

Characteristics of latrine promotion participants and non-participants; inspection of latrines; and perceptions of household latrines in Northern Ghana

Ann F. Rodgers¹, Lydia A. Ajono², John O. Gyapong³, Maria Hagan⁴ and Paul M. Emerson⁵

¹ Yale University, School of Epidemiology & Public Health, New Haven, CT, USA

² Guinea Worm Eradication Program, Kotoka International Airport, Accra, Ghana

³ Health Research Unit, Accra, Ghana

⁴ Eye Care Unit, Ghana Health Service, Accra, Ghana

⁵ The Carter Center, Atlanta GA, USA

Summary

OBJECTIVES To examine characteristics of household heads in two districts of Northern Ghana who had or had not participated in latrine promotion programmes; to inspect latrines; and to explore perceptions of latrine ownership.

METHODS One hundred and twenty latrine owners and 120 non-owners were randomly selected from all trachoma-endemic villages and interviewed. Structured questionnaires assessed demographics, household data, wealth indicators, and perceptions of latrine ownership. Latrines were inspected.

RESULTS Latrine owners and non-owners were similar demographically, but owners were more likely to report any education or wealth indicators: any education OR = 2.0, (95% CI 1.2–3.4); large family size OR = 4.6 (2.6–8.2); children in school OR = 3.8 (1.3–10.5); and metal roof OR = 9.1 (2.0–40.0). All 120 latrine owners were participating in promotion programmes; no latrines had been self-built without programme support. Inspection showed 73/120 (60.1%) latrines were completed and used. Of the uncompleted latrines 41/47 (87.2%) were more than a year old. Programme participants (regardless of whether they had a completed latrine) had contributed cash (mean \$16.74 S.D.18.09) and 117/120 had provided labour and/or construction materials. The most frequently reported advantages of latrine ownership were convenience, cleanliness and health benefits; reported disadvantages were the need for maintenance and cleaning and bad odour.

CONCLUSIONS Current latrine promotion programmes do not reach all households equally. Joining a latrine programme was expensive and did not guarantee latrine ownership; this may cause people to lose trust in such programmes. Latrines were perceived to be useful, suggesting unmet demand. Reliable and inclusive programmes that provide low cost latrines may receive community support.

keywords community mobilization, Ghana, latrines, *Musca sorbens*, sanitation, trachoma

Introduction

Trachoma, a chronic follicular keratoconjunctivitis caused by ocular infection with *Chlamydia trachomatis*, is the single most important cause of infectious blindness worldwide and is estimated to be responsible for 3.6% of the overall global burden of blindness (Resnikoff *et al.* 2004). Generally, poverty and poor hygienic conditions favour the transmission of ocular *C. trachomatis* where it is spread through several routes such as direct contact during play or when sharing a bed, conveyance on fingers, indirect spread on fomites, eye-seeking flies, and possibly coughing

or sneezing (Emerson *et al.* 2000a; Pruss & Mariotti 2000; Kuper *et al.* 2003; Mabey *et al.* 2003).

The challenge posed by the control of this disease has resulted in the formation of the WHO Alliance for the Global Elimination of Trachoma as a blinding disease by the year 2020 (GET 2020; WHO 1998). In order for GET 2020 to succeed there must be an impact on transmission to lessen the community prevalence of active disease. This requires a community-based preventive approach to both the perception of the disease and its management. The need for treatment is not in doubt, but on its own it may not be successful at achieving long-lasting control if the condi-

tions that favour transmission remain and re-infection from neighbouring districts or countries is possible.

The preventive components of trachoma control programmes generally incorporate elements of improving hygiene, increasing access to potable water, improving access to latrines, avoiding crowding, and reducing the density of flies in the environment (Emerson *et al.* 2006). The presence of flies is an important risk factor for trachoma and it has been shown that eye-seeking flies are vectors of the disease (Emerson *et al.* 2004). Although there are many species of fly in the domestic environment, only the Bazaar fly, *Musca sorbens*, has been proposed as a vector of trachoma (Hafez & Attia 1958; Emerson *et al.* 2000b). This species feeds aggressively on nasal and ocular discharges and moves from person to person and eye to eye, whereas other species are more generalist feeders (Emerson *et al.* 2000b). This behaviour allows it to effectively transfer *Chlamydia* directly between people, and experimental data confirm that *C. trachomatis* can be isolated from these flies (Emerson *et al.* 2000b; Miller *et al.* 2004). The enormous reproductive potential of *M. sorbens* means that it is unlikely that attacking the adult population will have a significant impact on fly density, and so reducing the availability of suitable breeding media may be more effective. The preferred larval medium for *M. sorbens* was found to be human feces, and removing this from the environment through the provision of basic sanitation is likely to greatly decrease the *M. sorbens* population, eye contact and consequently trachoma transmission (Hafez & Attia 1958; Emerson *et al.* 2001).

This paper details an assessment of latrine ownership and participation in latrine promotion programmes in two districts in the Northern Region of Ghana. Currently, active trachoma rates are as high as 67% in some villages and overall latrine access is less than 20% (Ghana Health Service 2005). In response to the threat of trachoma, the Ghana Trachoma Control Programme set a goal to provide 25 000 household latrines in endemic communities by 2009 (Ghana Health Service 2005). This study aims to provide insight of how to increase latrine access for all those at risk.

