ONLINE SUPPLEMENT

Questionnaire Design

The questionnaire design process involved the following steps:

(a) Existing literature was reviewed to identify relevant variables to assess;

(b) Authors of previous studies using a relevant questionnaire were contacted (n=37), and those that were obtained (n=16) were assessed for relevance and validity;

(c) Individual questionnaire items were borrowed or modified from the most validated tools available, with the permission of the authors.[1-11]

(d) Parents (n=2) and expert practitioners/researchers in public health and pediatrics (n=4) were consulted to identify any missing themes;

(e) The questionnaire was formatted according to Dillman's Tailored Design Method;[12]

(f) Validation of the questionnaire for content and face validity included review by parents (n=5), epidemiologists (n=2), family medicine physicians (n=2), pediatricians (n=1), public health nurses (n=3), a survey methodologist (n=1), and vaccination program administrators (n=4);

(g) Cognitive interviewing[13] was conducted with two parents to confirm ease of use and face validity, and wording and formatting changes were made as needed;

(h) The questionnaire was pilot tested with parents (n=6), including parents who did and did not immunize their children; and,

(i) Final revisions were completed.

The final questionnaire consisted of 49 questions (some with sub-questions), took approximately 15 to 20 minutes to complete, and was at a grade 6 reading level (Flesch-Kincaid Grade Level Score 6.1[14]). Response formats included Yes/No, 5-point Likert-type scales,[15] and some narrative responses.

Coding of Variables for Analysis

Questionnaire items that were answered on a 5-point Likert-type scale were treated as continuous variables in analysis, unless they exhibited a nonlinear relationship. In such an event, the responses were dichotomized at the natural breakpoint in the data (i.e. when a scatter plot of data points identified a clear point at which the responses of cases and controls differed); in most instances this was also the midpoint in the range of possible values.

Composite scores were created when a previously validated tool was used to measure a construct, (e.g., need for social support),[16] or when correlation matrices and factor analysis suggested that multiple questions were measuring a single construct (e.g., trust in government, positive experience with immunization provider).

All of the knowledge, attitude, and belief (KAB) questions were scored on a 5-point Likert-type scale. A factor analysis was conducted on the 17 KAB items, and two factors were extracted based on the Kaiser eigenvalue > 1 criterion [17]. A Varimax rotation[17] separated two distinct groups of items, each group loading on only one factor. The variable "concern about vaccine safety" was a composite measure derived from responses to the first group of items, consisting of five safety related questions: (a) I am scared of the possible long-term side-effects of vaccines, (b) I am scared of the possible short-term side-effects of vaccines, (c) Vaccines are safe for children, (d) The additives and preservatives in vaccines are safe, and (e) Combining vaccines into one shot is safe (e.g. Measles-Mumps-Rubella). Item responses were reflected (i.e. flipped) as needed to ensure that the valence of all responses was consistent for the composite scale. The range of possible scores for the new variable was 5 to 25, and because the responses exhibited a nonlinear relationship, the variable was dichotomized as Yes/No at the midpoint, which was also the natural breakpoint; No $\leq$12 and Yes >12. Nine other KAB questions from the

second group of items identified in factor analysis created a second composite measure, which measures “lack of belief in disease susceptibility and severity, and vaccine effectiveness”. This composite score was also dichotomized at the natural breakpoint; No ≤ 33 and Yes >33.

“Don’t know” (DK) responses to any questions were either: (a) scored as a “No” when judged that DK reflected absence of the factor or lack of influence of the factor (e.g., “Have you ever had a bad experience with one of your older children when he/she was receiving their vaccinations”); or (b) scored as “Missing” when DK was judged more indicative of indecisiveness (e.g., “I could use more help with daily tasks than I currently receive”).

Missing item responses were excluded for calculation of frequencies, but imputed with the mean for multivariate analysis, to enable inclusion of the subject in the full model. Whenever missing values were imputed for a given variable, a dummy variable was created (Missing value=1; Not missing=0) to test in the model to confirm that the mean was a reasonable imputation.

Non-Response Bias Assessment

Respondents and non-respondents were compared on the variables available in the immunization registry, specifically immunization status and designated local health centre (based on postal code). Although it would have been ideal to conduct more comprehensive follow-up and assessment of non-respondents by telephone,[18] we did not have access to participants’ phone numbers. Non-response bias assessment indicated that a higher proportion of controls (51.7%) in the sample responded to the survey, while only 30.4% of cases responded. It is unclear whether this was due to differential *refusal* on the part of cases, or *undiagnosed non-contacts* (i.e. undeliverable surveys that were not ‘returned to sender’ by the post office). Non-response

assessment based on subjects' designated health centre indicated a higher rate of non-response from some of the lower income neighbourhoods in the region, which may reflect less willingness/ability to respond to the survey due to competing priorities, or a higher rate of non-contact due to a highly mobile lifestyle.[19] The possibility that low response is due to higher rate of undiagnosed non-contact is supported by the fact that some of the lower income neighbourhoods also had a higher proportion of subjects 'returned to sender' by the post office. Unfortunately, without the ability to link non-response to variables of interest in this study (e.g. concern about vaccine safety), it is not possible to determine if real bias is present and thus there are no grounds for post-survey adjustment of the data.

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