Completion

Frequency:	Respondents				Proportional Change**
	1999		2000		
	n	%*	n	%*	
Never Use Antibiotics	16	3.2	24	4.7	1.5
Never Finish the Full Amount	24	4.8	19	3.7	-1.1
Sometimes Finish the Full Amount	89	17.8	59	11.6	-6.2
Always Finish the Full Amount	365	72.9	394	77.7	4.8
Do Not Know/Refused	7	1.4	11	2.2	0.8
Total	501	100.1	507	99.9	

*Percentages do not total 100 due to rounding.

**Significance at $p < .05$

- A slightly larger proportion of 2000 respondents (77.9 percent) than 1999 respondents (75.0 percent) said most cold, cough, and flu illnesses are caused by viruses (75.0 percent in 1999) (Table 25).

Table 25. Cause of Most Cold, Cough, and Flu Illnesses

Cause:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
Virus	376	75.0	395	77.9	2.9
Bacteria	86	17.2	77	15.2	-2.0
Do Not Know/Refused	39	7.8	35	6.9	-0.9
Total	501	100.0	507	100.0	

- A significant increase of 2000 respondents (52.1 percent) stated that antibiotics such as penicillin are used to treat only bacterial infections, compared with 44.4 percent of 1999 respondents (Table 26).

Table 26. When Antibiotics Should Be Used in the Treatment of Bacterial and/or Viral Infections

Response:	Respondents				Proportional Change**
	1999		2000		
	n	%*	n	%	
Only Bacterial	223	44.4	264	52.1	7.7
Only Viral	58	11.6	56	11.0	-0.6
Both	149	29.7	115	22.7	-7.0
Do Not Know/Refused	71	14.2	72	14.2	0.0
Total	501	99.9	507	100.0	

*Percentages do not total 100 due to rounding.

**Significance at $p < .05$

- A slightly larger majority of 2000 respondents (72.8 percent) than 1999 respondents (69.0 percent) disagreed or strongly disagreed with the statement that they would ask their doctor for an antibiotic in the future when they have cough, cold, or flu symptoms (Table 27).

Table 27. Agreement with: I May Request an Antibiotic for Cough, Cold, or Flu Symptoms in the Future

Response:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%*	
Strongly Disagree	211	42.1	214	42.2	0.1
Disagree	135	26.9	155	30.6	3.7
Neither Disagree not Agree	85	17.0	72	14.2	-2.8
Agree	47	9.4	49	9.7	0.3
Strongly Agree	23	4.6	17	3.4	-1.2
Total	501	100.0	507	100.1	

*Percentages do not total 100 due to rounding.

- A slightly larger percentage of 2000 respondents (68.2 percent) than 1999 respondents (65.2 percent) disagreed or strongly disagreed with the statement that most of their friends think they should take an antibiotic for cough, cold, or flu symptoms (Table 28).

Table 28. Agreement with: Friends Think I Should Take an Antibiotic for Cough, Cold, or Flu Symptoms

Response:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
Strongly Disagree	173	34.5	175	34.5	0.0
Disagree	154	30.7	171	33.7	3.0
Neither Disagree not Agree	103	20.6	90	17.8	-2.8
Agree	47	9.4	51	10.1	0.7
Strongly Agree	24	4.8	20	3.9	-0.9
Total	501	100.0	507	100.0	

- A slightly larger percentage of 2000 respondents (69.6 percent) than 1999 respondents (67.0 percent) disagreed or strongly disagreed with the statement that not taking an antibiotic will result in being sick for a longer time (Table 29).

Table 29. Agreement with: Not Taking an Antibiotic Will Result in Being Sick Longer

Response:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
Strongly Disagree	184	36.7	173	34.1	-2.6
Disagree	152	30.3	180	35.5	5.2
Neither Disagree not Agree	81	16.2	79	15.6	-0.6
Agree	61	12.2	54	10.7	-1.5
Strongly Agree	23	4.6	21	4.1	-0.5
Total	501	100.0	507	100.0	

- Nearly equal proportions of 1999 (90.9 percent) and 2000 (91.4 percent) respondents disagreed or strongly disagreed with the statement that they will go to another doctor if their current doctor does not prescribe an antibiotic for cough, cold, or flu symptoms (Table 30).

Table 30. Agreement with: Not Being Prescribed Antibiotics Will Result in Changing Doctors

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%*	
Strongly Disagree	330	65.9	307	60.6	-5.3
Disagree	125	25.0	156	30.8	5.8
Neither Disagree not Agree	22	4.4	22	4.3	-0.1
Agree	14	2.8	13	2.6	-0.2
Strongly Agree	10	2.0	9	1.8	-0.2
Total	501	100.1	507	100.1	

*Percentages do not total 100 due to rounding.

- A slightly smaller percentage of 2000 respondents (38.9 percent) than 1999 respondents (41.3 percent) agree or strongly agreed with the statement that they know if they need an antibiotic before seeing a doctor for cough, cold, or flu symptoms (Table 31).

Table 31. Agreement with: Possess Knowledge of Needing an Antibiotic Before Seeing a Doctor

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Strongly Disagree	98	19.6	97	19.1	-0.5
Disagree	103	20.6	116	22.9	2.3
Neither Disagree not Agree	93	18.6	97	19.1	0.5
Agree	138	27.5	148	29.2	1.7
Strongly Agree	69	13.8	49	9.7	-4.1
Total	501	100.1	507	100.0	

*Percentages do not total 100 due to rounding.

- A significantly larger percentage of 2000 respondents (68.1 percent) than 1999 respondents (53.8 percent) agreed or strongly agreed with the statement that a hard-to-treat infection is more likely to develop when antibiotics are taken when they are not needed (Table 32).