Materials and methods

Study objectives

There were three objectives to the study: to compare the characteristics of household heads who participated in latrine promotion programmes to those who did not; to conduct a visual inspection of the condition of the latrines built through the latrine promotion programmes; and to

determine the perceived advantages and disadvantages of owning a latrine by those who are latrine owners and those who are not.

Study area and sampling frame

The survey was conducted in 15 villages in the districts of Tolon/Kumbungu and Savelugu in the Northern Region of Ghana (Figure 1). The mean prevalence of WHO trachoma grade TF (trachomatous follicular inflammation) (Thylefors *et al.* 1987) in children in Ghana aged 1–9 years ranges from 4.7% to 16.1% (Ghana Health Service 2005). The sampling frame consisted of 93 trachoma endemic villages, of which 71 were excluded as they had no latrines (0% access). The remaining 22 villages with at least one latrine were listed and 15 selected using a computer generated random number. Selected villages were visited in the order in which they appeared on the list.

Selection of households and respondents

A household was defined as a family unit living within the same compound and sharing a food bowl. Village health volunteers compiled a list of household heads who had built or were building a latrine either as a participant in a promotion programme or on an individual basis. This included completed, partially completed, and abandoned latrine construction. If a village had 12 or fewer latrine owners, each household head who owned a latrine was interviewed in turn. If there were more than 12, the latrine owners were listed and 12 selected at random for interview using computer generated random numbers. An equal number of household heads who did not own a latrine

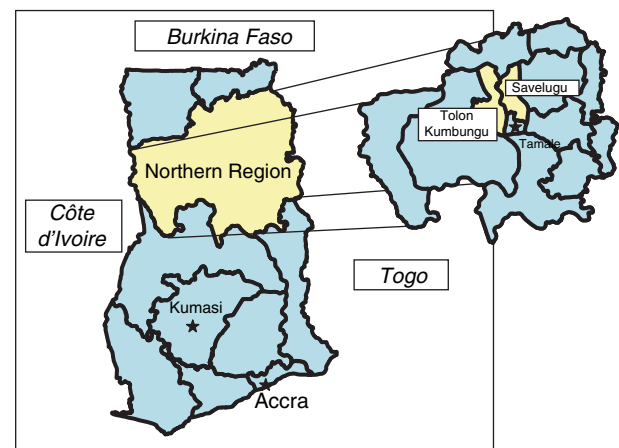


Figure 1 Map of Ghana showing location of Northern Region and Tolon Kumbungu and Savelugu Districts.

were interviewed in each village by taking the nearest non-owning neighbour on the left of each of the selected latrine-owning households.

Grouping of interviewees

Respondents were designated into three groups according to the condition of their latrine and their responses. Owners of 'completed and used latrines' were defined as those who reported that latrine construction was completed and whose latrine had a slab, superstructure, and feces present in it. Owners of 'uncompleted latrines' were defined as those who either reported that construction was abandoned or unfinished, or owners of finished latrines that did not contain feces. 'Non-owners' were categorized as those participants who neither owned a latrine nor were constructing one at the time of the survey.

Questionnaires

The same questions were used on both latrine owner and neighbour questionnaires to collect basic demographic and background information concerning the household head including travel history, highest educational level attained, and wealth. Proxy indicators of wealth were determined prior to collecting data. We used metal roof, larger than mean family size and any child attending school as our proxy wealth indicators. Roofs were either thatch, an inexpensive local material that requires annual replacement, or galvanized corrugated iron sheet which is longer lasting but more expensive. The number of people including children who slept in the compound the previous night determined the household size. A larger household was considered advantageous in that agricultural output is increased by having more people to work the fields, and more wives and children tend to symbolize the household head's capability of supporting a large family. The ability to send children to school also indicates the wealth of the family. School fees and work in the household keeps many of the less wealthy children from attending school.

Attitudes towards latrines were assessed using questions on the advantages and disadvantages of owning a latrine. In addition non-owners were questioned about the disadvantages of *not* owning a latrine.

Latrine characteristics

Latrine condition was assessed by visual inspection and by documenting the construction materials used. How full the latrine was, whether it was at risk of damage from flooding, the presence of a cover and of a vent pipe were recorded. We also asked questions regarding the organ-

ization that helped build the latrine, its age, and how much cash and materials the participant had provided for the construction.

Survey logistics

Questionnaire forms were pre-printed in English. Questionnaires were pretested in one village in Tolon/Kumbungu district and one village in Savelugu district. After field testing, clarifications and additional responses were included and interviewers agreed on a standard translation to Dagbani, the local language. Interviews were conducted in the rainy season of 2005 in Dagbani and took approximately 15 min to complete. Interviews were conducted in the respondent's compound with the household head or the compound decision maker. If another member of the household was the respondent, background information regarding education, occupation, and travel were queried about the household head. For each question the interviewer marked the most appropriate response from the list of pre-coded answers. If an appropriate answer was not pre-coded, the response was written onto the questionnaire. Prompting was used for questions about the materials provided by the owners for latrine construction and the perceived advantages and disadvantages of latrine ownership. The respondent was asked 'anything else' after each response until they gave no more answers. Order of response was not recorded for prompted questions.

