

## At Nicaraguan Motels Rented for Sexual Encounters, Making Condoms Available in Rooms Increases Use

Couples visiting motels in Managua, Nicaragua, for sexual encounters are more likely to use condoms if the condoms are handed directly to them or are available in their rooms than if condoms are available only on request.<sup>1</sup> However, data collected at 19 motels used mainly for sexual encounters indicate that the presence of health education materials in the room decreases condom use among sex workers and their clients and has no effect on use among couples visiting motels for noncommercial sex.

According to the researchers who conducted the study, crowded living conditions in Managua limit opportunities for private sexual encounters. As a result, a substantial number of such encounters—particularly those between sex workers and their clients—occur in motels that rent rooms for short periods of time.

To evaluate whether providing condoms and health education materials in motels that rent rooms for sexual encounters would affect condom use, the researchers identified 36 such motels in Managua and interviewed 29 of the owners regarding characteristics of the motels and their clients. (Seven owners refused to be interviewed.) The interviews covered such topics as whether a motel was used mainly for commercial or noncommercial sex, the charge for the room, the amount of time guests typically spent in a room, and whether the motels' rooms had flush toilets. Nine of the owners who were interviewed refused to participate in the study, and one of the motels closed during the study period, leaving 19 motels in the study. Eleven of these were used mainly for commercial sex and eight mainly for noncommercial sex. One motel used mainly for commercial sex had flush toilets in its rooms, compared with four of the motels used mainly for noncommercial sex.

The researchers tested six combinations of the intervention: providing condoms to couples who request them; making printed health education materials available in motel rooms and providing con-

doms to couples who request them; making condoms available in motel rooms; making both condoms and printed educational materials available in motel rooms; distributing condoms unsolicited to couples before they enter their rooms; and distributing condoms unsolicited and making printed educational materials available in the rooms. Nicaragua's Ministry of Health requires motels to provide condoms to all guests, but the general practice in most motels is to give condoms only to people who ask for them. Therefore, the researchers used couples who were given condoms on request to provide a baseline for condom use among motel guests in Managua.

The educational materials contained information about the number of people in Nicaragua and Central America who have AIDS and about the use of condoms to prevent the transmission of HIV and other sexually transmitted diseases. The materials also included diagrams with explanations about the correct way to use a condom. The information was provided in the form of leaflets left on the bed and posters hanging in the room.

To assess whether couples had used condoms, fieldworkers dressed as motel cleaning staff collected condoms from the rooms after the couples had left. The research team classified a couple as having used condoms if at least one condom containing semen was retrieved from their room.

From July 31 to October 4, 1997, the researchers visited the motels on the three busiest days of the week—either Thursday through Saturday or Friday through Sunday—for a total of 24 days in each motel. Overall, the fieldworkers collected data on 456 days.

The fieldworkers collected one or more used condoms from the rooms of 3,106 couples (48%), unused condoms from the rooms of 152 couples (2%) and no condoms from the rooms of 3,205 couples (50%). Couples engaging in commercial sex used condoms three times as frequently as couples engaging in noncom-

mercial sex (61% vs. 20%).

At motels used mostly for commercial sex, couples who rented rooms in which health education materials were available used condoms less frequently than did those who rented rooms that did not contain information (59% vs. 62%). This was not the case, however, at motels used mainly for noncommercial sex, where about one in five couples used condoms, regardless of whether health information was available.

Among couples visiting motels used mainly for commercial sex, 64% of those who were given condoms unsolicited used them, compared with 62% of those who rented rooms in which condoms were available and 56% of those at motels where condoms were given on request. At motels used for noncommercial sex, 25% of couples who received condoms in their rooms used them, compared with 21% of those who were given condoms unsolicited before entering their rooms and 15% of couples at motels where condoms were given to couples on request. Multi-level logistic modeling that controlled for characteristics of the motel showed that provision of health information decreased condom use at motels used for commercial sex (odds ratio, 0.89) and had no effect at those used for noncommercial sex.

The largest effect of type of condom distribution on frequency of use was among couples visiting motels for noncommercial sex who received condoms in their rooms. Compared with couples in such motels who received condoms on request, these couples were more likely to use condoms (odds ratio, 1.81). Couples engaging in noncommercial sex who were given condoms unsolicited before entering their rooms also were more likely to use them (odds ratio, 1.52) when compared with couples who received condoms on request.

