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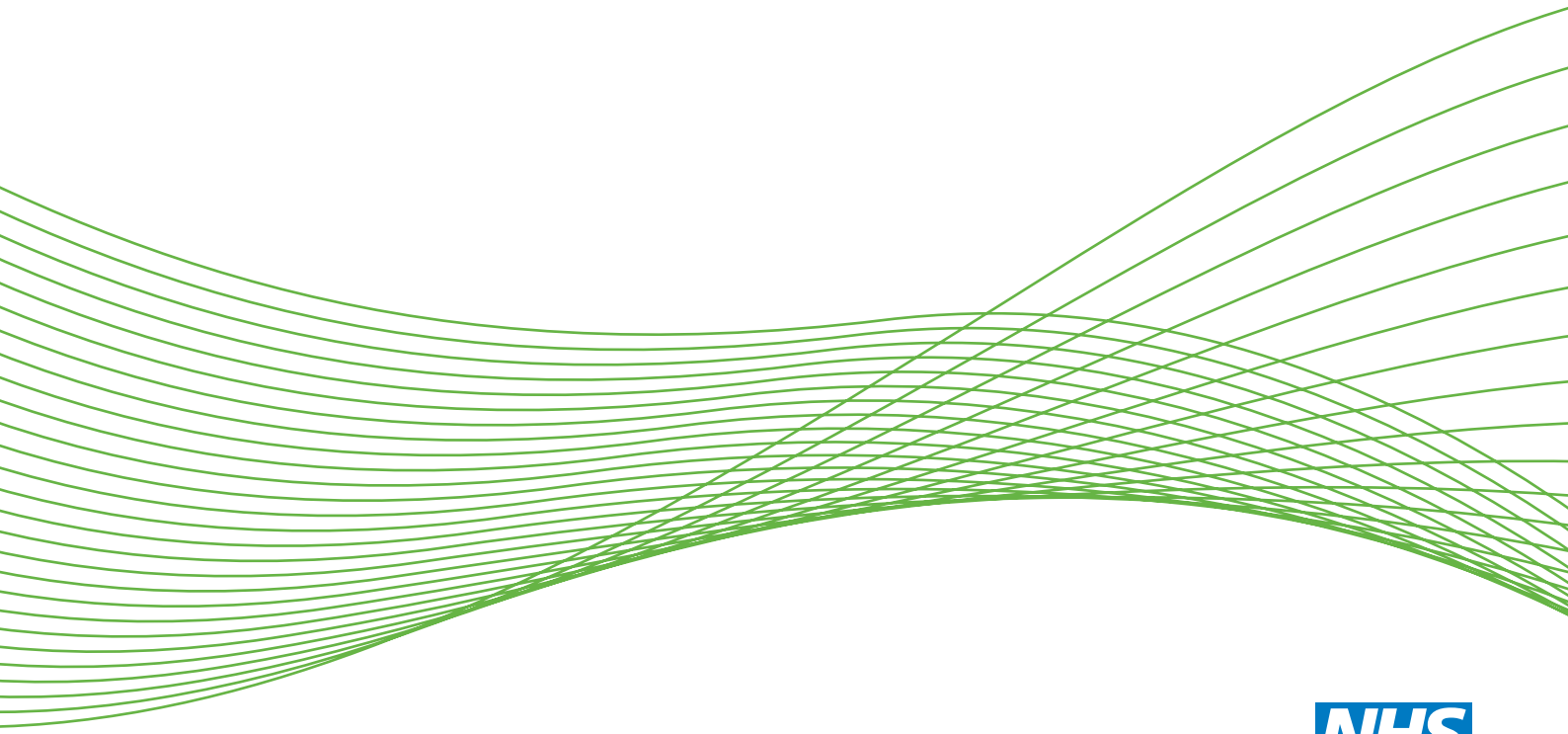

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Abstract

The design of a survey questionnaire to measure perceptions and behaviour during an influenza pandemic: the Flu TElephone Survey Template (FluTEST)

G James Rubin,[1]* Savita Bakhshi,[2] Richard Amlôt,[3] Nicola Fear,[1] Henry WW Potts[4] and Susan Michie[5]

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Background: During the 2009–10 influenza (flu) pandemic, surveys to assess behaviour among the general public were designed quickly and suffered from methodological deficits as a result. To facilitate survey work in a future pandemic we (1) identified variables relating to behaviour, perceptions and presence of symptoms that were of relevance to policy-makers and other public health experts; (2) tested and refined the wording of questions to measure these variables; (3) assessed the reliability of responses to these questions; and (4) tested whether non-response bias due to attrition might prevent the use of a longitudinal design for future pandemic-related surveys.

Objective: To design, test and refine a set of questions to assess perceptions and behaviours in relation to a pandemic flu outbreak.

Method: We identified variables via existing systematic reviews and through consultation with pandemic flu planners from Public Health England, the English Department of Health, their advisory groups and academic colleagues. We adapted questions from existing scales or developed them afresh, and tested their clarity in three rounds of qualitative interviews with members of the public (total $n = 78$). We used a random-digit dial telephone survey of adults from Great Britain ($n = 1080$) to assess the internal reliability of scales. We used a follow-up survey 1–2 weeks later to assess the test–retest reliability of responses and the differences between responders ($n = 621$) and non-responders ($n = 459$).

Results: We identified seven core sets of outcome variables relating to the presence of flu-like illness and to various protective behaviours, as well as a set of likely predictor variables for the behaviours. Qualitative interviews identified multiple issues with our questions, most of which we resolved. Reliability of the items was largely satisfactory. Evidence of non-response bias was found, with non-responders being younger and less well educated than responders, and differing on several flu-related variables.

Conclusions: It would be ill-advised for public health bodies to enter the next pandemic without a plan for how to measure the public's behaviours and perceptions. The extensive set of items that we compiled as part of this work has the benefit of being evidence based, policy relevant and readily understood. Although choosing how to gather data still requires consideration, these items can be used with

confidence as soon as the next pandemic begins. Future work should consider the most appropriate method for conducting surveys using these items.

Study registration: Current Controlled Trials ISRCTN40930724.

Funding: This project was funded by The National Institute for Health Research (NIHR) Health Services and Delivery Research programme and will be published in full in *Health Services and Delivery Research*; Vol. 2, No. 41. See the NIHR Journals Library website for further project information.

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List of abbreviations

IPQ-R	Revised Illness Perceptions Questionnaire	STAI-6	Six-Item State–Trait Anxiety Inventory
NIHR	National Institute for Health Research		

Plain English summary

During the 2009–10 influenza (flu) pandemic, telephone surveys were used to assess how people were reacting to the threat. These often left room for improvement. To improve surveys in a future pandemic we (1) identified what questions should be asked about behaviour, perceptions and flu-like symptoms; (2) checked that these questions were easy to understand; (3) checked whether people gave consistent answers to questions when asked a week apart; and (4) tested whether people who dropped out of a two-stage survey were different to people who did not.

We identified what questions to ask by consulting the scientific literature and talking to experts. After producing a set of possible questions, we checked their wording in 78 interviews with members of the public. We used a telephone survey of 1080 adults from Great Britain, and a follow-up survey 1–2 weeks later, to assess the consistency of answers and the differences between those who did and did not complete the second survey. These surveys used a subset of the questions we generated.

We produced a long list of 208 questions. Our interviews identified multiple issues with these, most of which we resolved. People generally gave consistent answers over time. People who did not respond to our second survey tended to be younger and less well educated than those who did, and differed on several flu-related variables.

Our items cover the key areas that should be measured in the next pandemic and can be used as soon as a pandemic begins.

Scientific summary

Background

During a public health crisis, it is essential for policy-makers and public health experts to understand how members of the public are reacting. Having access to data on issues such as levels of worry among the community, the specific concerns or misperceptions that people have, the number of people who are aware of official recommendations and the number of people who are engaging in specific behaviours allows policy-makers to make evidence-based decisions, including what issues to focus on when communicating with the public and how best to frame their messages. During the 2009–10 influenza (flu) pandemic, surveys to assess behaviour among the general public were designed quickly and suffered from methodological deficits as a result.

Objectives

To facilitate survey work in a future pandemic, we sought to (1) identify variables relating to behaviour, perceptions and presence of symptoms that are of relevance to policy-makers and other public health experts; (2) test and refine the wording of questions to measure these variables; (3) assess the reliability of responses to these questions; and (4) test whether non-response bias due to attrition might prevent the use of a longitudinal design for future pandemic-related surveys.

Method

We identified variables via existing systematic reviews and through consultation with pandemic flu planners from Public Health England, the English Department of Health, their advisory groups and academic colleagues. To measure the selected variables, we adapted questions from existing scales or developed them afresh. Because telephone surveys usually last no longer than 15 minutes, we kept the number of items used for each variable to a minimum, using single items where possible. We tested the clarity of our items in three rounds of qualitative interviews with members of the public (total $n = 78$). We reworded items identified as difficult to understand or answer by two or more participants, and retested them in a subsequent round of interviews. We used a random-digit dial telephone survey of adults from Great Britain ($n = 1080$) to assess the internal reliability of scales. We used a follow-up survey 1–2 weeks later to assess the test–retest reliability of responses and the differences between responders ($n = 621$) and non-responders ($n = 459$). The telephone surveys were conducted between 16 and 30 January 2013. Proportional quota sampling ensured that respondents were demographically representative of the general population, with quotas derived from the most recent Census data and based on age, sex, work status, region and social grade. The design was identical to that used for the national surveys conducted by the Department of Health during the 2009–10 pandemic.

Results

We identified seven core sets of outcome variables relating to the presence of flu-like illness and various protective behaviours, as well as a set of likely predictor variables for the behaviours. In brief, the priority outcomes were (1) preparatory behaviours (e.g. stocking up on over-the-counter medication or making plans); (2) the presence of flu-like symptoms among respondents; (3) the perceived presence of flu among respondents; (4) performance of respiratory, hand hygiene and avoidance behaviours; (5) intended and actual behaviours when ill, relating to health-care use or avoidance of other people; (6) intended and actual vaccine uptake for self and for any children; and (7) intended and actual antiviral use for self and for children.

We generated 208 items relating to these outcomes and potential predictors of them. Qualitative interviews identified multiple minor issues with our questions, most of which we resolved. Reliability of the items was largely satisfactory. Evidence of non-response bias due to attrition was found, with non-responders being younger and less well educated than responders, and differing on several flu-related variables.

Conclusions

It would be ill-advised for public health bodies to enter the next pandemic without a plan for how to measure the public's behaviours and perceptions. The extensive set of items that we compiled as part of this work provides a good starting point for those who will need to make decisions on what data to collect in the next pandemic, and has the benefit of being evidence based, policy relevant and readily understood. Although choosing how to gather data is an area that still requires research, our items can be used with confidence as soon as the next pandemic begins.

The questions produced as a result of this work are freely available for anyone to use or adapt as they see fit, providing that appropriate reference is given to this paper. Within England, the questions will be kept under review and will be proposed for inclusion in any future survey work that is required during a flu pandemic or similar public health crisis. Funding and ethical approval is already in place for our team to assist with the analysis of any such surveys.

Study registration

This trial is registered as ISRCTN40930724.

Funding

The National Institute for Health Research Health Services and Delivery Research programme.

Chapter 1 Background

During a public health crisis, it is essential for policy-makers and public health experts to understand how members of the public are reacting. Having access to data on issues such as levels of worry among the community, the specific concerns or misperceptions that people have, the number of people who are aware of official recommendations and the number of people who are engaging in specific behaviours allows policy-makers to make evidence-based decisions, including what issues to focus on when communicating with the public and how best to frame their messages.[1,2]

Obtaining these data during a crisis can be difficult. The speed with which crises develop and evolve, and the need to obtain data quickly make rapid turnaround telephone- or internet-based surveys the most pragmatic techniques to use.[1,2] Such surveys are now an accepted part of any fully formed public health response to a major crisis.[3–5] Most recently, 39 such surveys were commissioned by the English Department of Health during the 2009–10 influenza H1N1A ('swine flu') pandemic.[6,7] However, the use of such surveys is not straightforward, and experience with the pandemic highlighted four practical challenges that can hamper our ability to draw useful conclusions from them.

First, decisions must be made on exactly what to measure. This is easier said than done. For example, during the pandemic, initial messages to the public from the English Department of Health focused on the importance of washing hands with soap and water as an effective way of preventing the spread of flu. Their surveys, however, contained no questions concerning hand-washing behaviour until 3 months into the pandemic, limiting our ability to assess what impact the messages were having. Similarly, although the surveys included some items that were useful in predicting whether people would or would not engage in a given behaviour, many other variables that are specified by theories in health psychology and that might have proved useful in assessing why people were not taking up the recommended behaviours were not measured.

Second, the speed with which surveys need to be launched during a crisis allows little time for questions to be piloted. Ambiguous or confusingly worded items are sometimes used, leading to problems in the subsequent interpretation of the data.[6,8] Within the Department of Health surveys, for example, emotional response to the pandemic was assessed by a single question: 'How worried, if at all, would you say you are now about the possibility of personally catching swine flu?' This conflated feelings of worry with perceptions about the likelihood of catching flu.

Third, the reliability of survey questions often goes untested. Assessing whether changes in survey responses over time reveal genuine shifts in public sentiment or simply reflect random fluctuations in the data requires us to have tested the stability of responses over time before the crisis begins.

Fourth, the issue of non-response bias can be problematic. Many surveys that track changes over time during a crisis recruit a fresh sample of participants for each wave of data collection. This limits our ability to use the responses given in one wave to predict the responses given in the next. Using a panel design – with the same participants being questioned in each wave – is one way to overcome this. This approach is itself problematic, however. Participants who drop out between survey waves may be systematically different from those who continue to respond, leading to increasing bias in the data.

These problems are not insurmountable but are difficult to address once a crisis has begun. In the specific context of a pandemic, it has been recommended that public health agencies, policy-makers and researchers should develop a plan for future surveys now, rather than wait for the next pandemic to emerge.[5,9] In this paper, we report the results of a study that (1) identified key variables (both outcomes and their main predictors) to assess during a future pandemic; (2) tested and refined a set of questions with which to measure them; (3) assessed the reliability of the questions when used in a nationally representative telephone survey during a normal flu season; and (4) investigated the impact of non-responder bias on responses to a follow-up survey.