Table 32. Agreement with: A Hard-to-Treat Infection is More Likely to Develop When Antibiotics Are Taken When Not Needed

Response:	Respondents				Proportional Change**
	1999		2000		
	n	%	n	%*	
Strongly Disagree	76	15.2	41	8.1	-7.1
Disagree	82	16.4	73	14.4	-2.0
Neither Disagree nor Agree	73	14.6	48	9.5	-5.1
Agree	127	25.3	183	36.1	10.8
Strongly Agree	143	28.5	162	32.0	3.5
Total	501	100.0	507	100.1	

*Percentages do not total 100 due to rounding.

**Significance at $p < .001$

ANTIBIOTIC-RESISTANT INFECTIONS OR SUPERBUGS

- Significantly fewer 2000 respondents than 1999 respondents stated they had heard about antibiotic-resistant infections, or superbugs from television stories or programs (36.1 percent versus 41.3 percent). Proportions were similar for respondents who indicated they gained their knowledge about antibiotic resistance through newspaper articles (27.8 percent versus 28.5 percent), or at a doctor's office (12.2 percent versus 12.4 percent). (Table 33 - Appendix Table 7). See Appendix Table 8 for a breakdown of respondents with Internet access.
- More than 17 percent of 2000 respondents stated they had heard about antibiotic-resistant infections from sources other than those listed as compared with 10.8 percent of 1999 respondents. See Appendix Table 9 for a listing of the other sources from which respondents received information about antibiotic infections.

Table 33. Knowledge of Antibiotic-Resistant Infection or Superbugs From Various Locations

Locations:	Respondents				Proportional Change
	1999		2000		
	n (n=501)	%	n (n=507)	%	
Magazine Articles	159	31.7	175	34.5	2.8
Newspaper Articles	143	28.5	141	27.8	-0.7
Television Stories or Programs**	207	41.3	183	36.1	-5.2
At a Doctor's Office	62	12.4	62	12.2	-0.2
Internet (If Internet Access)	16	6.4	13	4.3	-2.1
Other Sources*	54	10.8	87	17.2	6.4

*Complete listing of other sources is located in Appendix Table 9.

**Significance at $p < .05$

- A majority of respondents stated their level of concern about antibiotic-resistant bacteria increased after receiving information about superbugs from magazine articles (61.7 percent), the Internet (61.5 percent), television stories or programs (60.1 percent), other sources (59.8 percent), newspaper articles (58.2 percent), and at a doctor's office (53.2 percent) (Table 34).

Table 34. Change in Level of Concern About Antibiotic-Resistant Bacteria After Receiving Information About Superbugs From Various Locations

Locations:	Level of Concern						Total 2000 Respondents	
	Decrease		Stayed About the Same		Increase		n	%*
	n	%	n	%	n	%		
Magazine Articles	2	1.1	65	37.1	108	61.7	175	99.9
Newspaper Articles	0	0.0	59	41.8	82	58.2	141	100.0
Television Stories or Programs	3	1.6	70	38.3	110	60.1	183	100.0
At a Doctor's Office	1	1.6	28	45.2	33	53.2	62	100.0
Internet (If Internet Access)	0	0.0	5	38.5	8	61.5	13	100.0
Other Sources	3	3.4	32	36.8	52	59.8	87	100.0

*Percentages do not total 100 due to rounding.

- More than 40 percent of respondents stated they are more likely to ask their doctor about the necessity of using antibiotics after receiving information about antibiotic-resistance from the Internet (46.2 percent), at a doctor's office (41.9 percent), and television stories or programs (40.4 percent) (Table 35).

Table 35. Likelihood of Asking Doctor About Necessity of Antibiotic Use After Receiving Information About Superbugs From Various Locations

Locations:	Likelihood						Total 2000 Respondents	
	Less Likely		Just as Likely		More Likely		n	%*
	n	%	n	%	n	%		
Magazine Articles	52	29.7	62	35.4	61	34.9	175	100.0
Newspaper Articles	39	27.7	55	39.0	47	33.3	141	100.0
Television Stories or Programs	42	23.0	67	36.6	74	40.4	183	100.0
At a Doctor's Office	10	16.1	26	41.9	26	41.9	62	99.9
Internet (If Internet Access)	2	15.4	5	38.5	6	46.2	13	100.1
Other Sources	24	27.6	35	40.2	28	32.2	87	100.0

*Percentages do not total 100 due to rounding.

- A larger percentage of 2000 respondents (31.2 percent) than 1999 respondents (24.6 percent) stated that it was very likely that antibiotic-resistant infections, or superbugs, will be a significant health hazard in Fargo-Moorhead in the next 10 years (Table 36).

Table 36. Likelihood That Antibiotic-Resistant Infections or Superbugs Will Be a Significant Health Hazard in Fargo-Moorhead in the Next Ten Years

Response:	Respondents				Proportional Change*
	1999		2000		
	n	%	n	%	
Not at all Likely	55	11.0	43	8.5	-2.5
Somewhat Likely	149	29.7	133	26.2	-3.5
Moderately Likely	154	30.7	137	27.0	-3.7
Very Likely	123	24.6	158	31.2	6.6
Do Not Know/Refused	20	4.0	36	7.1	3.1
Total	501	100.0	507	100.0	

*Significance at $p < .05$

CHILDREN AND ANTIBIOTICS

- A slightly larger percentage of 2000 respondents (37.5 percent) than 1999 respondents (34.9 percent) stated they had children under the age of 18 in their household (Table 37).

Table 37. Children Under 18 in Household

Response:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
Yes	175	34.9	190	37.5	2.6
No	326	65.1	316	62.3	-2.8
Do Not Know/Refused	0	0.0	1	0.2	0.2
Total	501	100.0	507	100.0	

- Of respondents with children in their household under the age of 18, a majority of 1999 (76.9 percent) and 2000 (83.2 percent) respondents had children between the ages of 5 and 17 (Table 38).

