“The Risk of Asking”

or, more formally,

Being Surveyed Can Change Later Behavior and Related Parameter Estimates

Presented by Clair Null

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Data Collection is an Intervention

- Social interactions are an important determinant of many behaviors
  - "interpersonal communication" is key
- Surveys are a social interaction between respondent & enumerator (whether we want them to be or not)
- Does the data collection process change respondents' later behavior?
  - Possibly even affecting the outcome of interest
- Even if these changes are an identical level shift for treatment and comparison groups, they can still affect conclusions regarding the outcome of interest

Measuring Diarrhea

- Common approach: self-reported
  - Subjective “three or more loose or watery stools”
  - (Bi)weekly visits for many weeks to monitor
    - Motivated in part by concern about recall bias
    - Increases compliance with intervention for efficacy studies
- Potential biases in treatment effect estimates
  - Social desirability bias
  - Courtesy bias
  - Respondent fatigue
  - Question-behavior / mere measurement / self-prophecy
  - Survey effect (surveys → behavior change)
  - Hawthorne effect (observation → behavior change)

Our Research Contribution

- Think of data collection frequency as a “treatment” that can be randomized
  - Compare frequent and infrequent monitoring
    - Only other paper to do this is McCarney et al., 2007 BMC Med. Res. Method. (Ginko biloba & dementia)
- Quantify the bias in measured diarrhea prevalence in biweekly self-reported data
  - Survey/Hawthorne effect is large
  - Changes conclusions about health effects of a water quality improvement project

Evolution of Our Research:

Estimate Health Effects of Spring Protection

First Approach (Economist-style)

- randomize 180 communities into phases of intervention
- random sample of 8 households in each community
- 4 survey visits

  (approximately 6-12 months)

Second Approach (Epidemiologist-style)

- randomize last phase of communities (n=76) into 2 final waves of intervention
- random sample of 2 households in each community drawn from existing sample
- 19 survey visits

  (every 2 weeks)

Data Collection Frequency: Another "Treatment"?

- Randomly selected households for biweekly monitoring from among those who had already been surveyed 4 times (BWM households)
- Diarrhea rates started to fall drastically among this group compared to previous 6-12 month surveys
- Was this because of the surveying?
- Selected another random subset of original households for comparison (extension households); continued to survey them every 6 months

Summary of “Treatments”

- Frequency of data collection
  (BWM versus extension)

Rural Water Project (RWP):

- Spring protection
- Distribution of dilute chlorine for point-of-use water treatment

cross-cut interventions

Summary of RWP “Treatments”

Spring Protection Phase 1 (treatment)	Spring Protection Phase 2 (control)