Chapter 2 Methods

Identification of key outcome and predictor variables

Outcome variables were selected through discussion with senior representatives from the following groups of end users of the survey data: the pandemic flu team for the English Department of Health; the two official advisory groups for the Department of Health and the UK Health Protection Agency (now part of Public Health England) that deal with the behavioural and communication aspects of pandemic planning; a team from the Health Protection Agency responsible for modelling the spread of a pandemic; and academic colleagues with a particular interest in pandemic flu planning. We also included lay members in this process to include a broader public perspective. A central component of this was identifying the range of behaviours that members of the public might be advised to engage in, or which they might engage in even in the absence of any official recommendation. We also sought to identify what other data would assist these groups in their work in the event of a pandemic.

Predictor variables for the behaviours that were selected were then chosen, based on their theoretical or empirically demonstrated relationship with the behaviour. The main theoretical model we used to guide the selection was Protection Motivation Theory,[10] which proposes that people are more likely to engage in health-protective behaviours if they perceive that a health threat is likely to affect them; the consequences of the threat are severe; the protective behaviours are effective; any costs associated with the protective behaviours are small; and they have high 'self-efficacy' for the behaviour, i.e. if they are confident in their ability to perform the behaviour should they wish. We also used the results of two systematic reviews of factors associated with behaviour change during a pandemic to inform our selection.[11,12]

Testing and refinement of questions

In order to measure each variable we adapted a previously published item or scale where it existed or generated new items where required. Because telephone surveys usually last for no longer than 15 minutes, we kept the number of items used for each scale to a minimum, and we used single items rather than scales where possible.[13] Each item or scale was reviewed by the research team to rectify any obvious problems, such as the use of double-negatives. Where applicable, items were phrased to allow closed responses ('yes/no,' 'true/false' or 'strongly agree/agree/neither agree nor disagree/disagree/strongly disagree') or open-ended responses, which were coded into closed categories by an interviewer.

We tested the 208 items generated in this way for their comprehensibility, face validity and usability in three rounds of interviews ($n = 30$, $n = 20$ and $n = 28$). Participants aged ≥ 18 years and who spoke English were recruited by e-mail from a university database of volunteers drawn from the general population. Demographic characteristics for the participants are given in *Table 1*. We did not attempt to obtain a demographically representative sample for these interviews. Instead, participants were sought who would allow us to test our questions with people from different sections of society.

Consenting participants were read each item, in turn, and asked to provide their answer to it, and explain the reasoning for their answer. Where required, we also asked them to explain what they believed the question was asking and/or to suggest an alternative wording. The interviews were conducted over the telephone to reflect the way that our items would be used in practice during a pandemic. We reworded items identified as difficult to understand or answer by two or more participants, and retested them in a subsequent round of interviews. These interviews, and the surveys that followed, were approved by King's College London's Psychiatry, Nursing and Midwifery Research Ethics Subcommittee (20 July 2012, reference PNM11/12–139).

TABLE 1 Demographic characteristics for participants in the pilot interviews

Variable	Sample characteristics
Sex	Female: 57 (73.1%)
	Male: 21 (26.9%)
Age, years	Median: 30 (range 19–83)
Ethnicity	White British: 45 (57.7%)
	White non-British: 8 (10.3%)
	Black or black British: 7 (9.0%)
	Indian: 4 (5.1%)
	Chinese: 4 (5.1%)
	Mixed: 4 (5.1%)
	Bangladeshi: 2 (2.6%)
	Other ethnicity: 1 (1.3%)
	No response: 3 (3.8%)
Gross household income, £	< 30,000: 37 (47.4%)
	> 30,000: 32 (41.0%)
	No response: 9 (11.5%)
Long-lasting illness of disability or infirmity	No long-lasting illness or disability: 55 (70.5%)
	Presence of long-lasting illness or disability: 19 (24.4%)
	No response: 4 (5.1%)
Employment status	Working ≥ 30 hours per week: 33 (42.3%)
	Working 8–29 hours per week: 19 (24.4%)
	Not working (student): 8 (10.3%)
	Not working (unemployed): 5 (6.4%)
	Not working (retired): 4 (5.1%)
	Not working (other): 4 (5.1%)
	Not working (housewife/husbandhusband): 3 (3.9%)
	No response: 2 (2.5%)
Education	A-level or lower: 19 (24.4%)
	BSc/BA: 31 (39.7%)
	Postgraduate degree: 21 (26.9%)
	Other/still studying: 4 (5.1%)
	No response: 3 (3.8%)
Parental status	Parents of children aged < 17 years: 7 (9.0%)
	Not parents of children aged < 17 years: 70 (89.7%)
	No response: 1 (1.3%)

BA, Bachelor of Arts; BSc, Bachelor of Science.

Reliability of questions

Between 16 and 30 January 2013 (time 1), Ipsos MORI, a UK-based market research organisation, carried out a telephone survey in England, Scotland and Wales, using random-digit dialling of landline telephone numbers. Proportional quota sampling ensured that respondents were demographically representative of the general population, with quotas derived from the most recent Census data and based on age, sex, work status, region and social grade. Respondents were required to be ≥ 16 years and to speak English. Participants were initially asked for consent to take part in a survey on 'issues currently facing the UK' and were informed that the survey related to flu only after initial consent was obtained. Surveying continued until at least 1067 people had been interviewed. This allows any future prevalence estimates made from the survey data to be made with a confidence interval of ± 3%.[14] The design was identical to that used for the national surveys conducted by the Department of Health during the 2009–10 pandemic.[6]

Out of 17,044 calls made by Ipsos MORI which resulted in contact with someone whose demographic quota had not already been filled, 15,684 (92.0%) were to people who declined to participate, 273 (1.6%) were to people who asked the interviewer to call back later but who subsequently failed to keep their appointment, seven (< 0.1%) began their interview but did not complete it and 1080 (6.3%) completed it in full. This rate is usual for this type of survey and similar to the rates achieved in Great Britain for the national pandemic flu telephone surveys.[6] The demographic characteristics of the sample are given in *Table 2*.

TABLE 2 Demographic characteristics of survey participants at time 1 and time 2[a]

Variable	Variable levels	No. (%) at time 1	No. (%) at time 2[b]
Sex	Male	603 (55.8)	356 (57.3)
	Female	477 (44.2)	265 (42.7)
Age, years	18–24	85 (8.2)	39 (6.5)
	25–34	154 (14.8)	79 (13.2)
	35–54	399 (38.3)	233 (38.8)
	55–64	165 (15.9)	107 (17.8)
	> 64	238 (22.9)	142 (23.7)
Working status	Not working	458 (42.5)	276 (44.5)
	Working full or part time	619 (57.5)	344 (55.5)
Household income, £	< 30,000	448 (49.3)	272 (50.1)
	> 30,000	460 (50.7)	271 (49.9)
Highest qualification	None	108 (10.3)	65 (10.7)
	GCSE or equivalent	226 (21.6)	130 (21.3)
	A-level or equivalent	171 (16.4)	91 (14.9)
	Degree or higher	418 (40.0)	246 (40.4)
	Other	121 (11.5)	77 (12.6)
Ethnicity	White	986 (92.2)	575 (93.3)
	Other ethnic background	83 (7.8)	41 (6.7)
Chronic illness	Present	358 (33.6)	216 (35.4)
	Absent	707 (66.4)	395 (64.6)
Children aged ≤ 18 years	Yes	306 (29.8)	171 (28.6)
	No	722 (70.2)	427 (71.4)

A-level, Advanced level; GCSE, General Certificate of Secondary Education.
a Participants who declined to answer have been excluded for the relevant variables.
b Time 2 was between 28 January and 4 February 2013.

Interviews typically lasted 15 minutes. Because of the time limitation, we included only a subset of our questions (101 items: full wording and top-line responses are provided in *Appendix 1*). We excluded questions if they would make sense only in the context of a pandemic (e.g. questions relating to antiviral use, which is not normally recommended in the UK for seasonal flu) or if the basic format of a battery of questions could be checked by asking one or two example questions. As well as answering questions about themselves, parents who had children aged ≤ 17 years living at home with them were also asked a subset of vaccination-related questions about one child, who was selected using the 'most recent birthday' method.[15] To assess the test–retest reliability of the items, Ipsos MORI attempted to recontact all of the participants between 28 January and 4 February (time 2). Those who could be reached were asked to complete an identical set of questions. A total of 621 (57.5%) participants completed the time 2 survey. *Table 2* shows the demographic characteristics of these participants.

We assessed the internal reliability of a six-item scale assessing the severity of flu that we adapted from the Revised Illness Perceptions Questionnaire (IPQ-R)[16] and of a measure of worry about the flu outbreak that we adapted from the six-item state version of the State–Trait Anxiety Inventory (STAI-6)[17] by checking for adequate Cronbach's alphas (between 0.7 and 0.9), item-total correlations and inter-item correlations (between 0.2 and 0.9).[18] Because both scales resulted in skewed data, we dichotomised their scores, based on a median split for the time 1 data.

We assessed the test–retest reliability of data from scales and individual items using kappa coefficients and by assessing the percentage agreement in responses between the two time points. Owing to an administrative error, interviewers randomly selected a child to ask about vaccine-related questions at both times 1 and 2, rather than referring to the same child at both times. For the relevant items, we therefore restricted our analysis of test–retest reliability to those children who were of the same age and gender at each time point ($n = 71$), on the assumption that these were probably the same children. We treated kappa coefficients of 0.21–0.4 as 'fair,' those of 0.41–0.6 as 'moderate' and those of 0.61–0.8 as 'substantial'.[19]

Non-response bias

The survey data were also used to test for non-response bias. We tested this using chi-squared tests to compare participants who responded at time 2 and participants who did not respond at time 2, in terms of their scores at time 1.

Chapter 3 Results

Identification of key outcome and predictor variables

The key outcome and predictor variables that we selected are summarised in *Tables 3* and *4*. These tables also show the original source for the items, where applicable. In brief, the priority outcomes we identified were (1) preparatory behaviours (e.g. stocking up on over-the-counter medication or making plans); (2) the presence of flu-like symptoms among respondents; (3) the perceived presence of flu among respondents; (4) performance of respiratory, hand hygiene and avoidance behaviours; (5) intended and actual behaviours when ill, relating to health-care use or avoidance of other people; (6) intended and actual vaccine uptake for self and for any children; and (7) intended and actual antiviral use for self and for children.

TABLE 3 Summary of generic variables available in the full version of the survey, with example items and sources for the original versions where relevant

Category	Example item	Sources for items
Knowledge of flu symptoms	Can you please tell me what the three most common symptoms of flu are? [open-ended question]	New item
Knowledge about flu	It is likely that I have some natural immunity to the flu that's going round at the moment	New items and adapted from Rubin *et al.* 2010;[6] 2009;[20] 2012[21]
Information sources	Could you tell me what three places you have received most of your information about flu from in the past 7 days? [open ended]	New items
Information sufficiency	I have enough information about what I can do to avoid catching flu	Adapted from Griffin *et al.* 2004[22]
Credibility of information sources	[Source] can be trusted	Adapted from Meyer 1988[23]
Trust in official agencies	In general, I think the Department of Health is acting in the public's best interests in dealing with the current flu outbreak	Adapted from Rubin *et al.* 2009[20]
Perceived flu	As far as you know, have you had flu in the past 7 days?	New item
Flu symptoms	I am now going to read out a list of symptoms. For each one, can you tell me if you have had that symptom in the past 7 days?	List of symptoms based on Brooks-Pollock *et al.* 2011[24]
Anxiety about the flu outbreak (scale)	For each of the following, please tell me whether you've been feeling that way when thinking about the flu that's currently going round, in the past 7 days . . .	Adapted from Marteau and Becker 1992[17]
Perceived likelihood of catching flu	If I don't take any preventive action then I am likely to catch flu in the next 3 months	New items
Fatalism	I have little control over whether I will catch flu	New items
Perceived severity of flu (scale)	Flu would be a serious illness for me	Adapted from Moss-Morris *et al.* 2002[16]

TABLE 4 Summary of behaviour-specific variables available in the full version of the survey, with example items and sources for the original versions where relevant

Category	Example item	Sources for items
Behaviour change (avoidance)	Because of the flu that's going round, in the past 7 days have you . . . cancelled or postponed a social event, such as meeting friends, eating out or going to a sports event?	New items and adapted from Rubin *et al.* 2010;[6] 2009[20]
Hand-washing knowledge	What does the phrase 'thoroughly washing your hands' mean to you? [open-ended question]	New items and adapted from Rubin *et al.* 2010;[6] 2009[20]
Hand-washing behaviour	In the past 24 hours, how many times, if at all, have you washed your hands thoroughly?	Adapted from Rubin *et al.* 2009[20]
Perceived efficacy of behaviours	An effective way to prevent the spread of flu is to . . . avoid touching your eyes, nose or mouth	New items
Self-efficacy for behaviours	Are you confident that, if you wanted to, you could . . . reduce the number of people you meet in the next week?	New items
Subjective norms about behaviours	Most people would expect you to thoroughly and regularly wash your hands	Based on Myers and Goodwin 2011[25]
Preparatory behaviours	I know that I currently have enough over-the-counter medicines, such as painkillers, to keep me going for 7 days, if I catch flu	New items
Help-seeking behaviour	Have you sought help or advice about flu in the past 7 days? Where did you turn to first for help or advice? Can you tell me why you wanted help or advice?	New items
Likely behaviour if ill/actual behaviour when ill	Imagine that tomorrow morning, you develop flu . . . We are interested in what you would probably try to do . . . Contact a pharmacist or chemist by phone	New items
Vaccination intentions and behaviours (for self and child)	Have you had a flu vaccination for this winter?	New items
Perceived efficacy of vaccine	Having the flu vaccine is an effective way of preventing you from catching flu	New item
Perceptions and concerns relating to the vaccine	The flu vaccine has not been tested enough	New items based on perceptions discussed in Rubin *et al.* 2010;[6] 2011;[7] and Bish *et al.* 2011[12]
Antiviral use	Have you been advised to take antivirals such as Tamiflu[a] or Relenza[b] by a health-care professional?	New items
Perceived efficacy of antivirals	Antivirals are an effective treatment for flu	New item
Reasons for not taking or delaying taking antivirals once prescribed	Why did you not finish the course? [open-ended item]	New item

a Tamiflu®, Roche.
b Relenza™, GlaxoSmithKline.