Compared with couples who rented rooms for commercial sex and were given condoms on request, couples who rented rooms for commercial sex and were provided condoms in their rooms or were handed condoms directly before entering

their rooms were about equally more likely to use condoms (odds ratios, 1.31 and 1.32, respectively).

The presence or absence of health education materials in the room did not alter the effect of the different methods of condom distribution on couples' frequency of use in either type of motel.

The researchers acknowledge that they may have underestimated condom use among couples at motels used mainly for noncommercial sex because such motels were more likely than motels used mainly for commercial sex to have flush toilets in their rooms. However, they note that because their sample was randomized, disposal of used condoms in toilets was not likely to differ among the different intervention groups.

In the motels the researchers studied, use increased by 8% when condoms were available in the rooms. The researchers estimate that approximately 500,000 acts of sexual intercourse per year take place in these 19 motels, and that approximately one million sexual encounters occur in all motels in Managua during an entire year. Thus, according to the researchers, if the intervention they studied were to be implemented in all motels in Managua, approximately 80,000 additional acts of sexual intercourse per year would be protected.

The investigators conclude that providing condoms in rooms increases condom use substantially, possibly because it allows couples to avoid asking for condoms. In addition, they say, their findings confirm that simply providing information, without offering condoms, "is insufficient to change behavior."—*B. Brown*

## Reference

1. Egger M et al., Promotion of condom use in a high-risk setting in Nicaragua: a randomized controlled trial, *Lancet*, 2000, 355(9221):2101–2105.

## Changes in Bone Density From Hormonal Methods Are Small and Temporary

Hormonal contraceptives have only small, reversible effects on bone density, according to a multicenter study conducted in Africa, Asia and Latin America.<sup>1</sup> Compared with women who do not use hormonal methods, women who use combined oral contraceptives experience a significant increase in bone density, while those who use the injectable depot medroxyprogesterone acetate (DMPA) or the levonorgestrel implant experience a significant decrease. These changes disappear

after the first 2–3 years of current use and appear to be clinically insignificant.

A total of 2,545 women aged 30–34 were enrolled between 1994 and 1997 at family planning clinics in Bangladesh, Brazil, China, Egypt, Mexico, Thailand and Zimbabwe. During interviews, each woman provided information on her social and demographic characteristics, obstetric and contraceptive history, dietary habits, and height and weight. Seventy-one women were excluded because they were currently pregnant or lactating (or had been within the prior six months), had undergone hysterectomy or oophorectomy, or reported diseases or drug intake that could influence calcium metabolism.

The remaining 2,474 women were categorized as users of hormonal contraceptives if they had used hormonal contraceptives for at least two years over their lifetime and as never-users if their lifetime exposure amounted to no more than six months. Study participants who had used more than one hormonal contraceptive were assigned to the method most recently used for at least two years. Thus, 33% were classified as pill users, 14% as DMPA users and 25% as implant users, while 28% were considered never-users.

To determine bone density, the radius was measured near the wrist and the ulna was measured at midshaft. The average bone density at both sites differed significantly by country, with women in Zimbabwe having the highest values at both the radius and the ulna and women in Bangladesh having the lowest values. As a group, Asian centers (those in Bangladesh, China and Thailand) had the lowest bone density readings of any region.

When the data were adjusted for study center, an analysis of covariance showed that bone density at both the radius and the ulna were associated with body mass index, age, total months of lactation, total months since last lactation and the occupation of the woman's partner. Parity and coffee consumption were related to bone density at the radius only. Bone density at both sites was associated with hormonal method use: Values were highest for women who did not use hormonal contraceptives, followed by those who relied on the pill, those who used the implant and those who relied on the injectable.

Most of these associations persisted after adjustment for the other variables in the analysis. Bone density values for women who relied on the pill (both all users and exclusive users) were not significantly different from those for never-users. Women who used DMPA had

lower bone density; only the difference at the radius was significant for all users, while the differences at both the radius and the ulna were significant for exclusive users. Women whose only hormonal method had been the levonorgestrel implant had significantly lower bone density at the ulna. The decrease in bone density for women who used DMPA or levonorgestrel was approximately 0.01 g/cm<sup>2</sup>, a relatively small decline given that a decrease of one standard deviation below the measurements in never-users equals approximately 0.05 g/cm<sup>2</sup>.