Table 38. Age Composition of Children Under 18 (of Respondents with Children Under 18)

Respondents with Children Under 18	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
No Children Less Than 5	102	58.6	112	60.1	1.5
1 to 2 Children Less Than 5	71	40.8	68	37.0	-3.8
3 or More Children Less Than 5	1	0.6	4	2.9	2.3
Total	174	100.0	184	100.0	
No Children Between 5 and 17 Years old	40	23.1	32	16.8	-6.3
1 to 2 Children Between 5 and 17 Years old	103	59.5	130	68.4	8.9
3 or More Children Between 5 and 17 Years Old	30	17.4	28	14.8	-2.6
Total	173	100.0	190	100.0	

- Of respondents with children in their household under the age of 18, a smaller percentage of 2000 respondents (20.5 percent) than 1999 respondents (30.9 percent) had both parents decide if the child should go to the doctor (Table 39).

Table 39. Person Who Decides if Child Should Go to the Doctor (of Respondents with Children Under 18)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Mother/Stepmother	112	64.0	136	71.6	7.6
Father/Stepfather	5	2.9	14	7.4	4.5
Both Parents	54	30.9	39	20.5	-10.4
Grandparent	1	0.5	1	0.5	0.0
Other	2	1.0	0	0.0	-1.0
Do Not Know/Refused	1	0.5	0	0.0	-0.5
Total	175	99.8	190	100.0	

*Percentages do not total 100 due to rounding.

- Of respondents with children under the age of 18 in their household, a slightly larger percentage of 2000 respondents (64.2 percent) than 1999 respondents (61.1 percent) disagreed or strongly disagreed with the statement that most of their friends think that their child should take an antibiotic for cough, cold, or flu symptoms (Table 40).

Table 40. Agreement with: My Friends Believe My Child Should Take Antibiotics for Cough, Cold, or Flu Symptoms (of Respondents with Children Under 18)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Strongly Disagree	58	33.1	51	26.8	-6.3
Disagree	49	28.0	71	37.4	9.4
Neither Disagree not Agree	39	22.3	27	14.2	-8.1
Agree	21	12.0	25	13.2	1.2
Strongly Agree	6	3.4	7	3.7	0.3
Do Not Know/Refused/Missing	2	1.1	9	4.7	3.6
Total	175	99.9	190	100.0	

*Percentages do not total 100 due to rounding.

- Of respondents with children under the age of 18 in their household, a slightly smaller percentage of 2000 respondents (14.2 percent) than 1999 respondents (16.6 percent) agreed or strongly agreed to the statement that their child will be sick for a longer period of time if he or she does not receive an antibiotic for cough, cold, or flu symptoms (Table 41).

Table 41. Agreement with: Child Will Be Sick For a Longer Period of Time if He or She Does Not Receive an Antibiotic for Cough, Cold, or Flu Symptoms (of Respondents with Children Under 18)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
Strongly Disagree	62	35.4	65	34.2	-1.2
Disagree	63	36.0	73	38.4	2.4
Neither Disagree not Agree	20	11.4	20	10.5	-0.9
Agree	19	10.9	19	10.0	-0.9
Strongly Agree	10	5.7	8	4.2	-1.5
Do Not Know/Refused/Missing	1	0.6	5	2.6	2.0
Total	175	100.0	190	100.0	

- Of respondents with children under the age of 18 in their household, a smaller percentage of 2000 respondents (52.6 percent) than 1999 respondents (64.6 percent) strongly disagreed with the statement that their child will be taken to another doctor if his or her doctor does not prescribe an antibiotic for cough, cold, or flu symptoms (Table 42).

Table 42. Agreement with: Child Will Be Taken to Another Doctor if His or Her Doctor Does Not Prescribe an Antibiotic for Cough, Cold, or Flu Symptoms (of Respondents with Children Under 18)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Strongly Disagree	113	64.6	100	52.6	-12.0
Disagree	43	24.6	67	35.3	10.7
Neither Disagree not Agree	10	5.7	4	2.1	-3.6
Agree	4	2.3	8	4.2	1.9
Strongly Agree	4	2.3	6	3.2	0.9
Do Not Know/Refused/Missing	1	0.6	5	2.6	2.0
Total	175	100.1	190	100.0	

*Percentages do not total 100 due to rounding.

- Of respondents with children under the age of 18 in their household, a smaller percentage of 2000 respondents (5.3 percent) than 1999 respondents (16.6 percent) strongly agreed with the statement that they know if their child needs an antibiotic before they take him or her to the doctor for cough, cold, or flu symptoms (Table 43).

Table 43. Agreement with: I usually Know if Child Needs an Antibiotic Before He or She is Taken to the Doctor for Cough, Cold, or Flu Symptoms (of Respondents with Children Under 18)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Strongly Disagree	23	13.1	31	16.3	3.2
Disagree	35	20.0	37	19.5	-0.5
Neither Disagree not Agree	34	19.4	36	18.9	-0.5
Agree	52	29.7	69	36.3	6.6
Strongly Agree	29	16.6	10	5.3	-11.3
Do Not Know/Refused/Missing	2	1.1	7	3.7	2.6
Total	175	99.9	190	100.0	

*Percentages do not total 100 due to rounding.

- Of respondents with children under the age of 18 in their household, a larger percentage of 2000 respondents (65.3 percent) than 1999 respondents (57.1 percent) agreed or strongly agreed with the statement that their child is more likely to develop an infection that is hard to treat if he or she takes antibiotics when they are not needed (Table 44).

Table 44. Agreement with: Child is More Likely to Develop a Hard-to-Treat Infection if He or She Takes Antibiotics When Not Needed (of Respondents with Children Under 18)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Strongly Disagree	16	9.1	19	10.0	0.9
Disagree	27	15.4	21	11.1	-4.3
Neither Disagree not Agree	27	15.4	16	8.4	-7.0
Agree	38	21.7	65	34.2	12.5
Strongly Agree	62	35.4	59	31.1	-4.3
Do Not Know/Refused/Missing	5	2.9	10	5.3	2.4
Total	175	99.9	190	100.0	

*Percentages do not total 100 due to rounding.