Testing and refinement of questions

In general, participants provided interpretations of our questions that matched our own interpretation, although questions that required them to consider a hypothetical circumstance, such as being prescribed antivirals, provoked more hesitation and uncertainty. All three rounds of interviews highlighted minor issues regarding ambiguity, technical jargon and lack of clarity within items. Most were straightforward to resolve. However, three difficulties were noteworthy. First, problems with wording persisted for items assessing social norms, which asked participants to state what 'people who are important to you' thought the participant should do. At the end of the third round of interviews, some participants still felt that these were convoluted and difficult to answer. Second, some participants were uncomfortable giving 'true' or 'false' answers to statements that were intended to assess knowledge or perceptions. This was resolved by changing the response options to 'probably true,' 'not sure' or 'probably false.' Third, it appeared that the five-point 'strongly agree' to 'strongly disagree' scale might pose challenges in a telephone interview. Participants often asked us to remind them of the options or hesitated when we asked them to clarify whether their agreement or disagreement was 'strong' or not. This was resolved by using the same three-point 'probably true' to 'probably false' scale. A complete list of all questions produced following our pilot testing is given in *Appendix 2*.

Reliability of questions

Removal of two items from the severity scale adapted from the IPQ-R ('if I catch flu, it will cause difficulties for people who are important to me' and 'if I catch flu, it will have serious financial consequences for me') brought the Cronbach's alpha (0.73), inter-item correlations (0.30–0.50) and item-total correlations (0.42–0.57) to acceptable levels. The four-item scale was used in further analyses. The adapted STAI-6 showed acceptable Cronbach's alpha (0.75) although one item, 'content,' showed poor inter-item correlations with the items 'tense' (0.15) and 'worried' (0.11). Deleting this item to produce a five-point scale that retained acceptable Cronbach's alpha (0.72), inter-item correlations (0.21–0.58) and item-total correlations (0.45–0.53). The five-point scale was therefore used for all further analyses.

Test–retest reliability was fair for 33 variables, moderate for 36 variables and substantial for 12 variables (see *Appendix 3*). Two variables, relating to the perceived ability of someone to thoroughly and regularly wash hands if they wanted to (kappa coefficient = 0.16) and believing that flu is spread via coughs and sneezes (0.06), had low kappa coefficients. Both displayed ceiling effects, with > 95% of participants reporting high self-efficacy or believing the statement to be true, and both showed high agreement between the two time points (93% and 97%). The kappa coefficient, as a measure of chance-corrected agreement, is not useful in these circumstances.

Non-response bias

For the large majority of items, there was no difference in terms of responses to questions at time 1 between those who did and those who did not go on to respond at time 2.

Table 5 shows the difference between responders and non-responders in terms of demographic variables. The only significant effects were that responders tended to be older and better educated than non-responders.

TABLE 5 Demographic characteristics [*n* (%)] for responders and non-responders at time 2

Variable	Variable levels	Responders	Non-responders	Difference
Sex	Male	265 (42.7)	212 (46.2)	$\chi^2 = 1.32$, $p = 0.25$
	Female	356 (57.3)	247 (53.8)	
Age, years	18–24	39 (6.5)	46 (10.4)	$\chi^2 = 11.35$, $p = 0.02$
	25–34	79 (13.2)	75 (17.0)	
	35–54	233 (38.8)	166 (37.6)	
	55–64	107 (17.8)	58 (13.2)	
	> 64	142 (23.7)	96 (21.8)	
Working status	Not working	276 (44.5)	182 (39.8)	$\chi^2 = 2.40$, $p = 0.12$
	Working full or part time	344 (55.5)	275 (60.2)	
Household income, £	< 30,000	272 (50.1)	176 (48.2)	$\chi^2 = 0.31$, $p = 0.58$
	> 30,000	271 (49.9)	189 (51.8)	
Highest qualification	None	65 (10.5)	43 (9.4)	$\chi^2 = 12.38$, $p = 0.03$
	GCSE or equivalent	130 (20.9)	96 (20.9)	
	A-level or equivalent	91 (14.7)	80 (17.4)	
	Degree or higher	246 (39.6)	172 (37.5)	
	Other	77 (12.4)	44 (9.6)	
Ethnicity	White	575 (93.3)	411 (90.7)	$\chi^2 = 2.49$, $p = 0.11$
	Other ethnic background	41 (6.7)	42 (9.3)	
Chronic illness	Present	216 (35.4)	142 (31.3)	$\chi^2 = 1.94$, $p = 0.16$
	Absent	395 (64.6)	312 (68.7)	
Children aged < 18 years	Yes	171 (28.6)	135 (31.4)	$\chi^2 = 0.94$, $p = 0.33$
	No	427 (71.4)	295 (68.6)	

Appendix 3 shows the difference between responders and non-responders in terms of non-demographic variables. The pattern of significant differences generally suggested that non-responders may have felt more vulnerable to flu than responders. More specifically, non-responders were more likely to report that they had recently had flu; believe that other people expected them to cough and sneeze into tissues; believe that catching flu would have financial consequence for them; believe that antibiotics are an effective treatment for flu; intend to be vaccinated; be willing to pay to be vaccinated; feel they had insufficient information about the vaccine; feel confused about the vaccine; and have high anxiety concerning flu. Non-responders were also less likely to believe that catching flu would cause difficulties for their friends or loved ones and to take over-the-counter remedies if they caught flu.

Chapter 4 Discussion

During a crisis, communication between health experts and the public needs to be a two-way process,[26] yet mechanisms for obtaining feedback from the public are often designed at speed once a crisis has begun. This allows little time for deciding what information to collect, how to phrase questions or how to collect the data. In the heat of the moment, mistakes can be made. In this study, we undertook much of the groundwork needed to allow researchers and policy-makers to avoid common pitfalls and to obtain useful feedback from the public during the next flu pandemic. Specifically, we identified the variables that are most important to measure; generated questions with which to measure them; demonstrated that these questions are readily understood by members of the public and produce answers that are reasonably stable over time; and showed that it is possible to use a panel approach to data collection, albeit with caveats.

The outcome variables we selected were based on the requirements of several groups of stakeholders, including policy-makers, communication experts and infectious disease modellers. The result was a long list of issues that reflected their interests, including preparatory behaviours that people might be asked to undertake prior to a pandemic, respiratory and hand hygiene behaviours, behaviours relating to help-seeking when symptomatic, and behaviours relating to pharmaceutical and vaccine interventions. The list of potential predictor variables and other more generic variables that might be of assistance was similarly lengthy. Neither list is complete, however, and, before any future survey is launched, decisions on what variables to prioritise will still need to be made. Despite this, our list provides a good starting point for those who will need to make these decisions, being both evidence based and policy relevant.

The pilot interviews that we conducted improved the quality of our questions. They also demonstrated the importance of this step. Even though we had time to consult the literature, engage with stakeholders and discuss item wording among our team, each of the three rounds of interviews we conducted revealed ambiguities in our questions that we had not considered. This was not restricted to minor issues of item wording. Perhaps most notable was the confusion among participants as to the use of the 'strongly agree/agree/neither agree nor disagree/disagree/strongly disagree' response options. This was troubling, as these options are widely used in many other questionnaires.[18] We believe the issue may have reflected our attempt to use the scale over the telephone.[27] Had we used a written questionnaire, the visual presence of the items may have been sufficient to remind participants about the range of responses available to them. Future telephone surveys using the 'strongly agree to strongly disagree' scale should consider asking participants to write down the options before proceeding or collapsing responses into 'agree/neither/disagree' for the analysis.

The scale properties and test–retest reliabilities for our items were adequate, suggesting that each of the scales measured a single underlying concept as intended, and that substantial changes in results over time in item or scale scores are likely to reflect genuine shifts in public behaviours or opinions, rather than chance fluctuations in the data.

In terms of survey design, our data suggest that although a panel design is possible for pandemic flu-related surveys, care needs to be taken in its design and interpretation. Without incentives, participant attrition, even over the course of 1–2 weeks, is likely to be high. To maintain a sufficient sample size, recruitment of new responders would be required. Complicating this, our analysis of non-response bias suggested that those who drop out between survey waves are likely to be younger and less well educated, and differ from responders with respect to several flu-related variables. A design involving recruitment of a fresh sample of respondents at each survey wave, together with subsequent follow-up, may be required to allow prospective data to be collected while minimising the effects of bias due to attrition.

Future use of the survey template

The questions listed in *Appendix 2* are freely available for anyone to use or adapt as they see fit, providing that appropriate reference is given to this paper. Within England, the questions will be kept under review and will be proposed for inclusion in any future survey work that is required during a flu pandemic or similar public health crisis. Funding and ethical approval is already in place for our team to assist with the analysis of any such surveys. The protocol for this future work, and for the current study, is given in *Appendix 4*. The questions are not specific to Great Britain and colleagues from other countries may wish to consider whether or not the items in *Appendix 2* are applicable to their own needs and contexts. Use of identical items across countries would be of value in building an evidence base systematically and efficiently during the next pandemic. Further work on identifying a minimum data set that could be collected internationally would be worthwhile.

We do not recommend that future users attempt to adopt the items wholesale or uncritically, however. Most obviously, there are too many items for this to be feasible and priorities will need to be made. These are likely to change, depending on the needs of the survey end user and also on the stage of the pandemic. We also plan to conduct factor analysis with some of our data set to explore options for further reducing the number of items used. Future users should also be aware that the questions reflect current recommendations and needs. When these change, the questions will need to be adapted. For example, we used current official definitions to help develop some items, such as what flu-like symptoms to record[24] and how to describe appropriate hand-washing.[28]

Limitations

Five limitations should be considered regarding this work. First, our use of a database of research volunteers for our pilot interviews may have made our sample unrepresentative. In particular, it is possible that members of the database were familiar with research jargon and procedures owing to their participation in previous studies, making them less inclined to detect or comment on unusual wording in our questions.

Second, our items relating to social norms remained difficult for some participants to understand. The confusion appeared to relate to being asked to anticipate what someone else might think or feel about one's behaviours. Additional work on these items is required.

Third, although generally acceptable, the test–retest reliability scores for some items suggested room for improvement. Some caution is required in interpreting our statistical measures of test–retest reliability. Participation in the initial survey and knowing that the interviewer would be calling back may have prompted some participants to read about flu-related issues between the two time points, artificially lowering the apparent reliability of their responses. Indeed, participating in the time 1 survey may itself have been sufficient to alter how people thought about flu, with other questions or interviewer prompts changing the way participants perceived certain issues. Nonetheless, our use of single-item measures almost certainly contributed to genuine low reliability in many cases. Although adding more items and producing scales for each variable might be one option to improve reliability, this would be at the expense of reducing the number of variables that could be measured in any given survey. We therefore chose to accept suboptimal reliability for some variables as an acceptable trade-off for increased information per survey.

Fourth, our items are based on self-report. Responses may be affected by recall or social desirability biases. Although this is less of an issue for some variables (e.g. recall for having had a flu vaccination) it may be more problematic for others (e.g. reports of how many times the participant has washed their hands). As ever with survey data, caution should be exercised when interpreting some of the results. Future work should explore how to improve the validity of self-report items in this context, for example by linking behaviours to a concrete activity or point in time to help make them easier to recall (e.g. washing your hands before your last meal).

Fifth, our measure of non-response bias relates to the effects of non-response only among people who had already elected to take part in the survey at time 1. Whether or not that sample is representative of the general adult population of Great Britain is a separate matter. The choice of a random-digit dial proportional quota sample for this study was primarily driven by our desire to replicate the official surveys used within Great Britain during the 2009–10 pandemic. These strategies inevitably give rise to questions concerning their low response rates, although it should be noted that such surveys can still perform well when compared with other, more traditional, epidemiological techniques.[29] Despite this, given the current decline in landline telephone use and the drive to explore alternative survey methods, a telephone survey using quota sampling may not be appropriate during a future pandemic.[30] The decision as to how to deploy the questions described in this paper is an issue that requires consideration in its own right.

Chapter 5 Conclusions

Understanding how the public are reacting during a public health crisis is an important challenge for public health experts and policy-makers. Preparing to obtain these data should not be left until a crisis is already under way. The work described in this paper has resulted in an evidence-based, policy-relevant set of items that can be used with confidence in a telephone survey during the next pandemic or related public health incident. Although it is impossible to predict exactly what data will be required in these circumstances, the questions can also be readily adapted to suit the needs of researchers or policy-makers as an outbreak evolves.

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Contribution of authors

G James Rubin (Senior Lecturer in the Psychology of Emerging Health Risks) and **Susan Michie** (Professor of Health Psychology) had the original idea for the study following discussion with policy and public health colleagues in Europe and the UK, and developed the study design with **Richard Amlôt** (Scientific Programme Leader in Behavioural Science), **Nicola Fear** (Reader in Epidemiology) and **Henry WW Potts** (Senior Lecturer, Statistics).

Savita Bakhshi (Post-Doctoral Research Worker, Psychology) conducted the interviews to test question wording and carried out the statistical analyses with James Rubin.

G James Rubin and **Savita Bakhshi** co-wrote sections for the first draft of the manuscript.

All authors contributed to further drafts and had full access to all of the data.

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Appendix 1 Top-line survey results

The survey comprised two waves. An identical questionnaire was used for both waves. 15 minute CATI telephone interview

RDD quota sample representative of the GB population (England, Scotland and Wales) aged 16 and above used for Wave 1. Wave 2 comprised as many as possible participants from Wave 1.