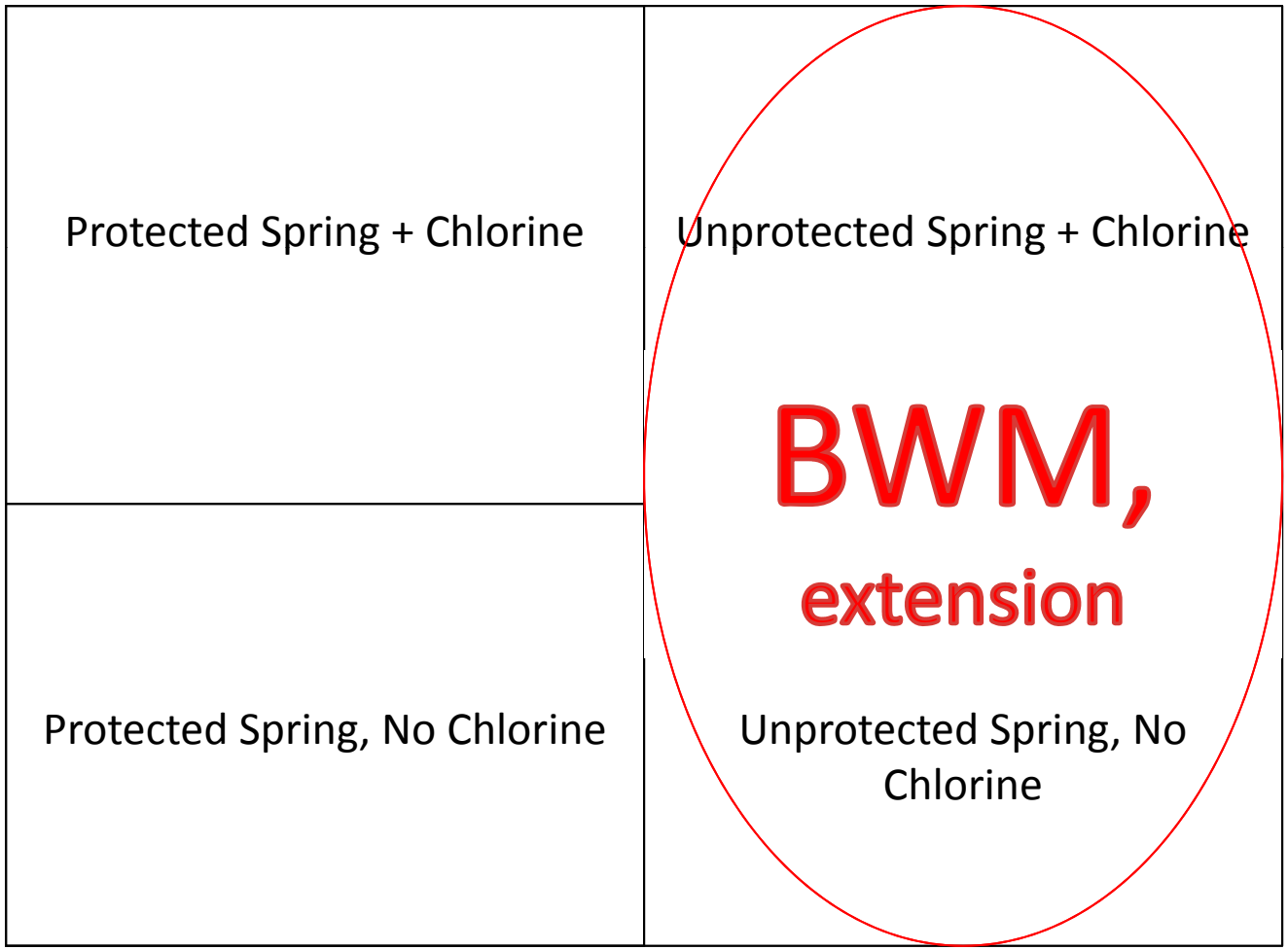
Summary of RWP “Treatments”

Chlorine Distribution (treatment: Households given a 6-month supply of chlorine and an improved water storage container)
Chlorine Distribution (control)

Summary of RWP “Treatments”

Protected Spring + Chlorine	Unprotected Spring + Chlorine
Protected Spring, No Chlorine	Unprotected Spring, No Chlorine

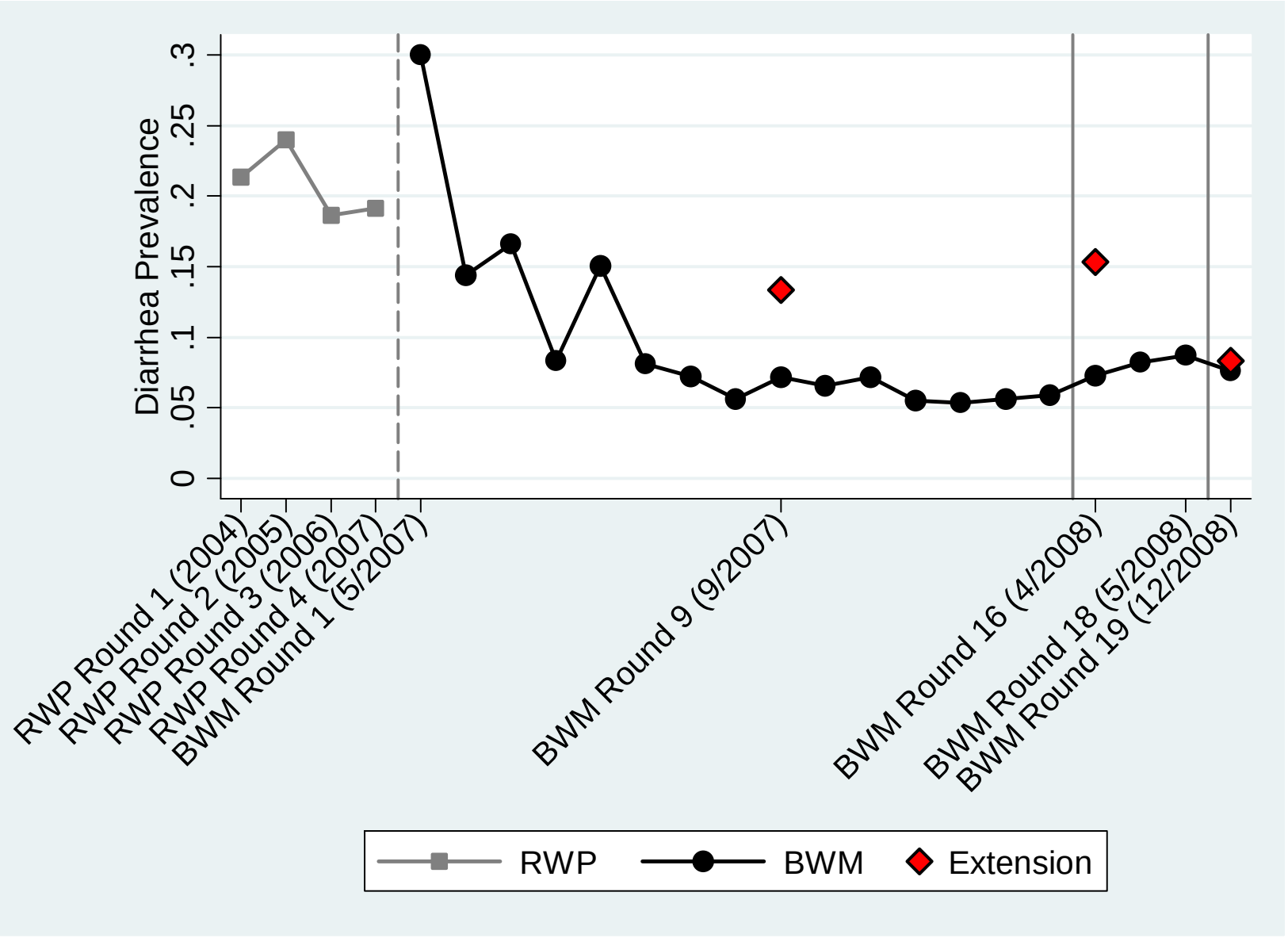
Summary of RWP “Treatments”