Statistical analysis

Data were double-entered into Epi-Data 3.1 by different entry clerks and validated. Analysis was conducted using SPSS 13.0. Summary statistics are presented as frequencies and percentages for each of the categorical variables. Normally distributed continuous variables are presented with the mean and standard deviation. Cross-tabular frequency tables were constructed in order to determine the odds ratios and confidence intervals for background characteristics and latrine ownership status. Means of continuous variables were compared using 2-tailed *t*-tests, significance tests of categorical data were conducted with the chi-square test. ANOVA was used to determine if the proportion of completed latrines provided by different organizations were similar. Denominators vary because of some respondents declining to answer all of the questions.

Ethical approval

Approval for the study was given by the Ghanaian Ethical Review Committee and by the Institutional Review Board of Emory University.

Results

Interviews

We interviewed 120 randomly selected latrine owners and 120 neighbouring non-owners. The latrine owners could be divided into those who had completed and used latrines (73/120) and those whose latrines were either not completed or not used (47/120). The two latrine owner groups and one non-owner group are shown in Figure 2.

Household characteristics of all participants

Characteristics of the 240-households and household heads are presented in Table 1. Virtually all household heads were from the Dagomba ethnic group (99.6%). Most household heads were Muslim (82.5%); 10.4% were

traditionalist and 7.1% Christian. Of those described as having an agricultural occupation, 99.5% were farmers, one was a cattle herder. Of those described as traders or employed, 88.6% were petty traders, 8.6% were artisans, and 2.9% received a monthly salary. There was a minimum of 2 people and a maximum of 50 in a household. 97.1% of household heads were originally from the district they were interviewed in and only 0.8% of the participants originated from elsewhere. About 86.7% household heads had travelled to Tamale (district capital) at least once and 40.4% had ever travelled to the city of Kumasi (approximately 6 h travel time), or to Accra (approximately 10 h travel time). About 23.0% of the household heads had ever lived in a large town for one year or longer. Of these individuals, 48.4% had access to a latrine in the large town.

Comparison of demographic and household characteristics of latrine owners and non-owners

Table 2 presents background characteristics and odds ratios of the 120 latrine owners and 120 non-owners. Only statistically significant odds ratios are shown. There was a significant difference in the highest level of education attained by the household head between latrine owners and non-owners ($P = 0.001$). Compared with non-owners, latrine owners were 3.3 (95% CI 1.7–6.2) times more likely to have attended religious or non-formal education (NFE); twice as likely to report attending any schooling (OR = 2.0, 95% CI 1.2–3.4); 4.6 (95% CI 2.6–8.2) times

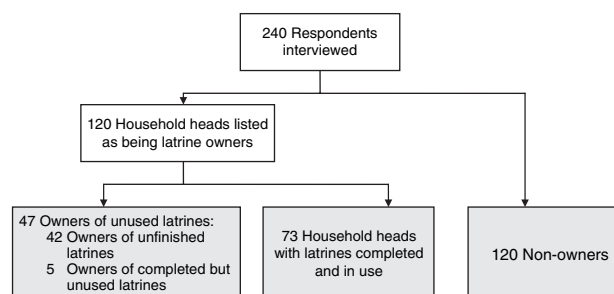


Figure 2 Division of respondents by latrine ownership.

Table 1 Demographic and household characteristics of the study population by interview group*

	All Heads of Households (<i>n</i> = 240)	All Latrine Owners (<i>n</i> = 120)	All Non-owners (<i>n</i> = 120)	Owners of Completed & Used Latrines (<i>n</i> = 73)	Owners of Unfinished or Unused Latrines (<i>n</i> = 47)
Male (%)	226/240 (94.2)	113/120 (94.2)	113/120 (94.2)	68/73 (93.2)	45/47 (95.7)
Age in years, mean (SD)	51.1 (15.2)	52.0 (14.8)	50.1 (15.6)	50.6 (15.3)	54.2 (13.9)
Ever lived in a large town (%)	55/239 (23.0)	27/120 (22.5)	28/119 (23.5)	16/73 (21.9)	11/47 (23.4)
Highest educational level					
Government school (%)	22/240 (9.2)	8/120 (6.7)	14/120 (11.7)	5/73 (6.8)	3/47 (6.4)
Religious or NFE† (%)	56/240 (23.3)	40/120 (33.3)	16/120 (13.3)	25/73 (34.2)	15/47 (31.9)
No formal or non-formal education (%)	162/240 (67.5)	72/120 (60.0)	90/120 (75.0)	43/73 (58.9)	29/47 (61.7)
Occupation					
Agricultural (%)	205/240 (85.4)	100/120 (83.3)	105/120 (87.5)	63/73 (86.3)	37/47 (78.7)
Trading or employed (%)	35/240 (14.6)	20/120 (16.7)	15/120 (12.5)	10/73 (13.7)	10/47 (21.3)
Wealth indicators					
Household size, mean (SD)	14.5 (9.4)	17.9 (10.2)	11.1 (6.9)	18.5 (11.2)	17.0 (8.5)
Any children attend school (%)	217/239 (90.8)	114/119 (95.8)	103/120 (85.8)	70/73 (95.9)	44/46 (95.7)
Roof made from metal sheet (%)	18/240 (7.5)	16/120 (13.3)	2/120 (1.7)	7/73 (9.6)	9/47 (19.1)

*Denominators vary because of missing data.