Further analysis of bone density for exclusive users and never-users revealed a pattern of significant change for all three methods during short-term current use. Women who had been using the pill for only 2–3 years had higher values at both bone sites than did never-users, while women who had been relying on either DMPA or the levonorgestrel implant for a similar period had significantly lower values than never-users at both bone sites. No other differences in bone density were found for any of the contraceptive methods for longer durations of current or past use, which suggests that such changes are reversible over time.

According to the researchers, the study's limitations include its cross-sectional design, the limited age range of the participants and the lack of bone density measurements at the femoral neck and spine. They note that the substantial variations across countries remain unexplained because several potentially important variables were not explored, such as calcium intake, dietary habits in childhood and exercise. The women displayed minimal variation in smoking and alcohol consumption, so the potential influence of these variables on bone density could not be determined.

The investigators point out that the small decreases in bone density found in this study among women using the implant and the injectable are not considered abnormal and fall short of the definition of low bone mass—and well short of that for osteoporosis. They conclude that the changes in bone density observed soon after the beginning of hormonal contraceptive use appear to be temporary and clinically insignificant.—*L. Ninger*

## Reference

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## HIV-Infected Partner's Viral Load Is the Main Factor In the Risk of Transmission in Heterosexual Couples

The viral load of an HIV-positive sexual partner is the most important factor affecting heterosexual transmission of the virus in rural Uganda.<sup>1</sup> Among 415 serodiscordant couples identified in a population-based study in Rakai, transmission rates increased with the number of copies of HIV ribonucleic acid (RNA) in the blood, from two seroconversions per 100 person-years when the infected partner had fewer than 3,500 copies per milliliter to 23 per 100 person-years when the partner had at least 50,000 copies per milliliter. No seroconversions occurred when the HIV-positive partner's viral load was less than 1,500 copies per milliliter.

The data for analysis came from a community-based study conducted in Rakai to determine whether treatment of sexually transmitted diseases (STDs) would lower the rate of HIV transmission. All participants were offered HIV testing, were counseled on how to prevent HIV transmission and were provided with free condoms.

To determine behavioral and biological risk factors for heterosexual transmission of HIV, researchers conducted individual interviews with participants at baseline and at follow-up visits occurring every 10 months over a period of up to 30 months. Each partner provided information on demographic characteristics; sexual history, including number of partners and use of condoms; and health history, including past and current symptoms of STDs and symptoms of AIDS. Biological samples for HIV and STD testing were taken at every visit.

Following the study, data from couples (either married or in a long-term consensual union) in which one partner had been HIV-positive at baseline and the other had not were analyzed. Couples in which the

HIV-negative partner seroconverted were matched with couples in which no seroconversion occurred by sex of the positive and negative partner, by five-year age-group and by the timing of the biological sampling.

At baseline, the male partner was infected in 55% of the 415 couples and the female partner in 45%. During follow-up, 22% (90) of the seronegative partners seroconverted; of these, 56% were women and 44% were men. Among men, seroconversion occurred only among those who had not been circumcised (29%). Transmission was more likely if the seropositive partners had genital discharge (34%) or symptoms of AIDS (43%) than if they did not (21% each). No significant differences were found according to number of sexual partners or use of condoms (only 12% of couples used them). The rate of transmission from men to women was equal to the rate from women to men.

Blood levels of HIV RNA were highly associated with transmission. Among couples in which the HIV-positive partner had a viral load of up to 1,500 copies per milliliter, no uninfected partner seroconverted. Transmission rates progressed from 2.2 per 100 person-years when the infected partner's viral load was no more than 3,499 copies per milliliter to 23.0 per 100 person-years when the viral load was at least 50,000 copies per milliliter. The mean viral load of the infected partner in couples who experienced seroconversion was 90,254 copies per milliliter, compared with 38,029 copies per milliliter in couples who did not.