Wave 1: n=1,080; 14th January - 21st January. Wave 2: n=621; 28th January - 4th February

All % are rounded up to the nearest whole number. Percentages may not add up to 100% - this is due to rounding, exclusion of not stated, or multiple response answers. *% indicates a finding more than 0 but less than 0.5%. Data are not weighted

Q1	**For the first two questions, your options to choose from are: probably yes, not sure and probably no.** *SINGLE CODE ONLY*				
		Probably yes	Not sure	Probably no	No opinion
		%	%	%	%
Wave 1 (n=1080)	As far as you know, have you had flu in the past seven days?	5	1	94	*
Wave 2 (n=621)		4	1	95	0
Wave 1 (n=1080)	As far as you know, have you had flu since the start of October?	13	2	84	0
Wave 2 (n=621)		13	2	85	0

Q2	**Can you please tell me what the three most common symptoms of flu are?** *DO NOT READ OUT* *MULTICODE*		
		Wave 1 (n=1080)	Wave 2 (n=621)
		%	%
1	Fever /temperature	62	66
2	Chills / shivering	20	18
3	Headache / migraine	40	39
4	Aches or pains in your muscles / bones / joints	45	60
5	Fatigue / tiredness / low energy	25	21
6	Diarrhoea	1	1
7	Sore throat	16	17
8	Runny or blocked nose / too much phlegm / snot	31	27
9	Sneezing	8	9
10	Loss of appetite	3	2
11	Difficulty sleeping	*	1
12	Coughing (e.g. dry /chesty / itchy / scratchy)	19	18
13	Sinus problems / pain	3	1
14	Nausea / vomiting	8	6
15	Shortness of breath	1	*
16	Stomach ache	1	*

Q3	**Because of the flu that's currently going round, in the past seven days have you…***SINGLE CODE ONLY* *ROTATE ORDER OF STATEMENTS 1-5*			
		Yes	No	Not sure
		%	%	%
Wave 1 (n=1080)	Cleaned or disinfected things you might touch (such as door knobs or hard surfaces), more often than usual	19	80	2
Wave 2 (n=621)		19	81	1
Wave 1 (n=1080)	Used sanitising hand gel to clean your hands, more often than usual	24	75	1
Wave 2 (n=621)		22	77	1
Wave 1 (n=1080)	Reduced the amount you touch your eyes, nose or mouth	14	83	3
Wave 2 (n=621)		23	75	2
Wave 1 (n=1080)	Washed your hands more often than usual	30	69	1
Wave 2 (n=621)		31	68	1
Wave 1 (n=1080)	Tried to avoid people who could have flu	41	57	2
Wave 2 (n=621)		39	58	3
Wave 1 (n=1080)	Usually carried tissues with you when out and about	69	30	1
Wave 2 (n=621)		76	24	0
Wave 1 (n=1080)	Usually used tissues when sneezing or coughing	80	19	1
Wave 2 (n=621)		83	16	1

Wave 1 (n=864)	*If yes to previous question:* Usually put the tissues in the bin after use	87	11	1
Wave 2 (n=515)		92	7	1
Wave 1 (n=1080)	Have you done anything else to avoid catching flu that I haven't already mentioned?	26	73	1
Wave 2 (n=621)		18	81	1
	And what is that? (open ended, please code as one of the options below			
Wave 1 (n=285)	Wrapping up warm	12		
Wave 2 (n=114)		14		
Wave 1 (n=285)	Not going out in bad weather	4		
Wave 2 (n=114)		2		
Wave 1 (n=285)	Having the central heating on	2		
Wave 2 (n=114)		3		
Wave 1 (n=285)	Avoiding people who seem to have flu symptoms	6		
Wave 2 (n=114)		9		
Wave 1 (n=285)	Other	87		
Wave 2 (n=114)		86		

Q4	**You may have heard of advice that people should thoroughly wash their hands to avoid catching and spreading the flu.**		
	What does the phrase 'thoroughly washing your hands' mean to you?	Wave 1 (n=1080)	Wave 2 (n=621)
1	*DO NOT READ OUT* *MULTICODE*	%	%
	Using warm or hot water	*49*	*62*
	Using soap	*67*	*75*
	Washing for a long time (more than 20 seconds)	*17*	*51*
	Washing all parts of the hand (i.e. front, back, between the fingers, nails)	*41*	*30*
	Washing up to the wrists	*9*	*7*
	Drying hands properly with a towel or dryer	*20*	*13*
	Other. Please specify:	*24*	*16*

Q5	**I can tell you that the official definition of "thoroughly washing your hands" is using soap and water, and washing them for at least 20 seconds. But many people nowadays find that they don't always have time to do that.** *SINGLE CODE ONLY*		
		Wave 1 (n=1080)	Wave 2 (n=621)
		Mean score	Mean score
1	In the past 24 hours, how many times, if at all, have you washed your hands thoroughly? *RECORD NUMBER*	8.0	9.1

Q6	**I am now going to read out some statements about flu. For each of the following statements, please tell me whether you think they are: probably true, probably false or if you're not sure.** *SINGLE CODE ONLY*				
	An effective way to prevent the spread of flu is to… *ROTATE ORDER OF STATEMENTS*	Probably true	Not sure	Probably false	No opinion
		%	%	%	%
Wave 1 (n=1080)	Reduce the number of people you meet	65	8	27	1
Wave 2 (n=621)		73	6	21	*
Wave 1 (n=1080)	Clean or disinfect surfaces that you might touch	87	5	8	*
Wave 2 (n=621)		87	5	8	0
Wave 1 (n=1080)	Thoroughly and regularly wash your hands	96	1	3	0
Wave 2 (n=621)		96	2	2	*
Wave 1 (n=1080)	Use sanitising hand gel	80	7	12	*
Wave 2 (n=621)		84	7	9	*
Wave 1 (n=1080)	Cough or sneeze into tissues, instead of your hands	97	1	2	*
Wave 2 (n=621)		97	1	2	*
Wave 1 (n=1080)	Avoid touching your eyes, nose or mouth	77	11	12	1
Wave 2 (n=621)		84	8	7	*
	And are you confident that if you wanted to, you could…				

	ROTATE ORDER OF STATEMENTS				
Wave 1 (n=1080)	Reduce the number of people you meet in the next week	42	8	49	1
Wave 2 (n=621)		47	8	44	0
Wave 1 (n=1080)	Keep things that you might touch clean or disinfected	80	7	13	*
Wave 2 (n=621)		82	6	12	0
Wave 1 (n=1080)	Wash your hands thoroughly and regularly	97	1	2	0
Wave 2 (n=621)		98	1	1	0
Wave 1 (n=1080)	Carry sanitising hand gel with you when out and about	70	5	25	*
Wave 2 (n=621)		75	3	22	*
Wave 1 (n=1080)	Carry tissues with you when out and about	95	1	5	*
Wave 2 (n=621)		95	1	4	0
Wave 1 (n=1080)	Avoid touching your eyes, nose or mouth	67	10	22	*
Wave 2 (n=621)		71	8	21	0

Q7	**The next two questions refer to people who are important to you, such as your family or friends. For each of the following statements, please tell me whether you think it is: probably true, probably false or if you're not sure.** *SINGLE CODE ONLY*				
		Probably true	Not sure	Probably false	No opinion
		%	%	%	%
Wave 1 (n=1080)	People who are important to you think that you should thoroughly and regularly wash your hands	85	8	6	1
Wave 2 (n=621)		89	6	5	1
Wave 1 (n=1080)	People who are important to you think that you should cough or sneeze into tissues instead of your hands	91	4	5	*
Wave 2 (n=621)		94	2	3	0

Q8	**The next two questions are similar, but this time we are talking about what *most people* would expect you to do, regardless of whether or not they are your friends or family.** *SINGLE CODE ONLY*				
		Probably true	Not sure	Probably false	No opinion
		%	%	%	%
Wave 1 (n=1080)	Most people would expect you to thoroughly and regularly wash your hands	82	8	10	*
Wave 2 (n=621)		82	8	9	*
Wave 1 (n=1080)	Most people would expect you to cough or sneeze into tissues instead of your hands	83	5	12	1
Wave 2 (n=621)		84	7	9	*

Q9	**I am now going to read out some general statements about flu. For each of the following statements, please tell me whether you think they are: probably true, probably false or if you're not sure.** *SINGLE CODE ONLY* *ROTATE ORDER OF STATEMENTS*				
		Probably true	Not sure	Probably false	No Opinion
		%	%	%	%
Wave 1 (n=1080)	Flu would be a serious illness for me	54	11	35	*
Wave 2 (n=621)		45	12	43	*
Wave 1 (n=1080)	If I catch flu, it will have major consequences on my life	39	12	49	*
Wave 2 (n=621)		31	12	57	*
Wave 1 (n=1080)	Flu would be a mild illness for me	45	15	39	1
Wave 2 (n=621)		48	17	35	*
Wave 1 (n=1080)	If I catch flu, it will not have much effect on me	24	14	62	1
Wave 2 (n=621)		32	18	50	1
Wave 1 (n=1080)	If I catch flu, it will have serious financial consequences for me	15	6	78	*
Wave 2 (n=621)		16	6	78	*
Wave 1 (n=1080)	If I catch flu, it will cause difficulties for people who are important to me	65	6	29	*
Wave 2 (n=621)		59	5	36	*
Wave 1 (n=1080)	If I don't take any preventive action, then I am likely to catch flu in the next three months	36	22	41	1
Wave 2 (n=621)		30	22	48	*

Wave 1 (n=1080)	I have little control over whether I will catch flu	50	13	37	*
Wave 2 (n=621)		52	9	38	*
Wave 1 (n=1080)	You can catch flu if you eat food that has been contaminated with flu germs	45	28	26	1
Wave 2 (n=621)		50	24	26	*
Wave 1 (n=1080)	You can catch flu if you touch things that have flu germs on them, and then you touch your eyes, nose or mouth	90	6	4	*
Wave 2 (n=621)		92	5	3	0
Wave 1 (n=1080)	You can catch flu if you are coughed or sneezed on by someone who already has flu	95	2	2	*
Wave 2 (n=621)		96	3	1	*
Wave 1 (n=1080)	It is always easy to spot people who might give you flu	18	11	70	1
Wave 2 (n=621)		17	11	71	0
Wave 1 (n=1080)	Antibiotics are an effective treatment for flu	17	16	68	*
Wave 2 (n=621)		16	13	71	*
Wave 1 (n=1080)	I have enough information about what I can do to avoid catching flu	84	6	9	*
Wave 2 (n=621)		87	7	7	0

Q10	**Have you sought help or advice about flu in the past seven days?** *SINGLE CODE ONLY*	Yes	No
		%	%
Wave 1 (n=1080)		4	96
Wave 2 (n=621)		2	98

Q11	IF NOT HAD FLU IN PAST SEVEN DAYS (IE QUESTION ON PAGE 2) Imagine that tomorrow morning, you develop flu. You have a cough, a temperature, your muscles ache and you are feeling tired. We are interested in what you would probably try to do. For each of the following statements, please tell me whether you think they are: probably true, probably false or if you're not sure. *SINGLE CODE ONLY* *ROTATE ORDER OF STATEMENTS 1-8*				
		Probably true	Not sure	Probably false	No opinion
		%	%	%	%
Wave 1 (n=1030)	I would try to stay at home	90	3	7	*
Wave 2 (n=597)		92	2	7	0
Wave 1 (n=1030)	I would try to go to school, college, university or work as normal	19	5	71	6
Wave 2 (n=597)		16	5	77	2
Wave 1 (n=1030)	I would try to avoid meeting people from outside of my household	83	3	14	*
Wave 2 (n=597)		86	4	10	0
Wave 1 (n=1030)	I would take over the counter remedies such as painkillers or cold and flu remedies	87	3	11	*
Wave 2 (n=597)		86	3	11	*
Wave 1 (n=1030)	I would take complementary remedies, such as homeopathy or herbal remedies	20	4	75	0
Wave 2 (n=597)		20	6	74	*

Wave 1 (n=1030)	If it came to it, I know someone who would be willing to collect medicines or food for me while I was ill	93	1	6	0
Wave 2 (n=597)		95	1	4	0
Wave 1 (n=1030)	If it came to it, I know someone who could look after me round the clock at home for seven days	56	5	38	*
Wave 2 (n=597)		60	5	35	*
Wave 1 (n=1030)	I would try to get medical advice or treatment	47	7	47	0
Wave 2 (n=597)		45	10	45	*
	IF YES TO GETTING MEDICAL ADVICE OR TREATMENT (STATEMENT8) And where would you turn to first for medical advice or treatment (code only one of the options below				
Wave 1 (n=479)	GP by phone	47			
Wave 2 (n=267)		49			
Wave 1 (n=479)	GP in person	16			
Wave 2 (n=267)		14			
Wave 1 (n=479)	Doctor or nurse at walk-in centre	4			
Wave 2 (n=267)		3			
Wave 1 (n=479)	Doctor or nurse at hospital	2			
Wave 2 (n=267)		1			

Wave 1 (n=479)	Pharmacist or chemist by phone	4
Wave 2 (n=267)		4
Wave 1 (n=479)	Pharmacist or chemist in person	6
Wave 2 (n=267)		7
Wave 1 (n=479)	A health telephone line (NHS Direct / NHS 24 / NHS Direct Wales / NI Direct)	7
Wave 2 (n=267)		5
Wave 1 (n=479)	An official health website (Dept of Health, NHS Choices, Health Protection Agency)	4
Wave 2 (n=267)		5
Wave 1 (n=479)	A friend or relative who is a healthcare worker	5
Wave 2 (n=267)		4
Wave 1 (n=479)	Other	6
Wave 2 (n=267)		7

Q12	**IF HAS HAD FLU IN PAST SEVEN DAYS (IE QUESTION ON PAGE 2) You said earlier that you think you have had flu in the past seven days. We are interested in what you did while you had flu. For each of the following statements, please tell me whether they are: true, false or if you're not sure.** *SINGLE CODE ONLY* *ROTATE ORDER OF STATEMENTS 1-8*				
		TRUE	Not sure	FALSE	No opinion
		%	%	%	%
Wave 1 (n=50)	I stayed at home	78	0	22	0
Wave 2 (n=24)		62	0	38	0
Wave 1 (n=50)	I tried to go to school, college, university or work as normal	44	2	50	4
Wave 2 (n=24)		42	0	54	4
Wave 1 (n=50)	I tried to avoid meeting people from outside of my household	68	0	32	0
Wave 2 (n=24)		71	0	29	0
Wave 1 (n=50)	I took over the counter remedies such as painkillers or cold and flu remedies	80	2	18	0
Wave 2 (n=24)		100	0	0	0
Wave 1 (n=50)	I took complementary remedies, such as homeopathy or herbal remedies	24	2	74	0
Wave 2 (n=24)		25	0	75	0
Wave 1 (n=50)	If it had come to it, I know someone who would have been willing to collect medicines or food for me while I was ill	92	0	8	0
Wave 2 (n=24)		96	4	0	0