BWM & Extension: Samples and Timeline

- Both sub-samples *randomly chosen* from larger sample using same methodology
  - BWM n = 170, extension n = 160
- BWM surveys began in May 2007
  - Springs protected between rounds 5-8
- Extension households surveyed 3 times
  - BWM rounds 9 (9/2007), 16 (4/2008), 19 (12/2008)
- Interruptions
  - Kenyan political crisis (12/2007 – 3/2008)
  - Supplies delayed by customs (6/2008 – 11/2008)

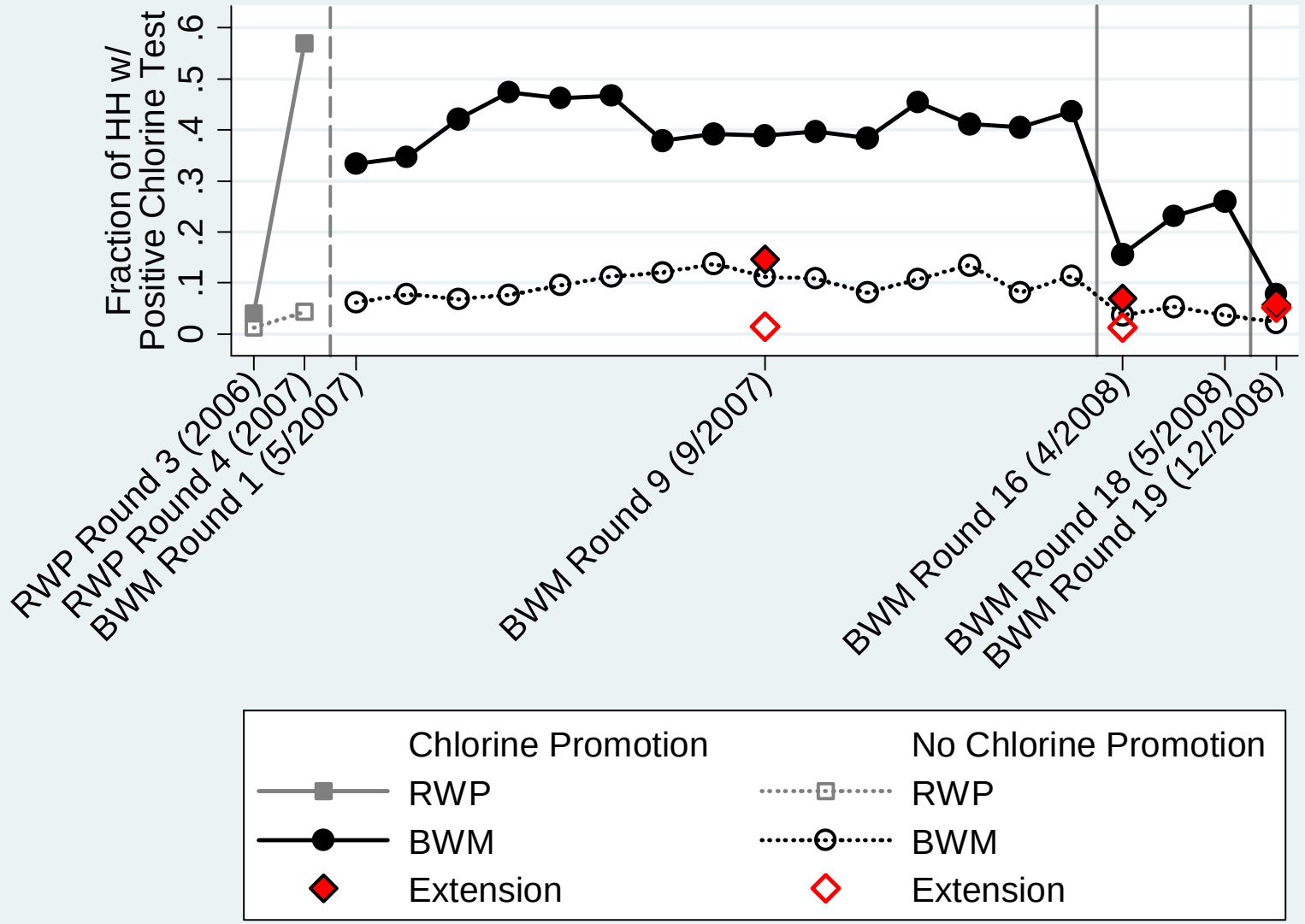
Diarrhea Trends



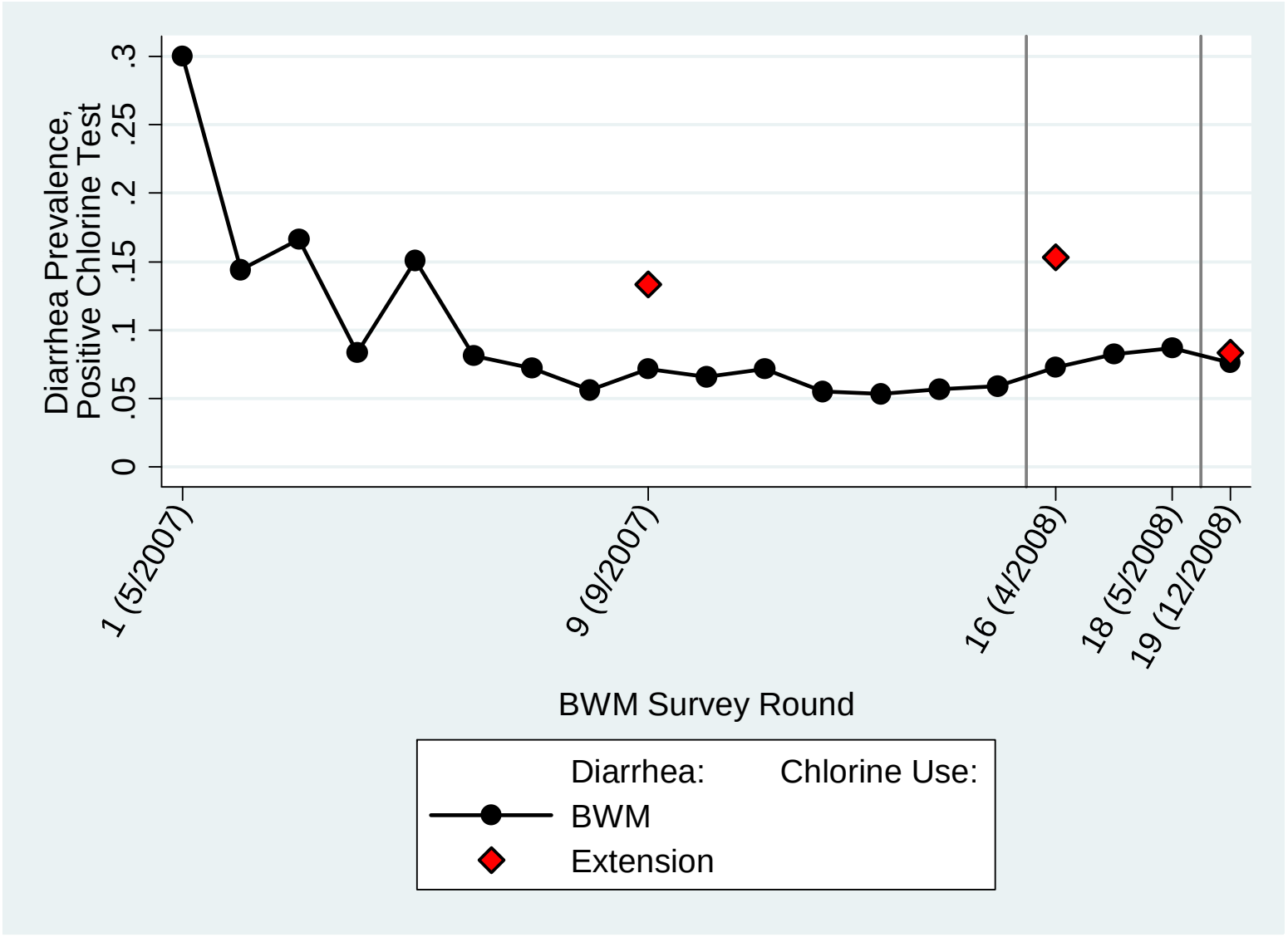
Explaining Falling Diarrhea Prevalence

- Changes in reporting
  - Courtesy bias
    - Subjects aware that NGO that conducted BWM surveys also implemented water quality improvement interventions
  - Survey fatigue
    - Basic survey lasted around 20 minutes; reporting diarrhea symptoms triggered