†Non-formal education.

Table 2 Demographic and household characteristics of latrine owners and non-owners*

	Latrine Owners (<i>n</i> = 120)	Non-owners (<i>n</i> = 120)	OR (95% CI)
Male (%)	113/120 (94.2)	113/120 (94.2)	n.s.
Age in years, mean (SD)	52.0 (14.8)	50.1 (15.6)	n.s.
Ever lived in a large town (%)	27/120 (22.5)	28/119 (23.5)	n.s.
Access to a latrine while living in large town	12/27 (44.4)	17/28 (60.7)	n.s.
Highest educational level			
Government school (%)	8/120 (6.7)	14/120 (11.7)	n.s.
Religious or NFE (%)	40/120 (33.3)	16/120 (13.3)	3.3 (1.7–6.2)
No formal or non-formal education (%)	72/120 (60.0)	90/120 (75.0)	0.50 (0.29–0.83)
Occupation			
Agricultural (%)	100/120 (83.3)	105/120 (87.5)	n.s.
Trading or employed (%)	20/120 (16.7)	15/120 (12.5)	n.s.
Wealth indicators			
Household size, mean (SD)	17.9 (10.2)	11.1 (6.9)	4.6 (2.6–8.2)
Any children attend school (%)	114/119 (95.8)	103/120 (85.8)	3.8 (1.3–10.5)
Roof made from metal roof (%)	16/120 (13.3)	2/120 (1.7)	9.1 (2.0–40.0)

*Denominators vary because of missing data.

more likely live in a household with more than the population average of 14.5 people; 3.8 (95% CI 1.3–10.5) times more likely to have children in school; and 9.1 (95% CI 2.0–40.0) times more likely to have a metal roof.

Comparison of owners of completed and used latrines to owners of unfinished or unused latrines

The background characteristics of the 120 household heads interviewed as latrine owners were examined to determine if there was a significant difference between owners of completed latrines and owners of unfinished latrines. There were no significant differences in the demographic or household characteristics between owners with completed and used latrines compared with those with unfinished or unused latrines.

Latrine characteristics

The findings of the visual inspection of the 120 latrines are shown in Table 3. All latrines were either compartment (35.0%) or made with an improved cement slab (65.0%) and built with the aid of a latrine promotion programme. No latrines made with wood or other local materials. Only 60.8% were completed and used: 67.1% of these had a metal roof, 49.3% used cement plaster for the superstructure, and 24.7% used cement blocks for the superstructure.

The characteristics of the completed and used latrines compared with the unfinished or unused latrines (Table 4) showed no significant differences in age, whether this was the first latrine in the compound, how much cash the participant contributed, or what materials the latrine owner provided. Interestingly, 87.2% of the unfinished

latrines were more than 1-year-old, with 61.7% being 2 to 4 years old. All latrine owners received aid in constructing the latrines from an assisting organization through latrine promotion programmes. The likelihood of the latrine being completed differed between organizations ($P = 0.038$). Of the latrines reported to have been supported by NGO #1, 53.5% were completed and used at the time of the visit, and all 20 unfinished latrines were older than 1 year. NGO #2 had completed 58.1% of the latrines it supported at the time of inspection, and 77.0% of the unfinished latrines were older than 1 year. In contrast, 94.4% of the latrines built by NGO #3 were completed and used, and only 1 (3.4%), built 2 to 4 years ago, was not completed.

The overall mean cash contribution provided by the participants was 150 650 *Cedis* (approximately \$16.74). In addition, 97.5% of latrine owners had provided additional labour or materials.

Perceived advantages and disadvantages of latrine ownership reported by latrine owners and non-owners

All of the latrine owners and 98.3% of the non-owners gave at least one perceived advantage of having a latrine (Table 5). There was no significant difference in the frequency of reporting perceived advantages and disadvantages of latrine ownership between owners and non-owners. 'Convenience', 'cleanliness', and 'health benefits' were the three advantages reported most frequently. Three or more advantages were stated by 62.7% of latrine owners and 57.5% of non-owners.