According to a multivariate analysis, the infected partner's viral load was the most important factor predicting transmission. Compared with men and women whose partner had a viral load of less than

3,500 copies of HIV RNA per milliliter, those whose partner had a viral load of 3,500–9,999 were 5.8 times as likely to seroconvert, those whose partner had a viral load of 10,000–49,999 were 6.9 times as likely and those whose partner had a viral load of 50,000 or more were 11.9 times as likely. Transmission rates declined with advancing age: Men and women in their 20s were 68% as likely to seroconvert as those aged 15–19, while those in their 30s were 32% as likely and those in their 40s and 50s were 27% as likely.

The investigators caution that the study data could not specify the viral load at the time of seroconversion because of the 10-month interval between follow-up visits. The length of the interval, they add, may also have obscured the role of STDs in HIV transmission. The investigators conclude, nevertheless, that the use of antiretroviral drugs or vaccines could lower transmission rates by reducing the levels of viral RNA in blood and in genital secretions. The author of an accompanying editorial comments that although programs treating seropositive individuals to reduce their infectiousness may be just as important as those focused on seronegative persons in high-risk populations, "antiretroviral therapy is currently too expensive and the treatment regimen is too complex for routine use in developing countries."<sup>2</sup>—L. Ninger

### References

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## Couples' Reports of Their Contraceptive Use: Do Husbands in Africa Overstate the Case?

When monogamous spouses in Kenya and Zimbabwe are asked if they are currently using a contraceptive method, the majority give the same response; when their answers differ, however, men are more likely than their wives to say that the couple use a method. The difference is particularly striking in Kenya: Only the husband reports current method use in 29% of couples, whereas only the wife reports use in 6% of couples. In Zimbabwe, these proportions are 11% and 7%, respectively. According to an analysis of Demographic and

Health Survey (DHS) data, key factors in the consistency of spouses' reporting include whether they approve of and whether they discuss family planning.<sup>1</sup>

To explore patterns of contraceptive reporting, the analyst examined data on 1,055 matched married couples from the 1993 Kenya DHS who said that they were monogamous (i.e., not in a polygynous union) and 592 such couples from the 1994 Zimbabwe DHS. He conducted bivariate analyses and then two sets of multinomial logit analyses: one to assess the factors

influencing the risk that only one partner (rather than both) would report that the couple used a method, and one to examine the factors affecting the risk that both partners or only the wife (rather than the husband) would report using a contraceptive.

### Kenya

Two-thirds of couples in Kenya gave consistent responses about their contraceptive use: In 38%, both partners said that the couple were not currently using a method,

while in 28%, both said that they were. When spouses disagreed, the husband was more likely than the wife to report using a method (29% vs. 6% overall).

The overwhelming majority of Kenyan men whose wives said they had been sterilized corroborated that report (86%), but the proportion was somewhat lower among those whose wives reported using the pill (72%), IUD (65%) or injectable (61%). Only about half of men whose wives said they used periodic abstinence (52%) or no method (57%) gave the same account.\* While some men reported using a different method than their wives reported, others said that the couple used no method at all—6% of those whose wives said they were sterilized; 13–16% of those whose wives said they used the pill, IUD or injectable; and 36% of those whose wives reported using periodic abstinence.

By contrast, women were most likely to agree with their husbands' account of the couple's contraceptive use if their husbands reported using no method or the IUD (87% each), sterilization (77%) or the pill (71%); agreement was moderate for those whose husbands said that the couple were protected by an injectable (64%) and lowest for women whose husbands said they used periodic abstinence (10%) or condoms (6%). Roughly three-quarters of women whose husbands reported relying on condoms (73%) or periodic abstinence (79%) said they used no method; the proportion was much smaller for the injectable (32%), pill (21%) and sterilization (16%), and was negligible for the IUD (2%).

Results of bivariate analyses suggested that partners' background characteristics, attitudes toward family planning, spontaneous knowledge of methods and discussions about contraceptive use affected patterns of spouses' reporting. Findings from the multivariate analyses illustrate the independent effects of these factors.