additional survey questions (up to 5 minutes per child) and in some cases a mini-exam (an additional 5 minutes)
- Changes in behavior
  - Prevention (water treatment)
  - Treatment (oral rehydration therapy)
  - Others?

Chlorination Trends



How Much of the Fall in Diarrhea Can Increased Chlorination Explain?



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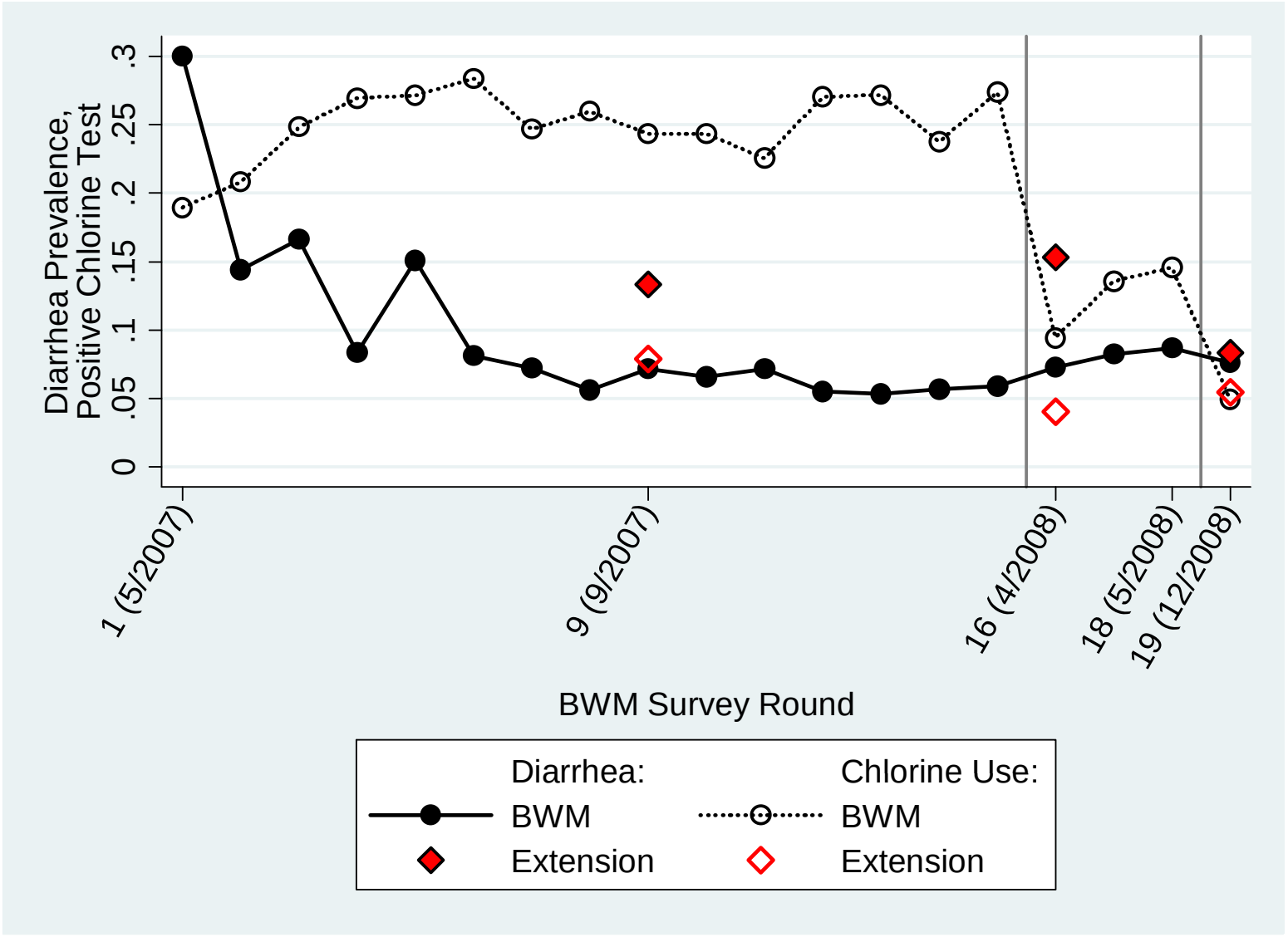