Wave 1 (n=50)	If it had come to it, I know someone who could have looked after me round the clock at home for seven days	58	2	38	2
Wave 2 (n=24)		79	0	21	0
Wave 1 (n=50)	I tried to get medical advice or treatment	44	4	50	2
Wave 2 (n=24)		25	0	75	0
	IF YES TO GETTING MEDICAL ADVICE OR TREATMENT (STATEMENT 8) And where did you turn to first for medical advice or treatment (code only one of the options below				
Wave 1 (n=22)	GP by phone	27			
Wave 2 (n=6)		83			
Wave 1 (n=22)	GP in person	32			
Wave 2 (n=6)		0			
Wave 1 (n=22)	Doctor or nurse at walk-in centre	5			
Wave 2 (n=6)		17			
Wave 1 (n=22)	Doctor or nurse at hospital	5			
Wave 2 (n=6)		0			
Wave 1 (n=22)	Pharmacist or chemist by phone	0			
Wave 2 (n=6)		0			
Wave 1 (n=22)	Pharmacist or chemist in person	14			
Wave 2 (n=6)		0			

Wave 1 (n=22)	A health telephone line (NHS Direct / NHS 24 / NHS Direct Wales / NI Direct)	0
Wave 2 (n=6)		0
Wave 1 (n=22)	An official health website (Dept of Health, NHS Choices, Health Protection Agency)	9
Wave 2 (n=6)		0
Wave 1 (n=22)	A friend or relative who is a healthcare worker	5
Wave 2 (n=6)		0
Wave 1 (n=22)	Other	5
Wave 2 (n=6)		0

Q13	The next questions are all about the flu vaccine. Please answer yes, no or not sure for each one. *SINGLE CODE ONLY*			
		Yes	Not sure	No
		%	%	%
Wave 1 (n=1080)	Have you ever had a flu vaccination, that is before August 2012?	43	3	54
Wave 2 (n=621)		42	2	56
Wave 1 (n=1080)	Have you had a flu vaccination for this winter?	31	1	68
Wave 2 (n=621)		31	*	68
	ROUTING: If yes to this item, go to next page			
Wave 1 (n=740)	Have you been offered a flu vaccination on the NHS for this winter?	19	3	78
Wave 2 (n=427)		22	3	75
Wave 1 (n=740)	As far as you know, are you eligible to have a flu vaccination on the NHS this winter?	29	29	42
Wave 2 (n=427)		30	28	41
Wave 1 (n=740)	Are you thinking about paying to have a flu vaccination outside of the NHS this winter?	5	3	92
Wave 2 (n=427)		2	3	95
Wave 1 (n=740)	Do you intend to have the flu vaccine this winter?	7	6	87
Wave 2 (n=427)		4	4	92

Wave 1 (n=302)	*For those ineligible (no on items 3 and 4)*: Imagine that the NHS changed its rules, and said that you were eligible to have the flu vaccine this winter, for free. Would you have it?	48	11	41
Wave 2 (n=175)		42	14	44

Q14	**I am going to read out some statements that other people have given about the flu vaccine. For each one, please whether you think they are: true, false or if you're not sure.** *SINGLE CODE ONLY* *ROTATE ORDER OF STATEMENTS*				
		TRUE	Not sure	FALSE	No Opinion
		%	%	%	%
Wave 1 (n=1080)	I disagree with vaccinations in general	8	6	85	*
Wave 2 (n=621)		8	5	87	*
Wave 1 (n=1080)	I don't like needles	32	3	64	1
Wave 2 (n=621)		33	2	65	1
Wave 1 (n=1080)	I don't need the vaccine because I am generally healthy	48	7	44	*
Wave 2 (n=621)		46	6	47	*
Wave 1 (n=1080)	I don't need the vaccine because I am not likely to get flu	18	13	69	1
Wave 2 (n=621)		20	12	68	1
Wave 1 (n=1080)	I'm too busy to get the flu vaccine	16	4	80	*
Wave 2 (n=621)		16	2	82	*
Wave 1 (n=1080)	It is difficult to get an appointment to get the flu vaccine	18	17	64	1
Wave 2 (n=621)		14	21	64	1
Wave 1 (n=1080)	A health professional has recommended to me to that I *should* have the vaccine	43	4	53	*
Wave 2 (n=621)		40	3	56	*

Wave 1 (n=1080)	A health professional has recommended that I *shouldn't* have the vaccine	5	4	91	*
Wave 2 (n=621)		4	4	93	*
Wave 1 (n=1080)	I do not know enough about the flu vaccine	35	11	54	1
Wave 2 (n=621)		29	13	59	*
Wave 1 (n=1080)	I am confused by all the information available about the flu vaccine	14	11	74	1
Wave 2 (n=621)		12	8	79	1
Wave 1 (n=1080)	The flu vaccine has not been tested enough	8	35	56	1
Wave 2 (n=621)		8	30	60	2
Wave 1 (n=1080)	The flu vaccine can cause unpleasant short-term side-effects	44	28	27	1
Wave 2 (n=621)		43	29	28	*
Wave 1 (n=1080)	The flu vaccine can cause long-term health problems	6	30	64	*
Wave 2 (n=621)		5	25	69	1
Wave 1 (n=1080)	The vaccine provides protection for only one flu season	75	18	6	*
Wave 2 (n=621)		81	13	6	*
Wave 1 (n=1080)	The flu vaccine would interact with other medications that I am currently taking	11	30	57	1
Wave 2 (n=621)		10	30	59	1

Wave 1 (n=1080)	The vaccination campaign is just about making money for the manufacturers	9	18	73	1
Wave 2 (n=621)		8	17	74	1
Wave 1 (n=1080)	Having the flu vaccine is an effective way of preventing you from catching flu	73	16	11	*
Wave 2 (n=621)		74	15	10	1

ONLY ASK Q15-18 IF Q15-18 WERE ANSWERED IN WAVE 1

Note to interviewer: Only ask to participants with children aged 17 or under living at home with them

We need to select one of your children to talk about. Please tell me the name of the child aged 17 or under who had the most recent birthday? You can give me a fake name for them if you want.

Interviewer should NOT record name, but refer to this child throughout. Referenced as "CHILD" in rest of questionnaire

	Wave 1 (n=315) Mean score	Wave 2 (n=168) Mean score
Q15. Can I ask how old CHILD is? *RECORD AGE IN YEARS*	9.1	9.1
Q16. And just to check, are they a boy or a girl?	%	%
Boy	55	57
Girl	45	43

Q17	**The next questions are all about [CHILD] and the flu vaccine. Please answer yes, no or not sure.** *SINGLE CODE ONLY*			
		Yes	Not sure	No
		%	%	%
Wave 1 (n=315)	Has CHILD had a flu vaccination in previous years, that is, before August 2012?	11	6	83
Wave 2 (n=168)		15	4	81
Wave 1 (n=315)	Has CHILD had a flu vaccination for this winter?	6	3	91
Wave 2 (n=168)		7	4	89
	If yes to this item, go to next box			
Wave 1 (n=295)	Has CHILD been offered a flu vaccination on the NHS for this winter?	3	9	88
Wave 2 (n=156)		1	8	92
Wave 1 (n=295)	As far as you know, is CHILD eligible to have a flu vaccination on the NHS this winter?	11	47	43
Wave 2 (n=156)		8	37	55
Wave 1 (n=295)	Are you thinking about paying to have CHILD vaccinated outside of the NHS this winter?	4	4	92
Wave 2 (n=156)		1	5	94
Wave 1 (n=295)	Do you intend for CHILD to have the flu vaccine this winter?	5	12	83
Wave 2 (n=156)		3	5	92

Wave 1 (n=262)	*For those ineligible (no on all items 3 and 4):* Imagine that the NHS changed its rules, and said that CHILD is eligible to have the flu vaccine this winter, for free. Would you have them vaccinated?	38	27	35
Wave 2 (n143)		36	23	41

Q18	I am going to read out some statements that other people have given about children and the flu vaccine. For each one, please whether you think they are: true, false or if you're not sure. *SINGLE CODE ONLY* *ROTATE ORDER OF STATEMENTS*				
		TRUE	Not sure	FALSE	No Opinion
		%	%	%	%
Wave 1 (n=315)	CHILD doesn't like needles	57	9	34	0
Wave 2 (n=168)		62	4	34	1
Wave 1 (n=315)	CHILD doesn't need the vaccine because they are generally healthy	59	13	28	*
Wave 2 (n=168)		60	12	28	0
Wave 1 (n=315)	CHILD doesn't need the vaccine because they are not likely to get flu	17	17	66	*
Wave 2 (n=168)		20	20	60	1
Wave 1 (n=315)	I'm too busy to get CHILD vaccinated	4	3	93	*
Wave 2 (n=168)		7	2	91	0
Wave 1 (n=315)	A health professional has recommended to me that CHILD should be vaccinated	13	9	79	0
Wave 2 (n=168)		12	3	85	0
Wave 1 (n=315)	A health professional has recommended that CHILD shouldn't have the vaccine	5	10	85	*
Wave 2 (n=168)		4	4	92	0

Wave 1 (n=315)	The flu vaccine would interact with other medications that CHILD is currently taking	4	22	74	*
Wave 2 (n=168)		5	12	83	0

Q19	I'd like to ask you some questions about your feelings about the flu that is currently going round. For each of the following, please tell me whether you've been feeling that way when thinking about the flu that's currently going round, in the past 7 days. Your options to choose from are: 'Very much, moderately, somewhat or not at all'. Feeling: *SINGLE CODE ONLY* *ROTATE ORDER OF STATEMENTS*					
		Very Much	Moderately	Somewhat	Not at all	Don't know
		%	%	%	%	%
Wave 1 (n=1080)	Calm	50	31	10	8	2
Wave 2 (n=621)		60	24	10	6	1
Wave 1 (n=1080)	Tense	2	8	6	82	1
Wave 2 (n=621)		1	5	3	90	1
Wave 1 (n=1080)	Upset	1	4	2	91	1
Wave 2 (n=621)		1	2	2	94	*
Wave 1 (n=1080)	Relaxed	48	32	10	7	2
Wave 2 (n=621)		54	30	10	5	1
Wave 1 (n=1080)	Content	42	31	9	14	4
Wave 2 (n=621)		50	27	12	11	1
Wave 1 (n=1080)	Worried	3	11	7	78	1
Wave 2 (n=621)		1	6	6	87	*

Appendix 2 Full set of survey questions

Notes on the use of the Influenza Telephone Survey Template (FluTEST) items

1. Not all items can be used in any given survey. Users are encouraged to select those items that will be most informative given the current stage of the pandemic and the particular area of interest.
2. Item order can be customised and randomised within specific sections. Care should be taken to ensure that early questions do not provide the answers needed for subsequent questions (for example, see handwashing questions or questions relating the perceived presence of flu).
3. Item wording was correct for England at the time of the survey's development (winter 2012/13). Users should check that items continue to reflect current policy, definitions or recommendations before use (e.g. names of organisations or information sources, symptoms used to define influenza like illness, recommendations relating to hand hygiene, medical risk factors).
4. Items were developed for use over the telephone. Alternative formulations may be possible for different modes of delivery (e.g. web-based surveys).
5. Users are encouraged to develop additional items as required, using the basic format provided within this template

1. Presence of flu

a. Perceived presence

	For the first two questions, your options to choose from are: probably yes, not sure and probably no.				
		Probably yes	Not sure	Probably no	No opinion
1	As far as you know, have you had flu in the past seven days?	1	2	3	4
2a	As far as you know, have you had flu in the past x months?	1	2	3	4
2b	If so, when did you get flu? *RECORD DATE*				

b. Presence of flu-like symptoms

	I am now going to read out a list of symptoms. For each one, can you tell me if you have had that symptom in the past 7 days, choosing from yes, no or not sure. We're ***not*** interested in symptoms that you think were probably caused by stress or exercise.			
		Yes	No	Not sure
1	Fever /temperature	1	2	3
2	Chills / shivering	1	2	3
3	Headache / migraine	1	2	3
4	Aches or pains in your muscles / bones / joints	1	2	3
5	Fatigue / tiredness / low energy	1	2	3
6	Diarrhoea	1	2	3
7	Sore throat	1	2	3
8	Runny or blocked nose / too much phlegm / snot	1	2	3
9	Sneezing	1	2	3
10	Loss of appetite	1	2	3
11	Difficulty sleeping	1	2	3
12	Coughing (e.g. dry /chesty / itchy / scratchy)	1	2	3
13	Sinus problems / pain	1	2	3
14	Nausea / vomiting	1	2	3
15	Shortness of breath	1	2	3
16	Stomach ache	1	2	3

2. Knowledge and understanding

a. Symptoms

	Can you please tell me what the three most common symptoms of flu are? *Interviewer to code all responses given to one of the options below*	
1	Fever /temperature	
2	Chills / shivering	
3	Headache / migraine	
4	Aches or pains in your muscles / bones / joints	
5	Fatigue / tiredness / low energy	
6	Diarrhoea	
7	Sore throat	
8	Runny or blocked nose / too much phlegm / snot	
9	Sneezing	
10	Loss of appetite	
11	Difficulty sleeping	
12	Coughing (e.g. dry /chesty / itchy / scratchy)	
13	Sinus problems / pain	
14	Nausea / vomiting	
15	Shortness of breath	
16	Stomach ache	

b. General perceptions

	I am now going to read out some general statements about flu, please tell me whether you think they are probably true, probably false or if you're not sure. *SINGLE CODE ONLY*				
		Probably true	Not sure	Probably false	No Opinion
1	The health effects of flu are usually more severe for children under 5 years	1	2	3	4
2	The health effects of flu are usually more severe for pregnant women	1	2	3	4
3	The health effects of flu are usually more severe for people who are 65 years old or more	1	2	3	4
4	The health effects of flu are usually more severe for people who already have a serious medical condition	1	2	3	4
5	You can catch flu if you eat food that has been contaminated with flu germs	1	2	3	4
6	You can catch flu if you touch things that have flu germs on them, and then you touch your eyes, nose or mouth	1	2	3	4
7	You can catch flu from animals	1	2	3	4
8	You can catch flu if you are coughed or sneezed on by someone who already has flu	1	2	3	4
9	It is always easy to spot people who might give you flu	1	2	3	4
1	There are different types of flu	1	2	3	4

0					
11	It is likely that I have some natural immunity to the flu that's going round at the moment	1	2	3	4
12	There is currently no vaccine to protect against the flu that's going round at the moment	1	2	3	4
13	Antibiotics are an effective treatment for flu	1	2	3	4

These should be amended to capture any additional current misperceptions or rumours