- Of respondents with children under the age of 18 in their household, a slightly larger percentage of 2000 respondents (70.0 percent) than 1999 respondents (66.3 percent) disagreed or strongly disagreed with the statement that in the future they may ask their child's doctor for an antibiotic when their child has cough, cold, or flu symptoms (Table 45).

Table 45. Agreement With: May Ask Doctor for an Antibiotic When Child Has Cough, Cold, or Flu Symptoms in the Future (of Respondents with Children Under 18)

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Strongly Disagree	66	37.7	74	38.9	1.2
Disagree	50	28.6	59	31.1	2.5
Neither Disagree not Agree	21	12.0	19	10.0	-2.0
Agree	27	15.4	20	10.5	-4.9
Strongly Agree	9	5.1	13	6.8	1.7
Do Not Know/Refused/Missing	2	1.1	5	2.6	1.5
Total	175	99.9	190	100.0	

*Percentages do not total 100 due to rounding.

- More than 55 percent of 1999 and 2000 respondents with children younger than 18 years of age in their household stated that they were either the mother or stepmother to the children in the household (Table 46 - Appendix Table 10).

Table 46. Relationship to Children in Household (of Respondents with Children Under 18)

Relationship:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
Mother/Stepmother	99	56.6	105	55.3	-1.3
Father/Stepfather	59	33.7	73	38.4	4.7
Sibling	10	5.7	7	3.7	-2.0
Grandparent**	NA	NA	1	0.5	NA
Other*	7	4.0	3	1.6	-2.4
Missing	0	0.0	1	0.5	0.5
Total	175	100.0	190	100.0	

*Complete listing for other relationship is located in Appendix Table 10.

**This was not a choice in the 1999 survey. NA=Not Applicable

DEMOGRAPHICS

- The majority of the 1999 and 2000 respondents were employed for wages (57.1 percent and 57.8 percent, respectively) (Table 47).

Table 47. Employment Status

Response:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Employed for Wages	286	57.1	293	57.8	0.7
Self-Employed	36	7.2	49	9.7	2.5
Out of Work for More Than 1 Year**	NA	NA	4	0.8	NA
Out of Work for Less Than 1 Year	6	1.2	7	1.4	0.2
Homemaker	21	4.2	19	3.7	-0.5
Student	48	9.6	36	7.1	-2.5
Retired	94	18.8	86	17.0	-1.8
Unable to Work	9	1.8	10	2.0	0.2
Do Not Know/Refused/Missing	1	0.2	3	0.6	0.4
Total	501	100.1	507	100.0	

*Percentages do not total 100 due to rounding.

**This was not a choice in the 1999 survey. NA=Not Applicable

- More than three-fourths of 1999 (75.6 percent) and 2000 (76.9 percent) respondents stated they had individual or employer-sponsored health insurance (Table 48 - Appendix Table 11).

Table 48. Current Health Insurance Coverage

Health Insurance:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Individual/Employer-Sponsored Health Insurance	379	75.6	390	76.9	1.3
Medical Assistance, Such as Medicaid	60	11.9	68	13.4	1.5
Other**	35	7.0	26	5.1	-1.9
None	23	4.6	16	3.2	-1.4
Do Not Know/Refused/Missing	4	0.8	7	1.4	0.6
Total	501	99.9	507	100.0	

*Percentages do not total 100 due to rounding.

**Complete listing of other current health coverage is located in Appendix Table 11.

- A majority of 1999 and 2000 respondents (64.7 percent each) stated they had partial coverage with a co-payment as the type of insurance coverage they had for prescription medication (Table 49 - Appendix Table 12).

Table 49. Type of Insurance Coverage for Prescription Medication

Insurance Coverage:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Full Coverage With No Co-Payment	45	9.0	50	9.9	0.9
Partial Coverage With a Co-Payment	324	64.7	328	64.7	0.0
No Coverage for Prescription Drugs	84	16.8	90	17.8	1.0
Other**	16	3.2	16	3.2	0.0
Do Not Know/Refused/Missing	32	6.4	23	4.5	-1.9
Total	501	100.1	507	100.0	

*Percentages do not total 100 due to rounding.

**Complete listing of other types of insurance coverage is located in Appendix Table 12.

- Approximately 50 percent of 1999 (50.1 percent) and 2000 (51.9 percent) respondents were between the ages of 25 and 50 (Table 50).

Table 50. Age

Age:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
18 and Younger	17	3.4	15	3.0	-0.4
19 to 24	55	11.0	50	9.9	-1.2
25 to 50	251	50.1	263	51.9	1.4
51 to 65	96	19.2	101	19.9	0.6
66 and Older	78	15.6	71	14.0	-1.7
Refused/Missing	4	0.8	5	1.0	1.0
Total	501	100.0	507	100.0	

- The majority of 1999 (97.0 percent) and 2000 (94.1 percent) respondents were Caucasian (Table 51 - Appendix Table 13).

Table 51. Racial or Ethnic Background

Racial or Ethnic Background:	Respondents				Proportional Change
	1999		2000		
	n	%*	n	%	
Caucasian	486	97.0	477	94.1	-2.9
Asian	3	0.6	5	1.0	0.4
African American	1	0.2	2	0.4	0.2
Native American	4	0.8	5	1.0	0.2
Mexican American/Puerto Rican**	NA	NA	4	0.8	NA
Other Hispanic	1	0.2	1	0.2	0.0
Other***	5	0.9	10	2.0	1.1
Do Not Know/Refused/Missing	1	0.2	2	0.4	0.2
Total	501	99.9	507	100.0	

*Percentages do not total 100 due to rounding.

**This was not a choice in the 1999 survey. NA=Not Applicable

***Complete listing of other racial or ethnic backgrounds is located in Appendix Table 13.

- Approximately 60 percent of 1999 (61.5 percent) and 2000 (60.0 percent) respondents were female (Table 52).