How Much of the Fall in Diarrhea Can Increased Chlorination Explain?

- **If effect of chlorination on diarrhea is the same in this sample as in RWP** (35% reduction, comparable to other health studies of chlorination), accounting for different usage rates, then difference in chlorination between BWM and extension households in round 9 would lead to 12% lower diarrhea among BWM relative to extension

- Since BWM had 50% less diarrhea than extension in round 9, **chlorination alone could explain roughly a quarter of the difference between BWM & extension households**

Comparing Results: Health Effects of Spring Protection by Survey Frequency

Table 1. Impact of more-frequent surveys on chlorine use, diarrhea, and spring protection treatment effect stability in Kenya

Parameter	Child diarrhea (self-report) in the past week—survey round 9 (1)	Child diarrhea (self-report) in the past week—panel data (2)	Chlorine in home drinking water container—survey round 9 (3)	Chlorine in home drinking water container—survey round 16 (4)	Child diarrhea (self-report) in the past week—panel data (5)
Surveyed more frequently	−0.068* (0.022)	−0.149* (0.026)	0.150* (0.050)	0.053† (0.028)	−0.182* (0.033)
Protected spring					−0.104* (0.034)
Surveyed more frequently × Protected spring					0.135* (0.048)
Mean of dependent variable	0.081	0.140	0.164	0.068	0.140
No. of observations	713	4,296	293	309	4,296

Ordinary Least Squares estimates with Huber-White SEs in parentheses, clustered at the spring level. Specifications reported in columns 2 and 5 include child fixed effects, because the data used there are an unbalanced panel.
*Significant at 1%.
†Significant at 10%.

Different conclusions about reduction in diarrhea due to spring protection, depending on frequency of data collection

4 Other Studies

- Marketing firm conducted a baseline among a random subsample of the target population
- Microfinance agency offered everyone a product
  - 2 health insurance products, 2 microloans
- Take-up of the products was collected from administrative data
  - Higher for rates for health insurance if surveyed at baseline; no effect for microlending
  - No effect on price elasticity of demand
- Even a baseline alone affected behavior
  - Draws attention to choices you might not otherwise consider

Conclusions

- High frequency data collection appears to have led to unreliable measures of child diarrhea prevalence
- We found objective evidence that at least one confounding behavior (chlorination) changed as a result of frequent data collection (social interactions)
  - Even much less intensive baseline surveys changed outcomes
- This in turn partially explains why estimates of the health effects of spring protection differ depending on data collection frequency
  - Frequent surveys → chlorination, which could be a substitute for spring protection (both lead to cleaner water)

Hawthorne Effects Change Unobservables

- Chorine use is just one of many behaviors that could have affected the parameter of interest
- But what about all sorts of other behaviors that we didn't / couldn't objectively observe?
- Self-reported outcome variables are problematic, but objective outcomes won't eliminate Hawthorne bias
- Blinding subjects and/or enumerators to the treatment also isn't enough to avoid the problem

Recommendations

- Studies that use frequent data collection should report time trends in the outcomes of interest
- Future studies should randomly assign data collection frequencies so that it is possible to control for survey/Hawthorne effects
  - Large infrequent samples may preferred to high frequency data collection
  - Even baseline surveys might have consequences

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