Household heads were less likely ($P < 0.001$) to report any perceived disadvantages of owning a latrine: 67.8% of latrine owners and 64.2% of non-owners gave at least one

Table 3 Findings of visual inspection of 120 latrines*

	Owners of Completed & Used Latrines (<i>n</i> = 73)	Owners of Unfinished or Unused Latrines (<i>n</i> = 47)
Type of latrine		
Improved cement slab (%)	46/73 (63.0)	32/47 (68.1)
Compartment (single or double) (%)	27/73 (37.0)	15/47 (31.9)
Other (%)	0/73 (0.0)	0/47 (0.0)
Miscellaneous characteristics		
Vent pipe present (%)	72/73 (98.6)	17/42 (40.8)
Pit full to within 1 m of slab (%)	20/73 (27.4)	1/31 (3.2)
Cover present (%)	22/72 (30.6)	11/33 (33.3)
Latrine covered when inspected (%)	19/57 (33.3)	10/30 (33.3)
Materials used for superstructure (excluding roof)		
Mud block (%)	44/73 (60.3)	13/47 (27.7)
Cement block (%)	18/73 (24.7)	5/47 (10.6)
Grass (%)	14/73 (19.2)	7/47 (14.9)
Metal sheet (%)	16/73 (21.9)	1/47 (2.1)
Cement plaster (%)	36/73 (49.3)	5/47 (10.6)
None (%)	0/73 (0.0)	26/47 (55.3)
Material of roof		
Thatch (%)	23/73 (31.5)	9/42 (21.4)
Metal sheet (%)	49/73 (67.1)	8/42 (19.0)
None (%)	1/73 (1.4)	25/42 (59.5)

*Denominators vary because of missing data.

Table 4 Reported experience of latrine construction*

	Owners of Completed & Used Latrines (<i>n</i> = 73)	Owners of Unfinished or Unused Latrines (<i>n</i> = 47)
First latrine in the compound (%)	70/73 (95.9)	41/47 (87.2)
Age of latrine		
< 1 year (%)	7/73 (9.6)	6/47 (12.8)
1–2 years (%)	6/73 (8.2)	12/47 (25.5)
2–4 years (%)	56/73 (76.7)	29/47 (61.7)
5 years + (%)	4/73 (5.5)	0/47 (0.0)
Assisting organization		
NGO #1 (%)	23/73 (31.5)	20/47 (42.6)
NGO #2 (%)	18/73 (24.7)	13/47 (27.7)
NGO #3 (%)	17/73 (23.3)	1/47 (2.1)
District Assembly (%)	5/73 (23.3)	2/47 (2.1)
Don't know (%)	9/73 (12.3)	9/47 (19.1)
Other (%)	1/73 (1.3)	2/47 (4.3)
Mean cash contribution by recipient		
Ghanaian cedis (SD)	160 712¢ (174,776¢)	135 021¢ (142,551¢)
US \$ (SD)	\$17.86 (\$19.42)	\$15.00 (\$15.84)
Resources (in addition to cash) provided by recipient		
Labour (%)	69/73 (94.5)	47/47 (100)
Grass/thatch (%)	14/73 (19.2)	11/47 (23.4)
Sand (%)	27/73 (37.0)	13/47 (27.7)
Wood (%)	6/73 (8.2)	3/47 (6.4)
Other (cement, zinc, hinges, zinc, food) (%)	7/73 (9.6)	5/47 (10.6)

*Denominators vary because of missing data.

Table 5 Perceived advantages and disadvantages of latrine ownership*

	Latrine Owners (<i>n</i> = 118)	Non-latrine Owners (<i>n</i> = 120)
Participant gave at least one advantage (%)	118/118 (100)	118/120 (98.3)
Participant gave 3 or more advantages of owning a latrine (%)	74/118 (62.7)	69/120 (57.5)
Perceived advantages of owning a latrine		
Convenient (%)	97/118 (82.2)	106/120 (88.3)
Clean/hygienic (%)	65/118 (55.1)	63/120 (52.5)
Health benefit (%)	57/118 (48.3)	54/120 (45.0)
Privacy (%)	45/118 (38.1)	48/120 (40.0)
Improves status/good for visitors (%)	35/118 (29.7)	28/120 (23.3)
Does not smell (%)	2/118 (1.7)	0/120 (0.0)
Other (%)	0/118 (0.0)	2/120 (1.7)
Recipient gave at least one disadvantage (%)	80/118 (67.8)	77/120 (64.2)
Participant gave 3 or more disadvantages of owning a latrine (%)	7/118 (5.9)	4/120 (3.3)
Perceived disadvantages of owning a latrine		
Needs maintenance (%)	45/118 (38.1)	43/120 (35.8)
Needs cleaning (%)	37/118 (31.4)	29/120 (24.2)
Bad odour (%)	30/118 (25.4)	30/120 (25.0)
Encourages flies (%)	8/118 (6.8)	8/120 (6.7)
Dangerous (%)	2/118 (1.7)	5/120 (4.2)
Takes up too much space (%)	0/118 (0.0)	0/120 (0.0)
Other (%)	5/118 (4.2)	5/120 (4.2)

*Denominators vary because of missing data.

disadvantage, and 5.9% of latrine owners and 3.3% of non-owners mentioned three or more disadvantages. 'Need for maintenance', 'cleaning', and 'bad odour' were the three disadvantages reported most frequently.

Discussion

In Tolon/Kumbungu and Savelugu districts of Northern Ghana latrine coverage is believed to be less than 20% overall and as low as 4% in the rural areas. The data presented here indicate that latrine access remains stubbornly low despite the efforts of several implementing agencies. There is a need to examine the quality of existing latrine coverage in trachoma endemic regions and to determine how to improve latrine access for all those people who currently have no other option than open defecation.