Table 52. Gender

Response:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
Male	193	38.5	200	39.4	0.9
Female	308	61.5	304	60.0	-1.5
Missing	0	0.0	3	0.6	0.6
Total	501	100.0	507	100.0	

- More than 35 percent of 1999 and 2000 respondents were college graduates, while 34 percent had some college or technical school (Table 53).

Table 53. Education

Response:	Respondents				Proportional Change
	1999		2000		
	n	%	n	%	
Never Attended School/Kindergarten Only*	NA	NA	1	0.2	NA
Elementary School	14	2.8	8	1.6	-1.2
Some High School	24	4.8	21	4.1	-0.7
High School Graduate or GED	113	22.6	105	20.7	-1.9
Some College or Technical School	173	34.5	170	33.5	-1.0
College Graduate	177	35.3	199	39.3	4.0
Do Not Know/Refused/Missing	0	0.0	3	0.6	0.6
Total	501	100.0	507	100.0	

*This was not a choice in the 1999 survey. NA=Not Applicable

Appendix

Appendix Table 1. Number of Days Sick Before Visit to a Doctor (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Days:	2000 Respondents	
	Number	Percent
1	6	4.5
2	21	15.7
3	23	17.2
4	11	8.2
5	7	5.2
6	5	3.7
7	27	20.1
8	2	1.5
9	1	0.7
10	3	2.2
12	1	0.7
14	9	6.7
21	5	3.7
30	1	0.7
90	1	0.7
Do not know	9	6.7
Refused	2	1.5
Total	134	100.0

Mean number of days = 6.77

Appendix Table 2. Symptoms During Last Doctor Visit (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Symptoms:	2000 Respondents							
	Experienced		Did Not Experience		Do Not Know/Refused		Total	
	n	%	n	%	n	%	n	%
Cough	99	73.9	34	25.4	1	0.7	134	100.0
Fever	51	38.1	83	61.9	0	0.0	134	100.0
Runny Nose	76	56.7	57	42.6	1	0.7	134	100.0
Green/Yellow Mucous in the Nose	57	42.5	73	54.5	4	3.0	134	100.0
Sore Throat	82	61.2	51	38.1	1	0.7	134	100.0

Appendix Table 3. Other Diagnoses (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Diagnoses:	2000 Respondents	
	Number	Percent
Allergies	6	20.0
Pneumonia	6	20.0
Asthma	4	13.3
Other/Do Not Know	3	10.0
Cold	2	6.7
Emphysema	1	3.3
Sore Throat	1	3.3
Mononucleosis	1	3.3
Sinus Infection	1	3.3
Upper Respiratory Infection	1	3.3
Viral Infection	1	3.3
Non-Viral Infection	1	3.3
Corroded Orthorectomy	1	3.3
Check-Up	1	3.3
Total	30	100.0

Appendix Table 4. Other Type of Doctor (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Type of Doctor:	2000 Respondents	
	Number	Percent
Internal Medicine	4	22.2
General Practitioner	4	22.2
Walk-In Clinic	3	16.7
Ear, Nose, and Throat	3	16.7
APPA	1	5.6
Neurologist	1	5.6
Pulmonary	1	5.6
Specialist	1	5.6
Total	18	100.0

Appendix Table 5. Number of Times to See a Doctor for Respiratory Illness in the Past 12 Months (of Respondents Who Had Been to the Doctor in the Past 12 Months for a Respiratory Illness)

Number of Times:	2000 Respondents	
	Number	Percent
0	8	6.0
1	77	57.9
2	26	19.5
2 or 3	1	0.8
3	10	7.5
4	3	2.3
4 or 5	1	0.8
5	3	2.3
6	2	1.5
7	1	0.8
Possibly 2 times, can't remember	1	0.8
Total	133	100.0

Appendix Table 6. Type of Illness For Which Doctor Gave Antibiotic Prescription Over the Telephone

Type of Illness:	2000 Respondents	
	Number	Percent
Cough	2	16.7
Back Pain	1	8.3
Claritin	1	8.3
Bowel Infection	1	8.3
Ear Infection	1	8.3
Hide	1	8.3
Infected Gland	1	8.3
Pulled Molar	1	8.3
Sinus Infection	1	8.3
Urinary Tract Infection	1	8.3
Unsure	1	8.3
Total	12	100.0

Appendix Table 7. Knowledge of Antibiotic-Resistant Infection or Superbugs From Various Locations

Locations:	2000 Respondents							
	Yes		No		Refused		Total	
	n	%	n	%	n	%	n	%
Magazine Articles	175	34.5	328	64.7	4	0.8	507	100.0
Newspaper Articles	141	27.8	361	71.2	5	1.0	507	100.0
Stories or Programs	183	36.1	319	62.9	5	1.0	507	100.0
At a Doctor's Office	62	12.2	440	86.8	5	1.0	507	100.0

Appendix Table 8. Internet Access; Saw Internet Information About Superbugs

	2000 Respondents							
	Yes		No		Do Not Know/Refused		Total	
	n	%	n	%	n	%	n	%
Internet Access	299	59.0	206	40.6	2	0.4	507	100.0
Saw Internet Information About Superbugs if Internet Access	13	4.3	286	95.7	0	0.0	299	100.0

Appendix Table 9. Other Sources Where Information Was Received About Antibiotic Resistance

Other Sources:	2000 Respondents	
	Number	Percent
Radio	25	28.7
Billboard	21	24.1
Doctor/Nurse/Hospital/Pharmacy	13	14.9
Work/Word of Mouth	10	11.5
Newsletter	9	10.3
Magazine/Medical Journal	6	6.9
Professor	1	1.1
Relatives	1	1.1
Drug Companies	1	1.1
Total	87	100.0

Appendix Table 10. Other Relationship to Children in Household (of Respondents with Children Under 18)

Relationship:	2000 Respondents	
	Number	Percent*
Aunt	1	33.3
Child	2	66.6
Total	3	99.9

*Percentages do not total 100 due to rounding.