3. Avoidance, hand hygiene and respiratory behaviours

a. Avoidance, cleaning and respiratory behaviours

	Because of the flu that's currently going round, in the past seven days have you...				
		Yes	No	Not sure	Not applicable
1	Reduced the amount you go to school, college, university or work	1	2	3	4
2	Cancelled or postponed a social event such as meeting friends, eating out or going to a sports event	1	2	3	4
3	Reduced or changed the way you use public transport	1	2	3	4
4	Reduced the amount you go into shops	1	2	3	4
5	Kept one or more of your children out of school or nursery	1	2	3	4
6	Kept away from crowded places generally	1	2	3	4
7	Cleaned or disinfected things you might touch (such as door knobs or hard surfaces), more often than usual	1	2	3	4
8	Carried sanitising hand gel with you when out and about	1	2	3	4
9	Used sanitising hand gel to clean your hands, more often than usual	1	2	3	4
10	Reduced the amount you touch your eyes, nose or mouth	1	2	3	4
11	Followed a healthy diet or took vitamin supplements	1	2	3	4
12	Tried to avoid people who have flu	1	2	3	4
13	Usually carried tissues with you when out and about	1	2	3	4
14	Usually used tissues when sneezing or coughing	1	2	3	4
15	*If yes to previous question:* Usually put the tissues in the bin after use	1	2	3	4
16	Have you done anything else to avoid catching flu that I haven't already mentioned?	1	2	3	4

16b	And what is that? *(*open ended, interviewer to code as one of the options below)		
	1	Wrapping up warm	
	2	Not going out in bad weather	
	3	Having the central heating on	
	4	Avoiding people who seem to have flu symptoms	
	5	Other	

b. Knowledge about hand washing

	You may have heard of advice that people should thoroughly wash their hands to avoid catching and spreading the flu.	
1	What does the phrase 'thoroughly washing your hands' mean to you? *Interviewer to code responses to options below*	
	Using warm or hot water	
	Using soap	
	Washing for a long time (more than 20 seconds)	
	Washing all parts of the hand (i.e. front, back, between the fingers, nails)	
	Washing up to the wrists	
	Drying hands properly with a towel or dryer	
	Other. Please specify:	
2	During the day, when do you feel it is appropriate to thoroughly wash your hands? *Interviewer to code responses to options given below*	
	When they seem dirty	
	After coughing into your hands	
	After sneezing into your hands	
	Before preparing food	
	Before eating	
	After eating	
	After using the toilet	
	After using public transport	
	After touching unclean things and/or surfaces	
	Other. Please specify:	

c. Hand washing behaviours

	I can tell you that the official definition of "thoroughly washing your hands" is using soap and water, and washing them for at least 20 seconds. But many people nowadays find that they don't always have time to do that. In the last seven days, to prevent the spread of flu, have you…			
		Yes	No	Not applicable
1	Washed your hands thoroughly, more often than usual?	1	2	3
2	Washed your hands thoroughly after sneezing, more often than usual?	1	2	3
3	Washed your hands thoroughly after using public transport, more often than usual?	1	2	3
4	Washed your hands thoroughly after touching your eyes, nose or mouth, more often than usual?	1	2	3
5	In the past 24 hours, how many times, if at all, have you washed your hands thoroughly? *RECORD NUMBER*			

4. Perceived efficacy of avoidance, cleaning, hand hygiene and respiratory behaviours

	I am now going to read out some statements about flu. For each of the following statements, please tell me whether you think they are: probably true, probably false or if you're not sure.				
	An effective way to prevent the spread of flu is to…	Probably true	Not sure	Probably false	No opinion
1	Reduce the number of people you meet	1	2	3	4
2	Clean or disinfect surfaces that you might touch	1	2	3	4
3	Thoroughly and regularly wash your hands	1	2	3	4
4	Use sanitising hand gel	1	2	3	4
5	Cough or sneeze into tissues, instead of your hands	1	2	3	4
6	Avoid touching your eyes, nose or mouth	1	2	3	4

5. Self-efficacy for the behaviours relating to transmission of flu

	For the following statements, please tell me whether you think they are: probably true, probably false or if you're not sure.				
	And are you confident that if you wanted to, you could…	Probably true	Not sure	Probably false	No opinion
1	Reduce the number of people you meet in the next week	1	2	3	4
2	Keep things that you might touch clean or disinfected	1	2	3	4
3	Wash your hands thoroughly and regularly	1	2	3	4
4	Carry sanitising hand gel with you when out and about	1	2	3	4
5	Carry tissues with you when out and about	1	2	3	4
6	Avoid touching your eyes, nose or mouth	1	2	3	4

6. Subjective norms about behaviours to reduce transmission

	The next questions refer to people who are important to you, such as your family or friends. For each of the following statements, please tell me whether you think it is: probably true, probably false or if you're not sure.				
		Probably true	Not sure	Probably false	No opinion
1	People who are important to you think that you should reduce the number of people I meet	1	2	3	4
2	People who are important to you think that you should clean or disinfect things that I might touch (such as door knobs or hard surfaces)	1	2	3	4
3	People who are important to you think that you should thoroughly and regularly wash my hands	1	2	3	4
4	People who are important to you think that you should use sanitising hand gel to clean my hands	1	2	3	4
5	People who are important to you think that you should cough or sneeze into tissues instead of my hand	1	2	3	4
6	People who are important to you think that you should avoid touching my eyes, nose or mouth	1	2	3	4

	The next questions are similar, but this time we are talking about what *most people* would expect you to do, regardless of whether or not they are your friends or family. ***SINGLE CODE ONLY***				
		Probably true	Not sure	Probably false	No opinion
1	Most people would expect you to reduce the number of people I meet	1	2	3	4
2	Most people would expect you to clean or disinfect things that I might touch (such as door knobs or hard surfaces)	1	2	3	4
3	Most people would expect you to thoroughly and regularly wash my hands	1	2	3	4
4	Most people would expect you to use sanitising hand gel to clean my hands	1	2	3	4
5	Most people would expect you to cough or sneeze into tissues instead of my hands	1	2	3	4
6	Most people would expect you to avoid touching my eyes, nose or mouth	1	2	3	4

7. Preparatory behaviours

	I am now going to read out some statements about preparations that you may or may not have made for a flu outbreak. Please tell me yes, no, not sure or not applicable for each one.				
		Yes	No	Not sure	Not applicable
1	I know that I currently have enough food at home to last for 7 days	1	2	3	4
2	I have tried to purposely catch flu now, to get it over and done with	1	2	3	4
3	I have tried to arrange for one or more of my children to catch flu now, to get it over and done with	1	2	3	4
4	I have discussed with a friend or family member what we would do if one of us catches flu	1	2	3	4
5	I know that I currently have enough over the counter medicines, such as painkillers, to keep me going for 7 days, if I catch flu	1	2	3	4
6	I know that I currently have enough of my regular prescription medicines and medical supplies to keep me going for 7 days, if I catch flu	1	2	3	4

8. Perceptions regarding severity, likelihood and fatalism

a. Perceived likelihood of catching flu and fatalism

	For each of the following statements, please tell me whether you think they are: probably true, probably false or if you're not sure.				
		Probably true	Not sure	Probably false	No Opinion
1	If I don't take any preventive action, then I am likely to catch flu in the next x months	1	2	3	4
2	I have little control over whether I will catch flu	1	2	3	4

b. Perceived severity of the illness

	I am now going to read out some general statements about flu. For each of the following statements, please tell me whether you think they are: probably true, probably false or if you're not sure.				
		Probably true	Not sure	Probably false	No Opinion
1	Flu would be a serious illness for me	1	2	3	4
2	If I catch flu, it will have major consequences on my life	1	2	3	4
3	Flu would be a mild illness for me	1	2	3	4
4	If I catch flu, it will not have much effect on me	1	2	3	4
5	If I catch flu, it will have serious financial consequences for me	1	2	3	4
6	If I catch flu, it will cause difficulties for people who are important to me	1	2	3	4

9. Information about flu

a. Sources

	We are interested in what you think about the various sources from which you receive information about flu. Could you tell me what three places you have received most of your information about flu from in the past 7 days? *Interviewer should record three options using the list below*	
1	People I speak to day to day (i.e. family, friends, colleagues)	
2	Healthcare professionals (i.e. my doctor, GP, pharmacist, chemist, other healthcare professionals)	
3	Official helplines (i.e. NHS Direct/NHS 24/NHS Direct Wales/NI Direct)	
4	Official websites (i.e. NHS Choices/www.nhs.uk)	
5	Official departments and agencies (i.e. My local hospital, Department of Health, British Medical Association, Health Protection Agency, National Pandemic Flu Service, The Government, Centre for Diseases Control, World Health Organisation)	
6	Media: Websites	
	If yes, which ones: (*MULTIPLE CODING*)	
	NHS Direct/NHS 24/NHS Direct Wales/NI Direct	
	NHS Choices/www.nhs.uk	
	Department of Health	
	Other health websites	
	DirectGov	
	Patientinfo.com	
	BBC Health	
	Google/Yahoo/MSN	
	Social news / networking / bookmarking sites (Facebook, Twitter, etc)	
	Other online sources	
	PLEASE STATE:	
7	Media: Television	
	If yes, what? (*MULTIPLE CODING*)	
	News programmes	
	Current affairs	
	Expert opinions	
	Public discussions	
	Advertisements	
	Other sources:	
	PLEASE STATE:	
8	Media: Radio	
	If yes, what? (*MULTIPLE CODING*)	
	News programmes	
	Current affairs	
	Expert opinions	
	Public discussions	
	Advertisements	
	Other sources	
	PLEASE STATE:	

9	Media: Advertising campaigns	
	If yes, what? (*MULTIPLE CODING*)	
	News programmes	
	Current affairs	
	Expert opinions	
	Public discussions	
	Advertisements	
	Leaflets	
	Websites	
	Articles	
	Billboards/posters	
	Public transport	
	Other sources	
	PLEASE STATE:	
10	Media: Newspapers and magazines	
	If yes, what? (*MULTIPLE CODING*)	
	News programmes	
	Current affairs	
	Expert opinions	
	Public discussions	
	Advertisements	
	Articles	
	Other sources	
	PLEASE STATE:	
11	And which of those have you received most information from in the past 7 days?	
	PLEASE RECORD MAIN ONE	

b. Information sufficiency

	I am going to read out some statements about flu. Please tell me whether you think they are: probably true, probably false or if you're not sure.				
		Probably true	Not sure	Probably false	No Opinion
1	I have enough information about what I can do to avoid catching flu	1	2	3	4

c. Credibility of official communicators or agencies

	Thinking about <source where most information was received>, please tell me whether you think the following statements are: probably true, probably false or if you're not sure.				
	<name of source>	Probably true	Not sure	Probably false	No Opinion
1	Can be trusted	1	2	3	4
2	Is accurate	1	2	3	4
3	Tells the whole story	1	2	3	4
4	Is biased or one-sided	1	2	3	4

	And thinking now about the Department of Health, please tell me whether you think the following statements are: probably true, probably false or if you're not sure. Information from the Department of Health about flu…				
		Probably true	Not sure	Probably false	No Opinion
1	Can be trusted	1	2	3	4
2	Is accurate	1	2	3	4
3	Tells the whole story	1	2	3	4
4	Is biased or one-sided	1	2	3	4

d. Trust in official agencies

	The next set of statements are about how the Department of Health is dealing with the outbreak. Again, I'd like you to tell me whether each one is probably true, probably false or if you're not sure.				
		Probably true	Not sure	Probably false	No Opinion
1	In general, I think the Department of Health is doing a good job of dealing with the current flu outbreak	1	2	3	4
2	In general, I think the Department of Health has enough resources to cope with the current flu outbreak	1	2	3	4
3	In general, I think the Department of Health has the necessary knowledge to deal with the current flu outbreak	1	2	3	4
4	In general, I think the Department of Health is acting in the public's best interests in dealing with the current flu outbreak	1	2	3	4
5	In general, I feel confident in the Department of Health's ability to deal with the current flu outbreak	1	2	3	4

10. Behaviours if ill

a. Help seeking behaviour

	Have you sought help or advice about flu in the past seven days? If no, skip to next section.	Yes	No
		1	2

	IF YES TO GETTING MEDICAL ADVICE OR TREATMENT And where did you turn to first for medical advice or treatment (code only one of the options below)	
1	GP by phone	
2	GP in person	
3	Doctor or nurse at walk-in centre	
4	Doctor or nurse at hospital	
5	Pharmacist or chemist by phone	
6	Pharmacist or chemist in person	
7	A health telephone line (NHS Direct / NHS 24 / NHS Direct Wales / NI Direct)	
8	An official health website (Dept of Health, NHS Choices, Health Protection Agency)	
9	A friend or relative who is a healthcare worker	
10	Other	

	If yes to two or more of the above. **And can you tell me what order you used those in?** *INTERVIEWER TO LIST ORDER: 1, 2, 3 etc*	
1	GP by phone	
2	GP in person	
3	Doctor or nurse at walk-in centre	
4	Doctor or nurse at hospital	
5	Pharmacist or chemist by phone	
6	Pharmacist or chemist in person	
7	A health telephone line (NHS Direct / NHS 24 / NHS Direct Wales / NI Direct)	
8	An official health website (Dept of Health, NHS Choices, Health Protection Agency)	
9	A friend or relative who is a healthcare worker	
10	Other	

b. Reasons for help seeking behaviour

	Can you tell me why you wanted to get help or advice about flu? *NOTE TO INTERVIEWER– PLEASE ASK THEM TO EXPLAIN IF THEY SIMPLY OFFER "PEACE OF MIND" OR SIMILAR* *Interviewer to code all answers using options below*	
1	General information / advice about flu for self	
2	General information / advice about flu for someone else	
3	I thought I had flu	
4	I had severe symptoms	
5	General information / advice about vaccinations (e.g. how to get it, cost, eligibility)	
6	I wanted to be vaccinated against flu	
7	General information / advice about antivirals (e.g. what they are, how to obtain them)	
8	I wanted to obtain antivirals such as tamiflu and relenza	
9	Peace of mind / reassurance – ASK WHY THEY NEEDED IT AND CODE RESPONSE AS AN ADDITIONAL ANSWER	
10	Other people wanted me to get help or advice / other people were worried about me	
11	Any other reason:	
	Please specify: *RECORD VERBATIM*	