Of the 120 household heads who were listed by the village health volunteers as having participated in a latrine programme, and being latrine owners, only 73 had a completed and used latrine. This suggests that reported levels of actual latrine ownership are approximately 40% greater than the reality. This would equate to a true latrine coverage of 2% for the rural parts of the districts rather than the 4% reported (if we assume this sample to be representative).

This study found no self-built latrines – all the latrines surveyed had been built through promotion programmes

that used improved technology. The findings demonstrated that those people who had participated in latrine promotion programmes were more likely to have our indicators of wealth than the non-owners. They were more likely to have more people in the household, be sending their children to school, and have a metal roof. Consequently, it appears that the poorest in the communities were less likely to participate in the latrine promotion programmes. Latrine owners were also more likely to have reported ever attending any school. This result is consistent with the ability to read and write and suggests that the latrine owners were more likely to be able to complete an application for a latrine, thus enhancing their probability of successful participation.

Latrine promotion programmes that focus on providing latrines for the richest of the poor have missed the population with the greatest need and may contribute little to reducing the prevalence of trachoma on a large scale. Trachoma is a community disease, not a series of isolated cases; if all members of a community do not have access to a latrine, exposed human feces are still likely to be present to provide a breeding site for eye-seeking flies in the community (Bailey *et al.* 1989, Emerson 2005). Consequently, the community continues to be at risk of trachoma. There is likely to be a threshold for latrine coverage that is associated with a decline in trachoma prevalence, and in the absence of direct evidence, it cannot be assumed that this threshold is not 100%.



Figure 3 A completed ventilated pit latrine with a metal roof and plastered with cement is built to a higher standard than the owner's house made from mud blocks with a grass thatch roof.



Figure 4 An unfinished compartment latrine. Construction had been halted for at least 1 year in 87.2% of all unfinished latrines observed. It is doubtful this latrine will ever be completed and used.

In these two districts all of the latrines found in the villages were built by latrine promotion programmes. Almost half (49.3%) of the walls were made with cement

plaster, and 24.7% were made from cement blocks. Furthermore, 67.1% of the finished latrines had metal roofs. In contrast, only 9.6% of the owners of completed latrines had metal roofs for their own homes and we observed very few (probably less than 20%) cement-plastered houses, although this was not recorded. The latrines appear to have been built to higher standards than the owners' homes (Figure 3). This suggests that high quality latrines are being produced at the expense of providing a large quantity of latrines – which would benefit more people. It has also likely increased the expectations of how a latrine should be built in many villages, and the expectation that it is always up to an outside agency to build latrines, not their own responsibility. The lack of any self-built latrines in the study villages suggests that the villagers do not feel able to construct a latrine of the same high quality as those built with the aid of the latrine promotion programmes. The current latrines are unattainable models that people can only aspire to.

The average cash contribution made by latrine owners was \$16.74 in addition to local materials and labour. According to the World Bank, Ghana's gross national income/per capita in 2002 was \$270, which will include the relatively higher incomes achievable in the towns and cities (World Bank 2002). For many people in rural societies annual income will be well below US\$270; for these people \$16.74 is probably an impossible contribution, and an additional barrier to participation in a latrine promotion programme. Nonetheless, the success of trachoma control and sanitation programmes will rely on improving sustainable access to latrines by providing durable and high quality latrines and training local artisans to build them, whilst not over expending time and money on unnecessary administration and materials. It is imperative that programmes increase latrine access while taking into consideration the realistic ability of potential participants to apply for and make financial contributions to a latrine. Cheaper latrine designs are technically possible.

There were no significant differences in the amount of money or materials contributed by the household heads for the construction of completed and uncompleted latrines to suggest that the owners of incomplete latrines may not have been able to provide all of their contribution. The mean cash contribution by the recipient was \$16.74, regardless of whether the latrine was completed or not. Almost all (118/120) of the household heads had provided materials and/or labour in addition to this large sum of cash. 87.2% of the unfinished latrines were more than a year old, and 61.7% were between two and four years old (Figure 4). Despite the age of the latrine, there was no evidence that the owners of unfinished latrines felt empowered to take the initiative to complete the latrine in the absence of the implementing

A. F. Rodgers *et al.* **Who uses latrines in Ghana**

agency. Two of the organizations in particular completed less than 60% of the latrines they helped to build. Of these, all of the first organization's and 77% of the second organization's latrines were more than a year old. In contrast, a third organization had managed to complete 17/18 (94%) of the latrines it had started. The lack of a significant difference in the background characteristics of the owners of unfinished or unused latrines also suggests that the probability of having a completed latrine has more to do with which organization assisted in the construction than the owner. Considering the large cash, material, and time contributions made by the households, the loss of trust in the organizations' ability to complete their portion of the construction may prove detrimental for future programmes.