Appendix Table 11. Other Current Health Insurance Coverage

Health Insurance:	2000 Respondents	
	Number	Percent
Parents	12	46.2
Blue Cross/Blue Shield	4	15.4
Both	3	11.5
Medicare/Medicare Supplement	2	7.7
Employer	2	7.7
Self-Pay	1	3.8
Medical Expense Account	1	3.8
State of ND	1	3.8
Total	26	100.0

Appendix Table 12. Other Type of Insurance Coverage for Prescription Medication

Insurance Coverage:	2000 Respondents	
	Number	Percent
Full Coverage with a Co-Payment	6	37.5
Blue Cross/Blue Shield	1	6.3
Citing Scale	1	6.3
Veteran	1	6.3
Etna	1	6.3
Large Deductible	1	6.3
None	1	6.3
Partial Coverage	1	6.3
Family Practice	1	6.3
Up-front Fee and Percentage of Balance	1	6.3
Up to \$550	1	6.3
Total	16	100.0

Appendix Table 13. Other Racial or Ethnic Background

Racial or Ethnic Background:	2000 Respondents	
	Number	Percent
Norwegian	3	30.0
Asian American	2	20.0
American	1	10.0
French	1	10.0
Native American	1	10.0
Polish	1	10.0
Puerto Rican and Native American	1	10.0
Total	10	100.0

Survey Instrument

Antibiotic Resistance Knowledge Survey
September 25-October 5, 2000

Intro

Hello, my name is _____ and I'm calling from the Center for Social Research at North Dakota State University. We are conducting a research study on cough, cold, and flu in the Fargo/West Fargo/Moorhead community and your number was selected by chance. Do you have a few minutes to answer some questions?

- 1 Yes
- 2 No

IF (ANS = 2)

"Thank you for your time and have a good evening."

[Press any key to begin next interview.]

ID

The purpose of this study is to learn more about how people take care of these illnesses. The survey is supported by Dakota Medical Foundation and the NDSU College of Pharmacy, and is being conducted by Dr. Mary Kuzel from the NDSU College of Pharmacy.

Intro_2

The survey will take about 10 minutes and the information you provide will be recorded without your name or any other identifying information. Your participation is voluntary and you may skip any question or stop the interview at any time. The information you provide will help us learn more about the treatment of cough, cold and flu symptoms.

Q2

In general, would you say your health is:

- 1 Poor
- 2 Fair
- 3 Good
- 4 Very good
- 5 Excellent
- 6 Refused

Q_Think

For the next few questions, I would like you to think about episodes of respiratory illness that you had in the past few months. When I say respiratory illness I mean cough, cold, flu, sore throat, sinus infection, or ear infection. I will also be asking you some questions about antibiotics. Antibiotics are medicines that fight infections.

Q3

When was the last time you went to the doctor for a respiratory illness? This includes cough, cold, flu, sore throat, sinus infection, or ear infection.

- 1 less than 1 month
- 2 1-3 months ago
- 3 4-6 months ago
- 4 7-12 months ago
- 5 more than 12 months ago
- 6 [Do not know]
- 7 [Refused]

If (ans > 4) Skipto Q22

Q4

How many days were you sick before you went to the doctor?

Q5_9

Please tell me if you had any of the following symptoms the last time you went to the doctor.

- Cough
 - Fever
 - Runny nose
 - Green or yellow mucous in the nose
 - Sore throat
- 1 Yes
 - 2 No
 - 3 [Do not know]
 - 4 [Refused]

Q10

Next, I would like you to tell me how much you agree or disagree with the following statements about your most recent visit for respiratory illness. Please rate each statement on a scale from 1 to 5, with 1 being 'strongly disagree' and 5 being 'strongly agree'.

- I was satisfied with my medical care during that visit
- 1 Strongly disagree
 - 2 Disagree
 - 3 Neither disagree or agree
 - 4 Agree
 - 5 Strongly agree
 - 6 Do not know

Q11

The doctor spent enough time answering all my questions. Would you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither disagree or agree
- 4 Agree
- 5 Strongly agree
- 6 Do not know

Q12

The doctor gave me a clear explanation of the diagnosis and treatment plan. Would you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither disagree or agree
- 4 Agree
- 5 Strongly agree
- 6 Do not know

Q13

Before seeing the doctor, I believed that I needed an antibiotic for this illness. Would you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither disagree or agree
- 4 Agree
- 5 Strongly agree
- 6 Do not know

Q14

During this visit, did the doctor talk to you about antibiotic-resistant germs, also known as superbugs?

- 1 Yes
- 2 No
- 3 Do not know
- 4 Refused

Q15

Did you ask the doctor for an antibiotic during this visit?

- 1 Yes
- 2 No
- 3 Do not know
- 4 Refused

Q16

What was your diagnosis?

- 1 Ear infection
- 2 Cold or flu
- 3 Sinus infection
- 4 Strep throat
- 5 Bronchitis
- 6 Other
- 7 Do not know
- 8 Refused

Q17

What kind of doctor did you see during this visit?

- 1 Family practice doctor
- 2 Pediatrician
- 3 Urgent or emergency care doctor
- 4 Physician assistant or nurse practitioner
- 5 Other
- 6 Do not know
- 7 Refused

Q18

Did the doctor prescribe an antibiotic during this visit?

- 1 Yes
- 2 No
- 3 Do not know
- 4 Refused

If (Ans = 1) Skipto Q21

If (Ans > 2) Skipto Q21

Q19

Do you believe the doctor should have prescribed an antibiotic for your illness?

- 1 Yes
- 2 No
- 3 Do not know
- 4 Refused

Q20

Did the doctor explain why an antibiotic was not needed for your illness?

- 1 Yes
- 2 No
- 3 Do not know
- 4 Refused

Q21

About how many times in the past 12 months did you go to the doctor for a respiratory illness? This includes cough, cold, flu, sore throat, sinus infection, or ear infection.

Q22

In the past six months, did you ever take an antibiotic at home without first consulting a doctor?