	And why did you initially go to / speak to [*place they went to first*], instead of somewhere else? *Interviewer to code all answers using options below*	
1	I trust them	
2	I had heard that was the appropriate place to go	
2	It is easy to see someone / speak to someone there	
3	I couldn't see someone / speak to someone elsewhere	
4	I did not want to tie up medical resources elsewhere	
5	I did not want to risk giving other people flu elsewhere	
6	I did not want to risk catching flu elsewhere	
7	Other reason – record verbatim	
	Please specify: *RECORD VERBATIM*	

c. Delay in non-flu related help seeking behaviour

	Sometimes, people who need to seek medical advice or help for a non-flu related condition delay doing this while an outbreak of flu is happening. In the past seven days, have you…			
		Yes	No	Not applicable
1	Postponed or cancelled a non-flu related medical appointment?	1	2	3
2	Delayed getting advice or help about a non-flu related medical issue?	1	2	3

	Why was that? *Interviewer to code all reasons using options below*	
1	Don't want to overburden / bother doctor or nurse while there is an outbreak of flu	
2	There is a risk of catching flu at GPs / hospitals	
3	There is a risk of catching flu while travelling to GPs / hospitals	
4	My reason for seeing a doctor wasn't important / urgent	
5	Lack of time	
6	Obtained information and advice elsewhere	
7	Don't want to hear bad news	
8	Lack of resources	
9	Transport problems	
10	Non-flu related reasons	
11	Other reason, please specify: *RECORD VERBATIM*	

d. Likely behaviour if ill

	IF NOT HAD FLU IN THE PAST SEVEN DAYS (SEE PRESENCE OF FLU ITEMS) Imagine that tomorrow morning, you develop flu. You have a cough, a temperature, your muscles ache and you are feeling tired. We are interested in what you would probably try to do. I am going to read out some options in no particular order. For each one, please choose from: probably yes, probably no, not sure or not applicable.				
		Probably yes	Not sure	Probably no	Not applicable
1	I would try to stay at home	1	2	3	4
2	I would try to go to school, college, university or work as normal	1	2	3	4
3	I would try to avoid meeting people from outside of my household	1	2	3	4
4	Take over the counter remedies such as painkillers or cold and flu remedies	1	2	3	4
5	Take complementary remedies, such as homeopathy or herbal remedies	1	2	3	4
6	If it came to it, I know someone who would be willing to collect medicines or food for me while I was ill	1	2	3	4
7	If it came to it, I know someone who could look after me round the clock at home for seven days	1	2	3	4
8	I would try to get medical advice or treatment	1	2	3	4
	IF YES TO GETTING MEDICAL ADVICE OR TREATMENT And where would you turn to first for medical advice or treatment (interviewer to code only one of the options below)				
1	GP by phone				
2	GP in person				
3	Doctor or nurse at walk-in centre				
4	Doctor or nurse at hospital				
5	Pharmacist or chemist by phone				
6	Pharmacist or chemist in person				
7	A health telephone line (NHS Direct / NHS 24 / NHS Direct Wales / NI Direct)				
8	An official health website (Dept of Health, NHS Choices, Health Protection Agency)				
9	A friend or relative who is a healthcare worker				
10	Other				

e. **Actual behaviour when ill**

	IF HAS HAD FLU IN THE PAST SEVEN DAYS (SEE PRESENCE OF FLU ITEMS) You said earlier that you think you have had flu in the past seven days. We are interested in what you did while you had flu. I am going to read out some options in no particular order. For each one, please tell me if they are true, false, or if you are not sure.				
		True	Not sure	False	Not applicable
1	I stayed at home	1	2	3	4
2	I tried to go to school, college, university or work as normal	1	2	3	4
3	I tried to avoid meeting people from outside of my household	1	2	3	4
4	I took over the counter remedies such as painkillers or cold and flu remedies	1	2	3	4
5	I took complementary remedies, such as homeopathy or herbal remedies	1	2	3	4
6	If it had come to it, I know someone who would have been willing to collect medicines or food for me while I was ill	1	2	3	4
7	If it had come to it, I know someone who could have looked after me round the clock at home for seven days	1	2	3	4
8	I tried to get medical advice or treatment	1	2	3	4
	IF YES TO GETTING MEDICAL ADVICE OR TREATMENT And where did you turn to first for medical advice or treatment (interviewer to code only one of the options below)				
1	GP by phone				
2	GP in person				
3	Doctor or nurse at walk-in centre				
4	Doctor or nurse at hospital				
5	Pharmacist or chemist by phone				
6	Pharmacist or chemist in person				
7	A health telephone line (NHS Direct / NHS 24 / NHS Direct Wales / NI Direct)				
8	An official health website (Dept of Health, NHS Choices, Health Protection Agency)				
9	A friend or relative who is a healthcare worker				
10	Other				

11. Vaccinations

a. Intentions and behaviour (adults)

	The next questions are all about the flu vaccine. Please answer yes, no or not sure for each one. *SINGLE CODE ONLY*			
		Yes	Not sure	No
1	Have you ever had a flu vaccination, that is before [insert date]?	1	2	3
2	Have you had a flu vaccination for this winter?	1	2	3
	ROUTING: If yes to this item, go to next page			
3	Have you been offered a flu vaccination on the NHS for this winter?	1	2	3
4	As far as you know, are you eligible to have a flu vaccination on the NHS this winter?	1	2	3
5	Are you thinking about paying to have a flu vaccination outside of the NHS this winter?	1	2	3
6	Do you intend to have the flu vaccine this winter?	1	2	3
7	*For those ineligible (no on items 3 and 4)*: Imagine that the NHS changed its rules, and said that you were eligible to have the flu vaccine this winter, for free. Would you have it?	1	2	3

b. Perceptions about the vaccine (adults)

	I am going to read out some statements that other people have given about the flu vaccine. For each one, please whether you think they are: true, false or if you're not sure.				
		True	Not sure	False	No Opinion
1	I disagree with vaccinations in general	1	2	3	4
2	I don't like needles	1	2	3	4
3	I don't need the vaccine because I am generally healthy	1	2	3	4
4	I don't need the vaccine because I am not likely to get flu	1	2	3	4
5	Having the flu vaccine is not a priority for me	1	2	3	4
6	I'm too busy to get the flu vaccine	1	2	3	4
7	I would forget to make an appointment with my GP to get the flu vaccine	1	2	3	4
8	It is difficult to get an appointment to get the flu vaccine	1	2	3	4
9	A healthcare professional has recommended to me that I *should* have the vaccine	1	2	3	4
10	A healthcare professional has recommended that I *shouldn't* have the vaccine	1	2	3	4
11	I do not know enough about the flu vaccine	1	2	3	4
12	I am confused by all the information available about the flu vaccine	1	2	3	4
13	I feel uncertain about whether to have the flu vaccine	1	2	3	4
14	The flu vaccine has not been tested enough	1	2	3	4
15	The flu vaccine can cause unpleasant short-term side-effects	1	2	3	4
16	The flu vaccine can cause long-term health problems	1	2	3	4
17	The vaccine provides protection for only one flu season	1	2	3	4
18	The flu vaccine would interact with other medications that I am currently taking	1	2	3	4
19	The flu vaccine does not suit my religious or cultural needs	1	2	3	4
20	The vaccination campaign is just about making money for the manufacturers	1	2	3	4
21	Having the flu vaccine is an effective way of preventing you from catching flu	1	2	3	4

c. Intentions and behaviour (children)

Note to interviewer: Only ask to participants with children aged 17 or under living at home with them **We need to select one of your children to talk about. Please tell me the name of the child aged 17 or under who had the most recent birthday? You can give me a fake name for them if you want.** *Interviewer should NOT record name, but refer to this child throughout. Referenced as "CHILD" in rest of questionnaire*	
Can I ask how old CHILD is? *RECORD AGE IN YEARS*	
And just to check, are they a boy or a girl? *RECORD SEX*	

	The next questions are all about [CHILD] and the flu vaccine. Please answer yes, no or not sure.			
		Yes	Not sure	No
1	Has CHILD had a flu vaccination in previous years, that is, before August 2012?	1	2	3
2	Has CHILD had a flu vaccination for this winter?	1	2	3
	If yes to this item, go to next box			
3	Has CHILD been offered a flu vaccination on the NHS for this winter?	1	2	3
4	As far as you know, is CHILD eligible to have a flu vaccination on the NHS this winter?	1	2	3
5	Are you thinking about paying to have CHILD vaccinated outside of the NHS this winter?	1	2	3
6	Do you intend for CHILD to have the flu vaccine this winter?	1	2	3
7	*For those ineligible (no on all items 3 and 4):* Imagine that the NHS changed its rules, and said that CHILD is eligible to have the flu vaccine this winter, for free. Would you have them vaccinated?	1	2	3

d. Perceptions about the vaccine (children)

	I am going to read out some statements that other people have given about children and the flu vaccine. For each one, please whether you think they are: true, false or if you're not sure.				
		True	Not sure	False	No Opinion
1	I don't like CHILD having vaccinations in general	1	2	3	4
2	CHILD doesn't like needles	1	2	3	4
3	CHILD doesn't need the vaccine because they are generally healthy	1	2	3	4
4	CHILD doesn't need the vaccine because they are not likely to get flu	1	2	3	4
5	Having CHILD vaccinated is not a priority for me	1	2	3	4
6	I'm too busy to get CHILD vaccinated	1	2	3	4
7	I would forget to make an appointment with the GP to get CHILD vaccinated	1	2	3	4
8	A health professional has recommended to me that CHILD *should* be vaccinated	1	2	3	4
9	A health professional has recommended that CHILD *shouldn't* have the vaccine	1	2	3	4
10	I feel uncertain about whether to have CHILD vaccinated	1	2	3	4
11	The flu vaccine would interact with other medications that CHILD is currently taking	1	2	3	4

12. Antivirals behaviour

a. General questions (adults)

	As you may know, some people with flu are offered antiviral medicines such as Tamiflu or Relenza during a flu pandemic. These next set of questions are all about these antiviral medicines. Please answer yes, no, not sure or not applicable.				
		Yes	Not sure	No	Not applicable
1	Have you been advised to take antivirals such as tamiflu or relenza by a healthcare professional?	1	2	3	4
	If yes to question 1:				
2	Did you collect or receive your antivirals?	1	2	3	4
	If yes:				
3a	Did you take any?	1	2	3	4
	If yes:				
4	Did you finish the course?	1	2	3	4
	If no to question 1:				
5	If you were advised to take antivirals by a healthcare professional because you had caught flu, would you take them?	1	2	3	4

3b	*If yes to 3a above:* **You mentioned that you had taken some antivirals. Can you tell me how many days passed between you first getting any symptoms of flu and when you were officially advised to take antivirals?** *RECORD NUMBER*	
3c	*If yes to 3b above:* **And how many days passed between you being officially advised to take antivirals and you taking the first dose?** *RECORD NUMBER*	

b. Reasons for not taking antivirals (adults)

	If no to question 2, 3a, 4 of 5 above…. And why not? *Interviewer to code responses into one or more options below*	
1	I am not sure I have flu	
2	My symptoms went away / I got better	
3	I wanted to wait to see if I got worse	
4	I might catch flu at the dispensing site	
5	Concern about short-term side effects	
6	Concern about long-term health effects	
7	Concern about interaction with other medications	
8	I didn't know I had to take them	
9	Wanted to try a different medicine instead	
10	I don't like pills in general	
11	They taste bad	
12	I took them in the swine flu outbreak and don't like them	
14	I forgot	
15	Too inconvenient	
16	They haven't been tested enough	
17	They're not effective / don't work	
18	Information overload	
19	Not enough information about the tablets	
20	Advice from others not to take them (i.e. from GP, other healthcare professional, friends and family)	
21	There were none available	
22	Religious reasons	
23	Other, please specify: *RECORD VERBATIM*	

c. Perceived efficacy of antivirals (all)

	I am now going to read out a statement about antivirals such as tamiflu and relenza. Please tell me whether you think it is: probably true, probably false or if you're not sure.				
		Probably true	Not sure	Probably false	No Opinion
1	Antivirals are an effective treatment for flu	1	2	3	4

d. Antiviral behaviour (children)

	For those with one more children aged under 16, at home. **And thinking now about CHILD…** **Please answer yes, no or not sure for the following questions.**			
		Yes	Not sure	No
1	Have you any of your children been advised to take antivirals such as tamiflu or relenza by a healthcare professional?	1	2	3
	If yes to question 1:			
2a	Did you collect or receive the antivirals?	1	2	3
	If yes:			
3	Did they take any?	1	2	3
	If yes:			
4	Did they finish the course?	1	2	3
2b	*If no to question 1:* If one of your children was advised to take antivirals by a healthcare professional because they caught flu, would you give it to them?	1	2	3

3b	*If yes to 3a above:* **You mentioned that CHILD had taken some antivirals. Can you tell me how many days passed between CHILD first getting any symptoms of flu and when CHILD was officially advised to take antivirals?** *RECORD NUMBER*	
3c	*If yes to 3b above:* **And how many days passed between CHILD being officially advised to take antivirals and taking the first dose?** *RECORD NUMBER*	

e. Reasons for not taking antivirals (children)

	If no to question 2a, 3, 4 of 2b above…. And why not? *Interviewer to code responses into one or more options below*	
1	I am not sure they have flu	
2	The symptoms went away / got better	
3	I wanted to wait to see if child got worse	
4	Child might catch flu at the dispensing site	
5	Concern about short-term side effects	
6	Concern about long-term health effects	
7	Concern about interaction with other medications	
8	I didn't know Child had to take them	
9	Wanted to try a different medicine instead	
10	Child doesn't like pills in general	
11	They taste bad	
12	Child took them in the swine flu outbreak and doesn't like them	
13	Previous bad experience	
14	I forgot	
15	Too inconvenient	
16	They haven't been tested enough	
17	They're not effective / don't work	
18	Information overload	
19	Not enough information about the tablets	
20	Advice from others not to take them (i.e. from GP, other healthcare professional, friends and family)	
21	There were none available	
22	Religious reasons	
23	Child refuses to take them	
24	School, nursery or childcare won't administer them	
25	Other, please specify: *RECORD VERBATIM*	

13. Emotional response

	I'd like to ask you some questions about your feelings about the flu that is currently going round. For each of the following, please tell me whether you've been feeling that way when thinking about the flu that's currently going round, in the past 7 days. Your options to choose from are: 'Very much, moderately, somewhat or not at all'. Feeling:					
		Very Much	Moderately	Somewhat	Not at all	Don't know
1	Calm	1	2	3	4	0
2	Tense	1	2	3	4	0
3	Upset	1	2	3	4	0
4	Relaxed	1	2	3	4	0
5	Worried	1	2	3	4	0