The first multivariate analysis showed that compared with the risk that both partners would report contraceptive use, the risk that only the husband would report using a method was doubled if the husband knew about periodic abstinence (risk ratio, 1.9). This risk was reduced, however, if either the wife alone or both partners reported that the couple discuss family planning (0.1–0.2), if both partners approved of family planning (0.6) or if the wife knew about rhythm, understood the ovulatory cycle or had at least a secondary

education (0.4–0.6). It also was reduced among urban couples (0.5), and it fell by 4% for each year that the husband aged. The odds that the wife alone would report using a method were substantially elevated if another adult was present at her survey interview (3.0). They were greatly reduced if only the husband or if both partners reported having talked about family planning (0.1 for each), and they dropped as the wife's number of living children increased (0.8).

More striking results emerged when the researcher explored factors that influenced the risk that both partners or only the woman reported contraceptive use, rather than the man. Several factors—the couple's joint approval of family planning; the wife's knowledge of periodic abstinence and of the ovulatory cycle, and her having at least a secondary education; and urban residence—roughly doubled the likelihood of both spouses' saying they used a method (1.6–2.4). The greatest increase, however, occurred among couples in which either the wife alone or both partners said they had discussed family planning (8.2 and 5.6, respectively). Furthermore, couples in which the husband knew of periodic abstinence were half as likely to have both spouses report contraceptive use as to have only the man report use (0.5). The likelihood that wives, but not husbands, would report method use was elevated if the wife reported discussing family planning with her husband (3.3) and if she knew of periodic abstinence (4.3); it was reduced if only the husband reported discussing family planning (0.2).

### Zimbabwe

In four-fifths of Zimbabwean couples, both spouses gave the same answer when asked about their contraceptive use: Thirty-three percent were consistent in reporting that no method was being used, and 47% that they were using a contraceptive. In 11% of couples, the man alone said that the couple were using a method, and in 7%, the woman alone gave this response.

Virtually all men whose wives said they were using the pill (91%) corroborated that report; agreement also was high for nonuse of any method (74%). However, only 23% of Zimbabwean men whose wives said they were protected by withdrawal gave the same response. Half (53%) of men whose wives said that the couple used withdrawal reported that they used no method, compared with only 6% of those whose wives said they took

the pill. Zimbabwean women were highly likely to corroborate their husbands' reports of nonuse or pill use (83% for each), but 13% of those married to men who reported pill use said they used no method.

A number of factors had independent effects on the likelihood that a man would report contraceptive use but his wife would not. The risk of this disparity was dramatically reduced if both partners approved of family planning or if the wife had at least a secondary education (risk ratio, 0.2 for each); it declined by 24% for every additional living child the wife reported. For each year that husbands aged, however, the likelihood that only the male partner reported contraceptive use increased by 7%. A couple's joint approval of family planning reduced the odds that only the wife would report method use (0.2), but two other factors substantially elevated this likelihood: the presence of another adult when the wife was interviewed (6.0) and the wife's knowledge of withdrawal (9.6).

The risk that both spouses (rather than the husband alone) would report using a method was sharply elevated if both approved of family planning (4.5) and if the wife had a secondary education or more (5.9); the wife's number of living children had a more moderate but still positive effect (1.2). With each year that husbands aged, the odds that both partners would say they used a contraceptive fell by 10%. One factor significantly affected the likelihood that only wives would report contraceptive use: the wife's knowledge of withdrawal (4.2).

### Conclusion

Summing up his findings, the analyst notes that women's reports of contraceptive use receive greater corroboration from their husbands than men's reports receive from their wives. Furthermore, most of the significant multivariate findings are associated with increased odds that only wives would report contraceptive use or decreased odds that only husbands would do so. As a result, the analyst concludes that women may be making "a conscious effort... to use contraception even if their husbands are not supportive of it," and wives' report of current use "may more correctly reflect the couple's true contraceptive use status."—D. Hollander

### Reference

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\*For both countries, method-specific data are discussed only for methods reported by at least 25 respondents.

## Multiple Gestations Are Associated with Adverse Outcomes for the Mother

Women who are pregnant with more than one child, compared with those expecting one child, are 2–4 times as likely to experience complications of childbirth, according to an analysis of data on 885,338 pregnant women in Latin America and the Caribbean.<sup>1</sup> For example, women who are pregnant with more than one child are three times as likely as women pregnant with one child to have eclampsia or to need a cesarean delivery and are four times as likely to experience preterm labor. Among women who have given birth before, those who are pregnant with more than one child are twice as likely to die as women pregnant with one child. In addition, women who are carrying more than one child and have never given birth before are 2–7 times as likely as those who have given birth before to experience certain adverse maternal outcomes.