- 1 Yes
- 2 No
- 3 Do not know
- 4 Refused

Q23

In the past six months, did a doctor ever give you an antibiotic prescription over the telephone without an office visit? This does not include refill prescriptions, or switching to a different antibiotic because the first one didn't work.

- 1 Yes
- 2 No
- 3 Do not know
- 4 Refused

Q23a

For what type of illness?

If (Q23 > 1) Skp

Set_up

Next I'm going to read a list of symptoms that sometimes occur in adults. For each one, please tell me how often you believe antibiotics are needed. Assume the symptoms have been present for less than one week.

Q24_29

How often are antibiotics needed for:

- Middle ear infection
- Sore throat not caused by strep
- Cold
- Cough without fever
- Runny nose with yellow or green mucous

- 1 Never
- 2 Almost never

- 3 Sometimes
- 4 Almost always
- 5 Always
- 6 [Do not know]

Q29a

How often are antibiotics needed for preventing a secondary bacterial infection when you have a cough, cold, flu, or sinus infection?

- 1 Never
- 2 Almost never
- 3 Sometimes
- 4 Almost always
- 5 Always
- 6 [Do not know]

Q29b

When you are prescribed antibiotics how often do you finish taking all the pills in the bottle?

- 1 Never use antibiotics
- 2 Never finish the full amount
- 3 Sometimes finish the full amount
- 4 Always finish the full amount
- 5 [Do not know]

Q30

Now I would like to ask you some questions about common infections and their treatment. Are most cold, cough, and flu illnesses caused by bacteria, or are they caused by viruses?

- 1 Bacteria
- 2 Viruses
- 3 [Do not know]
- 4 [Refused]

Q31

Are antibiotics such as penicillin used to treat bacterial infections, viral infections, or both?

- 1 Bacterial
- 2 Viral
- 3 Both
- 4 [Do not know]
- 5 [Refused]

Q32

Now I would like you to tell me how much you agree or disagree with the following statements. We will use a scale from 1 to 5, with 1 being 'strongly disagree' and 5 being 'strongly agree'.

In the future, I may ask my doctor for an antibiotic when I have a cough, cold, or flu symptoms. Do you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither disagree or agree
- 4 Agree
- 5 Strongly agree

Q33

Most of my friends think I should take an antibiotic for cough, cold, or flu symptoms. Do you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither disagree or agree
- 4 Agree
- 5 Strongly agree

Q34

I will be sick for a longer time if I don't receive an antibiotic for cough, cold, or flu symptoms. Do you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither disagree or agree
- 4 Agree
- 5 Strongly agree

Q35

I will go to another doctor if my own doctor does not prescribe an antibiotic for cough, cold, or flu symptoms. Do you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither disagree or agree
- 4 Agree
- 5 Strongly agree

Q36

I usually know if I need an antibiotic before seeing a doctor for cough, cold, or flu symptoms. Do you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither disagree or agree
- 4 Agree
- 5 Strongly agree

Q37

I am more likely to develop an infection that is hard to treat if I take antibiotics when they are not needed.

Do you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither disagree or agree
- 4 Agree
- 5 Strongly agree

Set_up3

For the next few questions, I would like you to think about things you have heard or seen during the past six months.

Q38

The germs that cause antibiotic resistant infections are sometimes called superbugs because they are hard to treat. During the past six months, did you read any MAGAZINE articles about antibiotic resistant infections or superbugs?

- 1 Yes
- 2 No
- 3 [Refused]

If (ans > 1) skipto Q39

Q38a*

Based on the stories you read in magazines, did your level of concern about antibiotic-resistant bacteria:

- 1 Decrease
- 2 Stay about the same
- 3 Increase

Q38b*

Based on the stories you read in magazines, would you say you are less likely, just as likely, or more likely than before to ask your doctor about the necessity of taking antibiotics?

- 1 less likely
- 2 just as likely
- 3 more likely

Q39

Did you read any NEWSPAPER articles about antibiotic-resistant infections or superbugs in the past six months?

- 1 Yes
- 2 No
- 3 [Refused]

If (ans > 1) Skipto Q40

Q39a*

Based on the stories you read in NEWSPAPER, did your level of concern about antibiotic-resistant bacteria:

- 1 Decrease
- 2 Stay about the same
- 3 Increase

Q39b*

Based on the stories you read in the NEWSPAPER, would you say that you are less likely, just as likely, or more likely to ask your doctor about the necessity of taking antibiotics?

- 1 less likely
- 2 just as likely
- 3 more likely

Q40

In the past six months, did you see any stories or programs on TELEVISION about antibiotic-resistant infections or superbugs?

- 1 Yes
- 2 No
- 3 [Refused]

If (ans > 1) Skipto Q41

Q40a*

Based on the stories you saw on TV, did your level of concern about antibiotic-resistant bacteria:

- 1 Decrease
- 2 Stay about the same
- 3 Increase

Q40b*

Based on the stories you saw on TV, would you say you are less likely, just as likely, or more likely to ask your doctor about the necessity of taking antibiotics?

- 1 less likely
- 2 just as likely
- 3 more likely

Q41

Did you see or hear anything about antibiotic resistant infections at a doctor's office in the past six months?

- 1 Yes
- 2 No
- 3 [Refused]

If (ans > 1) Skipto Q41c

Q41a*

Based on the information you read or heard in the doctor's office, did your level of concern about antibiotic-resistant bacteria:

- 1 Decrease
- 2 Stay about the same
- 3 Increase

Q41b*

Based on the information you read or heard in the doctor's office, would you say you are less likely, just as likely, or more likely than before to ask your doctor about the necessity of taking antibiotics?

- 1 less likely
- 2 just as likely
- 3 more likely

Q41c

In your opinion, how likely is it that antibiotic resistant infections or superbugs will be a significant health hazard in Fargo/Moorhead within the next ten years?

- 1 Not at all likely
- 2 Somewhat likely
- 3 Moderately likely
- 4 Very likely
- 5 [Refused]

Q42

Do you have access to the Internet at home?