The majority of recipients (99.2%) gave at least one advantage of owning a latrine. Both latrine owners and non-owners listed convenience, cleanliness, and health benefits as the three most important advantages. 62.7% of latrine owners and 57.5% of non-owners reported three or more advantages of owning a latrine. Recognizing that there is a complex interaction between demand, cost-to-build, subsidy and sustainability, we cautiously interpret those high frequencies to suggest that there has been good health education, positive experience with latrines and that there is likely to be a high demand for latrine ownership. It also indicates that non-owners' lack of participation in a latrine promotion programme may not be because of the lack of want or understanding of the benefits of a latrine, but because of their inability to provide the high levels of resources and materials demanded by the implementing organizations. If these cautious interpretations are true, a reliable community-based programme that provides latrines for all community members regardless of application-driven demand may be able to contribute to meeting the needs of this population. Such a programme would address the fact that trachoma is a community problem, not a disease of isolated cases. As long as exposed human feces are present in or around a trachoma endemic village, it is likely that all members of the community are at higher risk of trachoma infection. Health education to discourage the presence of exposed feces is not enough. Every person should be given the equal opportunity to own a latrine. Only a community-based programme that offers latrines for *each* household, despite poverty or the inability of households to provide labour, has a chance of significantly reducing the rate of trachoma in each village.

Acknowledgements

The authors wish to thank the District Health Teams and Regional Health Teams that made this study possible; the

Community Water and Sanitation Agency of Northern Region for their helpful discussions, the field staff and data entry team in Tamale and also to all the participants whose generous allocation of time enabled the interviews to take place. Ann Rodgers also wishes to thank the Yale University Council on African Studies for the Lindsay Fellowship for Research in Africa. We acknowledge the input of two anonymous reviewers whose insightful contribution has improved the manuscript.

References

- Bailey R, Osmond C, Mabey DC, Whittle HC & Ward ME (1989) Analysis of the household distribution of trachoma in a Gambian village using a Monte Carlo simulation procedure. *International Journal of Epidemiology* **18**, 944–951.
- Emerson PM, Cairncross S, Bailey RL & Mabey DC (2000a) Review of the evidence base for the 'F' and 'E' components of the SAFE strategy for trachoma control. *Tropical Medicine and International Health* **5**, 515–527.
- Emerson PM, Bailey RL, Mahdi OS, Walraven GE & Lindsay SW (2000b) Transmission ecology of the fly *Musca sorbens*, a putative vector of trachoma. *Transactions of the Royal Society of Tropical Medicine and Hygiene* **94**, 28–32.
- Emerson PM, Bailey RL, Walraven GE & Lindsay SW (2001) Human and other faeces as breeding media of the trachoma vector *Musca sorbens*. *Medical and Veterinary Entomology* **15**, 314–320.
- Emerson PM, Lindsay SW, Alexander N *et al.* (2004) Role of flies and provision of latrines in trachoma control: cluster-randomised controlled trial. *Lancet* **363**, 1093–1098.
- Emerson PM, Simms VM, Makalo P & Bailey RL (2005) Household pit latrines as a potential source of the fly *Musca sorbens* – a one year longitudinal study from The Gambia. *Tropical Medicine and International Health* **10**, 706–709.
- Emerson P, Frost L, Bailey R & Mabey D (2006) *Implementing the SAFE Strategy for Trachoma Control: A Toolbox of Interventions for Promoting Facial Cleanliness and Environmental Improvement*. The Carter Center, Atlanta. Available at: http://www.cartercenter.org/news/publications/health/trachoma_reports.html.
- Ghana Health Service (2005) *Five-Year Strategic Plan for Trachoma Control in Ghana 2005–2009*. Ghana Health Service, Accra.
- Hafez M & Attia MA (1958) Studies on the ecology of *Musca sorbens* Wied. in Egypt. *Bulletin Société Entomologique d'Égypte* **42**, 83–121.
- Kuper H, Solomon AW, Buchan J *et al.* (2003) A critical review of the SAFE strategy for the prevention of blinding trachoma. *Lancet Infectious Diseases* **3**, 372–381.
- Mabey DC, Solomon AW & Foster A (2003) Trachoma. *Lancet* **362**, 223–229.
- Miller K, Pakpour N, Yi E *et al.* (2004) Pesky trachoma suspect finally caught. *British Journal of Ophthalmology* **88**, 750–751.

A. F. Rodgers *et al.* **Who uses latrines in Ghana**

- Pruss A & Mariotti SP (2000) Preventing trachoma through environmental sanitation: a review of the evidence base. *Bulletin of the World Health Organization* 78, 258–266.
- Resnikoff S, Pascolini D, Etya'ale D *et al.* (2004) Global data on visual impairment in the year 2002. *Bulletin of the World Health Organization* 82, 844–851.
- Thylefors B, Dawson CR, Jones BR, West SK & Taylor HR (1987) A simple system for the assessment of trachoma and its complications. *Bulletin of the World Health Organization* 65, 477–483.
- WHO (1998) *World Health Assembly Declaration 51.11*. WHO, Geneva.
- World Bank (2002) *Ghana at a glance*. Available at: <http://info.worldbank.org/etools/docs/library/80905/2nd%20Workshop/pdf/readingspdf/overview/ghana.pdf>, last accessed 2 February 2006.