To investigate whether women pregnant with more than one child have a higher risk of adverse maternal outcomes than women with singleton gestations, researchers collected data from the Perinatal Information System in Montevideo, Uruguay. Between 1985 and 1997, hospitals entered into the database more than one million perinatal clinical records on pregnancies of women from Argentina, Bahamas, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. The records include demographic information, reproductive history, maternal characteristics and data on prenatal care, labor management, maternal complications and neonatal outcomes. While the records do not include information on the use of assisted reproductive technologies, the multiple gestations that occurred are likely to have occurred naturally because the availability of these technologies was limited in developing countries when the research was conducted.

The researchers excluded 12% of the records in the database from their analysis because information was missing or implausible, leaving a final sample of 885,338 pregnancies. Of these, 15,484 (approximately 2%) were multiple gestations—pregnancies involving more than one fetus. The researchers estimated the relative risks of adverse maternal outcomes associated with multiple gestation and adjusted these estimates for maternal age, number of previous births, education, smoking, height, prepregnancy weight

and body mass index, history of high blood pressure, the trimester in which the mother began prenatal care, the number of prenatal care visits, geographic area, hospital type and year of delivery.

Multiple gestations were more common among women who were older, had given birth before, had a higher body mass index prior to pregnancy and had a family history of multiple gestations. For example, women who were at least 35 years old were more than three times as likely to be pregnant with more than one child than women who were younger than 20, and women who had a family history of multiple gestations were three times as likely as women who did not to have multiple gestations. There was no association between multiple gestations and history of abortion.

After adjusting the data for confounding variables, the researchers found that several adverse outcomes were significantly more common among women with multiple gestations. Women pregnant with more than one child were four times as likely as women pregnant with one child to experience preterm labor, three times as likely to experience eclampsia and cesarean delivery, and twice as likely to experience preeclampsia, anemia, postpartum hemorrhage and postpartum infection.

The researchers also calculated the estimated risk of complications associated with multiple gestations for women who had never given birth before and for women who had previously given birth. Among women having their first birth, those with multiple gestations were seven times as likely as those with singleton gestations to have a preterm delivery, six times as likely to experience eclampsia and three times as likely to have a cesarean delivery. Parous women who were pregnant with more than one child were twice as likely to die and to have a cesarean delivery and were three times as likely to experience preterm labor as parous women pregnant with only one child.

For most of the adverse outcomes in the researchers' analysis, whether a woman had given birth before did not make a difference in the elevated risk associated with multiple gestations. However, for eclampsia, preterm labor and cesarean delivery, the elevated risk associated with multiple gestation was significantly higher for women having their first birth than for those who had given birth at least once.

The researchers note that the accuracy of diagnoses in the database has not been verified and that complications could be underreported. However, because the rates of complications in their study are

similar to those reported in other studies, they believe that this potential limitation is not likely to have affected their findings. They conclude that multiple gestations should be included among risk factors for maternal mortality and that there be programs specifically designed for women carrying multiple gestations. Furthermore, they say that their findings, in addition to the "well-known increased risk of neonatal morbidity and mortality among multiple gestations, should focus attention on indiscriminate use of ovulation-inducing agents and assisted-reproductive technologies that raise the rate of multiple gestations."—*B. Brown*

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### Statement of Ownership, Management and Circulation

Title of publication: International Family Planning Perspectives. Publication no.: 404170. Date of filing: Oct. 1, 2000. Frequency of issue: Quarterly. No. of issues published annually: Four. Annual subscription price: Individuals, \$36.00; Institutions, \$46.00. Complete mailing address of known office of publication: 120 Wall Street, New York, NY 10005. Complete mailing address of the headquarters or general business offices of the publisher: Same as above. Publisher: The Alan Guttmacher Institute, same address as above. Editor: Patricia Donovan, same address as above. Owner: The Alan Guttmacher Institute. Known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages or other securities: None.

The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes have not changed during preceding 12 months.

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