- 1 Yes
- 2 No
- 3 [Refused]

If (Ans > 1) Skipto Q44

Q43

In the past six months, did you see any information on the Internet about antibiotic resistance?

- 1 Yes
- 2 No
- 3 [Refused]

If (ans > 1)skipto Q44

Q43a*

Based on the information you received from the Internet, did your level of concern about antibiotic-resistant bacteria:

- 1 Decrease
- 2 Stay about the same
- 3 Increase

Q43b*

Based on the information you received from the Internet, would you say you are less likely, just as likely, or more likely to ask your doctor about the necessity of taking antibiotics?

- 1 Less likely
- 2 Just as likely
- 3 More likely

Q44

Did you receive information on antibiotic resistance from any other sources in the past six months?

- 1 Yes
- 2 No
- 3 [Refused]

If (ans > 1) skipto Q45

Q44a

Please tell me where you saw or heard about antibiotic resistance.

Q44b*

Based on the other information you received, did your level of concern about antibiotic-resistant bacteria:

- 1 Decrease
- 2 Stay about the same
- 3 Increase

Q44c*

Based on the other information you received, would you say you are less likely, just as likely, or more likely to ask your doctor about the necessity of taking antibiotics?

- 1 Less likely
- 2 Just as likely
- 3 More likely

Q45

Do you have children younger than 18 living in your household?

- 1 Yes
- 2 No
- 3 [Refused]

If (Ans > 1) Skipto Q47

Q45a

How many children live in your household who are less than 5 years old?

Q45b

How many children live in your household who are between 5 and 17 years old?

Q45c

In your household, which person usually decides if a child should go to the doctor for cough, cold, or flu symptoms?

- 1 Mother/Stepmother
- 2 Father/Stepfather
- 3 Both parents (mutual decision)
- 4 Grandparent
- 5 Other person
- 6 [Do not know]
- 7 [Refused]

Set_up2

Next, I will read you a list of statements. Using a 1 to 5 scale, with 1 being 'strongly disagree' and 5 being 'strongly agree', please tell me how much you agree or disagree with each.

Q45d

In the future, I may ask my child's doctor for an antibiotic when my child has cough, cold, or flu symptoms. Do you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither agree or disagree
- 4 Agree
- 5 Strongly agree
- 6 Do not know
- 7 [Refused]

Q45e

Most of my friends think my child should take an antibiotic for cough, cold, or flu symptoms. Do you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither agree or disagree
- 4 Agree
- 5 Strongly agree
- 6 Do not know
- 7 [Refused]

Q45f

My child will be sick for a longer period of time if he or she doesn't receive an antibiotic for cough, cold, or flu symptoms.

- 1 Strongly disagree
- 2 Disagree
- 3 Neither agree or disagree
- 4 Agree
- 5 Strongly agree
- 6 Do not know
- 7 [Refused]

Q45g

I will take my child to another doctor if his or her doctor does not prescribe an antibiotic for cough, cold, or flu symptoms. Do you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither agree or disagree
- 4 Agree
- 5 Strongly agree
- 6 Do not know
- 7 [Refused]

Q45h

I usually know if my child needs an antibiotic before I take him or her to the doctor for cough, cold, or flu symptoms. Do you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither agree or disagree
- 4 Agree
- 5 Strongly agree
- 6 Do not know
- 7 [Refused]

Q45i

My child is more likely to develop an infection that is hard to treat if he or she takes antibiotics when they are not needed. Do you:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither agree or disagree
- 4 Agree
- 5 Strongly agree
- 6 Do not know
- 7 [Refused]

Q46

What is your relationship to the children in the household?

- 1 Mother/stepmother
- 2 Father/stepfather
- 3 Sibling
- 4 Grandparent
- 5 Other
- 6 [Refused]

Q47

What is your age?

Q48

Which of the following categories best describes your racial or ethnic background?

- 1 Caucasian
- 2 Asian
- 3 African American
- 4 Native American
- 5 Mexican American or Puerto Rican
- 6 Other Hispanic
- 7 Other
- 8 [Refused]

Q49

What is the highest grade or year of school you have completed?

- 1 Never attended school or kindergarten only
- 2 Elementary (grades 1 through 8)
- 3 Some high school (grades 9 through 11)
- 4 High school graduate or GED
- 5 Some college or technical school (1 to 3 years college)
- 6 College graduate (4 years or more)
- 7 [Refused]

Q50

Are you currently:

- 1 Employed for wages
- 2 Self-employed
- 3 Out of work for more than 1 year
- 4 Out of work for less than 1 year
- 5 Homemaker
- 6 Student
- 7 Retired
- 8 Unable to work
- 9 [Refused]

Q51

What is your zip code?

- 1 56560
- 2 58078
- 3 58102
- 4 58103
- 5 58104
- 6 58106
- 7 58107
- 8 Other
- 9 [Refused]

Q52

Which of the following best describes your current health insurance coverage?

- 1 Individual or employer-sponsored health insurance
- 2 Medical assistance, such as Medicaid

- 3 Other
- 4 None
- 5 [Refused]

Q53

What type of insurance coverage do you have for prescription medications?

- 1 Full coverage with no copayment
- 2 Partial coverage with a copayment
- 3 No coverage for prescription drugs
- 4 Other type of coverage
- 5 [Do not know]
- 6 [Refused]

End

That concludes our survey. Thank you very much for taking time to answer these questions. Everyone's answers will be combined to give us information about treatment of cough, cold, and flu illnesses in Fargo-Moorhead. If you would like to talk to someone about this survey, feel free to call Dr. Mary Kuzel in the NDSU College of Pharmacy at 231-7604. If you have questions about the rights of human research subjects, please contact the NDSU IRB office at 231-8908. Goodnight.

Gender

Record gender based on voice.

- 1 Male
- 2 Female

*Questions added to the 1999 instrument.