Corresponding Author Paul Emerson, The Carter Center, One Copenhill, Atlanta, GA 30307, USA. Tel.: +1 404 420 3854; Fax: +1 404 874 5515; E-mail: paul.emerson@emory.edu

Caractéristiques des participants et non participants à la promotion de latrines; inspection des latrines et perceptions pour les latrines familiales dans le nord du Ghana

OBJECTIFS Examiner les caractéristiques des chefs de famille qui ont ou n'ont pas participé aux programmes de promotion de latrines dans deux districts du nord du Ghana, inspecter les latrines et explorer les perceptions pour la possession de latrine.

METHODES 120 propriétaires et 120 non propriétaires de latrines ont été aléatoirement sélectionnés dans tous les villages endémiques pour le trachome et ont été interviewés. Des questionnaires structurés ont permis d'évaluer la démographie, les données sur la famille, les indicateurs de richesse et les perceptions sur la possession de latrine. Les latrines ont été inspectées.

RESULTATS Les propriétaires et les non propriétaires de latrine avaient des caractéristiques semblables démographiquement mais les propriétaires étaient plus à même de rapporter tout indicateur d'éducation ou de richesse: toute éducation confondue OR = 2,0 (IC95%: 1,2–3,4), taille des familles nombreuses OR = 4,6 (2,6–8,2), enfants scolarisés OR = 3,8 (1,3–10,5) et une toiture métallique OR = 91 (2,0–40,0). Tous les 120 propriétaires de latrine avaient participé au programme de promotion, aucune latrine n'avait été construite individuellement sans l'aide du programme. L'inspection a montré que 73/120 (60,1%) des latrines avaient été construites entièrement et utilisées. 41/47 (87,2%) des latrines inachevées avaient plus d'un an. Les participants aux programmes (indépendamment du fait qu'ils aient une latrine achevée ou non) avaient contribué en argent (en moyenne 16,74 \$, écart type: 18,09) et 117/120 avaient fourni la main d'oeuvre et/ou les matériaux de construction. Les avantages les plus souvent rapportés pour la possession de latrine étaient: la convenance, la propreté et les bénéfices sur la santé. Les inconvénients rapportés étaient le besoin d'entretien et de nettoyage et la mauvaise odeur.

CONCLUSIONS Les programmes actuels pour la promotion de latrines n'atteignent pas toutes les familles de façon égale. Joindre un programme de latrine est coûteux et n'assure pas la garantie de la possession de latrine; cela peut faire perdre la confiance des gens dans de tels programmes. Les latrines sont perçues pour être utiles ce qui suggère une demande non satisfaite. Des programmes fiables et intégrés qui fournissent des latrines peu coûteuses recevraient plus de soutien de la part de la communauté.

mots clés Mobilisation de communauté, Ghana, latrines, *Musca sorbens*, hygiène, trachome

Características de los participantes y de los no participantes en la promoción de letrinas; la inspección de letrinas; y las percepciones sobre letrinas en hogares del Norte de Ghana

OBJETIVOS Examinar las características de las cabezas de familia en dos distritos del norte de Ghana que participaban o no en programas de promoción de letrinas; para inspeccionar las letrinas; y para explorar las percepciones sobre la posesión de una letrina.

MÉTODOS Se seleccionó de forma aleatoria y de entre todas las poblaciones endémicas para tracoma, a 120 dueños de letrinas y a 120 personas que no tenían una. Se les entrevistó utilizando cuestionarios estructurados que evaluaban datos demográficos, sobre el hogar, indicadores sanitarios y percepciones sobre el poseer una letrina. También se inspeccionaron las letrinas.

RESULTADOS Los dueños de letrinas y los no-dueños eran similares desde un punto de vista demográfico, pero los dueños tenían más probabilidad de tener algún nivel de educación o indicadores sanitarios: educación OR = 2.0, (95% CI 1.2-3.4); gran tamaño familiar OR = 4.6 (2.6-8.2); niños en el colegio OR = 3.8 (1.3-10.5); y tejado de metal OR = 9.1 (2.0-40.0). Todos los 120 dueños de letrinas participaban en programas de promoción; ninguna de las letrinas había sido construida por sus dueños sin apoyo del programa. La inspección mostró que 73/120 (60.1%) letrinas se completaron y fueron puestas en uso. De aquellas sin terminar 41/47 (87.2%) tenían más de un año. Los participantes del programa (independientemente de si habían terminado la letrina) habían contribuido con dinero (media \$16.74 desviación estándar 18.09) y 117/120 habían aportado trabajo y/o materiales de construcción. Las ventajas más frecuentemente reportadas de poseer una letrina fueron la conveniencia, la limpieza y los beneficios sanitarios; las desventajas reportadas fueron la necesidad de mantenimiento, el tener que limpiar y el mal olor.

CONCLUSIONES Los actuales programas de promoción de letrinas no llegan a todos los hogares de forma equitativa. El unirse a un programa de estos era costoso y no garantizaba el terminar teniendo una letrina; esto podría resultar en una pérdida de confianza de la población a programas de este tipo. Las letrinas eran percibidas como útiles, sugiriendo una demanda no satisfecha. Los programas fiables y completos, que provean letrinas de bajo coste, podrían recibir soporte comunitario.

palabras clave movilización comunitaria, Ghana, letrinas, *Musca sorbens*, servicios sanitarios, tracoma