SECTION 3: DEMOGRAPHIC QUESTIONS

D1	**Gender** *RECORD, DO NOT ASK*	
	MALE	1
	FEMALE	2

D2	**Could you tell me your age on your last birthday?** *WRITE IN YEARS*	

D3	**And are you...** *READ OUT*	
	Working 30 hours or more a week (Full-time)	1
	Working 8 - 29 hours a week (Part-time)	2
	Not working (under 8 hrs) - housewife	3
	Not working (under 8 hrs) - unemployed	4
	Not working (under 8 hrs) - unemployed (not Registered but looking for work)	5
	Not working (under 8 hrs) - retired	6
	Not working (under 8 hrs) - student	7
	Not working (under 8 hrs) - other (inc. disabled)	8

D4	**Which of the following categories would you place your total household income from all sources before tax and any other deductions?** *READ OUT*	
	Under £10,000	1
	Over £10,000 but less than £20,000	2
	Over £20,000 but less than £30,000	3
	Over £30,000 but less than £40,000	4
	Over £40,000 but less than £50,000	5
	Over £50,000 but less than £75,000	6
	Over £75,000	7
	Don't know	8

D5	**And how many, if any, children aged 17 or under in your household are you the parent or guardian of?** *WRITE IN, CODE NULL IF NO CHILDREN AGED 5-17 IN HOUSEHOLD*	

D6	**Can you tell me the ages of those children, please** *WRITE IN*	

D7	**Please tell me which, if any, is the highest educational or professional qualification you have obtained?** *READ OUT*	
	GCSE / O-level / CSE	1
	Vocational qualifications (=NVQ1+2)	2
	A-Level or equivalent (=NVQ3)	3
	Bachelor Degree or equivalent (=NVQ4)	4
	Masters or equivalent	5
	PhD or equivalent	6
	Other	7
	No formal qualifications	8
	Still studying	9
	Don't know	10

D8(ALL)	**Have you ever been diagnosed by a medical doctor as having any long-lasting illness, disability or infirmity?**	
	YES	1
	NO	2
	DON'T KNOW	3

D9	**Can I ask what?** *Interviewer to code all relevant answers using options below*	
	Breathing complaint (e.g. Asthma, pulmonary disease, emphysema)	1
	Cancer	2
	Diabetes	3
	Heart disease (e.g. heart failure, high blood pressure)	4
	Kidney disease (e.g. Renal failure, kidney transplant)	5
	Liver disease (e.g. hepatitis, Cirrhosis)	6
	Mental health (i.e. depression, anxiety, stress)	7
	Neurological condition (i.e. caused by disease or damage to the brain, spinal cord or other parts of the nervous system)	8
	Stroke	9
	Substance misuse (i.e. alcohol, drugs)	10
	Other, please specify:	11

D10	**Which one of these ethnic groups would you describe yourself as belonging to?** *READ OUT*	
	WHITE - British	1
	WHITE - Irish	2
	WHITE - Any other white background	3
	ASIAN OR ASIAN BRITISH - Indian	4
	ASIAN OR ASIAN BRITISH - Pakistani	5
	ASIAN OR ASIAN BRITISH - Bangladeshi	6
	ASIAN OR ASIAN BRITISH - Any other Asian background	7
	BLACK OR BLACK BRITISH - Caribbean	8
	BLACK OR BLACK BRITISH - African	9
	BLACK OR BLACK BRITISH - Any other background	10
	MIXED - White and Black Caribbean	11
	MIXED - White and Black African	12
	MIXED - White and Asian	13
	MIXED - Any other mixed background	14
	CHINESE OR OTHER ETHNIC GROUP - Chinese	15
	CHINESE OR OTHER ETHNIC GROUP - Any other background	16

CLOSING REMARKS

Thank you for your responses, that is all the questions I have. I mentioned that we would like to call you back and ask you some more questions in 7 days time. Can I arrange a time now to call you back?

Interviewer to make appointment if possible.

And just to check, do you have a second telephone number, in case we have difficulties with the number you are on right now? Do you have a mobile number for instance?

RECORD NUMBER [ ]

And finally, will I need to ask for you by name when I call you back? If so, what name should I ask for? It doesn't have to be your full name or even your real name if you want.

RECORD NAME [ ]

Ok. Many thanks again for all your time.

If participant wants more information or wants to know the results:
If you are interested in knowing the results of this survey, they will be posted up on our website [*give address*]. Or if you would like any more information or help about flu, the best place to look is [*give address*].

And you can also always call us (*insert contact number here*) or the lead researcher if you have any questions about the survey or about flu [*give contact details*].

Appendix 3 Full table of results for assessment of non-response bias and test–retest reliability for all relevant items

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Perceived flu in past 7 days	Probably yes	1079	20 (3.2)	30 (6.6)	$\chi^2 = 14.56$, $p < 0.001$	621	24 (3.9)	Not applicable
	Not sure		3 (0.5)	11 (2.4)			6 (1.0)	
	Probably no		598 (96.3)	417 (91.0)			591 (95.2)	
Perceived flu this winter	Probably yes	1080	75 (12.1)	70 (15.3)	$\chi^2 = 3.06$, $p = 0.22$	621	79 (12.7)	0.73 (93.1)
	Not sure		13 (2.1)	13 (2.8)			12 (1.9)	
	Probably no		533 (85.8)	376 (81.9)			530 (85.3)	
Avoidance, cleaning and respiratory behaviour								
Cleaning or disinfecting things	Yes	1063	112 (18.2)	92 (20.5)	$\chi^2 = 0.85$, $p = 0.36$	615	115 (18.7)	0.47 (84.1)
	No		502 (81.8)	357 (79.5)			500 (81.3)	
Using sanitising hand gel	Yes	1069	136 (22.1)	123 (27.2)	$\chi^2 = 3.66$, $p = 0.06$	613	137 (22.3)	0.44 (80.6)
	No		480 (77.9)	330 (72.8)			476 (77.7)	
Reducing face touching	Yes	1045	74 (12.3)	73 (16.5)	$\chi^2 = 3.70$, $p = 0.05$	609	143 (23.5)	0.33 (80.1)
	No		528 (87.7)	370 (83.5)			466 (76.5)	
Washing hands more than usual	Yes	1064	179 (29.2)	141 (31.2)	$\chi^2 = 0.47$, $p = 0.49$	612	191 (31.2)	0.37 (73.6)
	No		433 (70.8)	311 (68.8)			421 (68.8)	
Avoiding people who have flu	Yes	1054	243 (40.0)	195 (43.8)	$\chi^2 = 1.63$, $p = 0.20$	602	243 (40.4)	0.47 (74.6)
	No		366 (60.0)	250 (56.2)			359 (59.6)	
Carrying tissues	Yes	1073	435 (70.6)	312 (68.3)	$\chi^2 = 0.68$, $p = 0.41$	621	472 (76.0)	0.57 (83.3)
	No		181 (29.4)	145 (31.7)			149 (24.0)	
Using tissues when sneezing or coughing	Yes	1069	499 (81.4)	365 (80.0)	$\chi^2 = 0.31$, $p = 0.58$	612	515 (84.2)	0.58 (87.9)
	No		114 (18.6)	91 (20.0)			97 (15.8)	
Putting tissues in bin after use	Yes	853	426 (86.6)	328 (90.9)	$\chi^2 = 3.71$, $p = 0.05$	509	475 (93.3)	0.47 (90.9)
	No		66 (13.4)	33 (9.1)			34 (6.7)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Efficacy of behaviours								
Meeting fewer people	Probably true	1070	407 (65.9)	291 (64.4)	$\chi^2 = 2.67$, $p = 0.26$	619	451 (72.9)	0.39 (71.9)
	Not sure		42 (6.8)	43 (9.5)			40 (6.5)	
	Probably false		169 (27.3)	118 (26.1)			128 (20.7)	
Cleaning or disinfecting surfaces	Probably true	1076	533 (86.2)	402 (87.8)	$\chi^2 = 0.58$, $p = 0.75$	621	543 (87.4)	0.29 (83.2)
	Not sure		35 (5.7)	24 (5.2)			31 (5.0)	
	Probably false		50 (8.1)	32 (7.0)			47 (7.6)	
Thoroughly and regularly washing hands	Probably true	1080	599 (96.5)	437 (95.2)	$\chi^2 = 2.67$, $p = 0.26$	620	599 (96.6)	0.26 (95.0)
	Not sure		6 (0.9)	10 (2.2)			10 (1.6)	
	Probably false		16 (2.6)	12 (2.6)			11 (1.8)	
Using sanitising hand gel	Probably true	1077	504 (81.3)	362 (79.2)	$\chi^2 = 1.02$, $p = 0.60$	618	521 (84.3)	0.33 (80.1)
	Not sure		41 (6.6)	37 (8.1)			43 (7.0)	
	Probably false		75 (12.1)	58 (12.7)			54 (8.7)	
Coughing or sneezing into tissues	Probably true	1079	605 (97.4)	444 (96.9)	$\chi^2 = 0.71$, $p = 0.70$	620	604 (97.4)	0.44 (97.3)
	Not sure		6 (1.0)	7 (1.5)			6 (1.0)	
	Probably false		10 (1.6)	7 (1.5)			10 (1.6)	
Avoiding touching face	Probably true	1073	477 (77.4)	352 (77.0)	$\chi^2 = 2.28$, $p = 0.32$	620	522 (84.2)	0.38 (79.3)
	Not sure		62 (10.1)	57 (12.5)			52 (8.4)	
	Probably false		77 (12.5)	48 (10.5)			46 (7.4)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Self-efficacy for behaviours								
Meeting fewer people	Probably true	1070	268 (43.5)	189 (41.6)	$\chi^2 = 0.90$, $p = 0.64$	621	293 (47.2)	0.35 (63.1)
	Not sure		43 (7.0)	38 (8.4)			52 (8.4)	
	Probably false		305 (49.5)	227 (50.0)			276 (44.4)	
Cleaning or disinfecting surfaces	Probably true	1077	500 (80.6)	361 (80.0)	$\chi^2 = 0.65$, $p = 0.72$	621	507 (81.6)	0.30 (77.6)
	Not sure		39 (6.3)	34 (7.4)			40 (6.4)	
	Probably false		81 (13.1)	62 (13.6)			74 (11.9)	
Thoroughly and regularly washing hands	Probably true	1080	609 (98.1)	437 (95.2)	$\chi^2 = 7.21$, $p = 0.03$	621	610 (98.2)	0.16 (96.9)
	Not sure		4 (0.6)	6 (1.3)			4 (0.6)	
	Probably false		8 (1.3)	16 (3.5)			7 (1.1)	
Carrying sanitising hand gel	Probably true	1076	433 (69.9)	320 (70.0)	$\chi^2 = 0.01$, $p = 0.99$	620	463 (74.7)	0.39 (74.4)
	Not sure		32 (5.2)	23 (5.0)			18 (2.9)	
	Probably false		154 (24.9)	114 (24.9)			139 (22.4)	
Carrying tissues	Probably true	1078	591 (95.2)	430 (94.1)	$\chi^2 = 0.98$, $p = 0.61$	621	590 (95.0)	0.38 (94.2)
	Not sure		5 (0.8)	3 (0.6)			6 (1.0)	
	Probably false		25 (4.0)	24 (5.3)			25 (4.0)	
Avoiding touching face	Probably true	1075	407 (66.0)	313 (68.3)	$\chi^2 = 0.71$, $p = 0.70$	621	438 (70.5)	0.33 (67.9)
	Not sure		66 (10.7)	47 (10.3)			51 (8.2)	
	Probably false		144 (23.3)	98 (21.4)			132 (21.3)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Perceptions of significant others								
Thoroughly and regularly washing hands	Probably true	1076	566 (91.3)	415 (91.0)	$\chi^2 = 1.58$, $p = 0.46$	621	586 (94.4)	0.34 (91.0)
	Not sure		28 (4.5)	16 (3.5)			14 (2.3)	
	Probably false		26 (4.2)	25 (5.5)			21 (3.4)	
Coughing or sneezing into tissues	Probably true	1071	538 (86.9)	375 (83.0)	$\chi^2 = 3.52$, $p = 0.17$	617	550 (89.1)	0.31 (84.9)
	Not sure		44 (7.1)	45 (10.0)			38 (6.2)	
	Probably false		37 (6.0)	32 (7.0)			29 (4.7)	
Expectations of most other people								
Thoroughly and regularly washing hands	Probably true	1074	506 (82.1)	386 (84.3)	$\chi^2 = 3.33$, $p = 0.19$	620	524 (84.5)	0.36 (81.1)
	Not sure		29 (4.7)	27 (5.9)			42 (6.8)	
	Probably false		81 (13.2)	45 (9.8)			54 (8.7)	
Coughing or sneezing into tissues	Probably true	1076	503 (81.4)	380 (83.0)	$\chi^2 = 6.78$, $p = 0.03$	620	512 (82.6)	0.28 (77.5)
	Not sure		45 (7.3)	45 (9.8)			50 (8.1)	
	Probably false		70 (11.3)	33 (7.2)			58 (9.4)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
General perceptions of flu								
Perceived severity (scale: responses of 4–12, with higher score indicating greater severity)	Low severity (score of 4–7)	1063	286 (46.6)	222 (49.4)	$\chi^2 = 0.85$, $p = 0.36$	612	250 (40.8)	0.63 (81.5)
	High severity (score of 8–12)		328 (53.4)	227 (50.6)			362 (59.2)	
Financial consequences of flu	Probably true	1076	89 (14.4)	77 (16.9)	$\chi^2 = 8.05$, $p = 0.02$	620	98 (15.8)	0.40 (79.6)
	Not sure		30 (4.8)	39 (8.6)			36 (5.8)	
	Probably false		501 (80.8)	340 (74.5)			486 (78.4)	
Difficulties for others	Probably true	1078	411 (66.3)	286 (62.4)	$\chi^2 = 6.75$, $p = 0.03$	619	364 (58.8)	0.41 (70.6)
	Not sure		28 (4.5)	38 (8.3)			32 (5.2)	
	Probably false		181 (29.2)	134 (29.3)			223 (36.0)	
Likelihood of catching flu	Probably true	1071	217 (35.3)	173 (37.9)	$\chi^2 = 4.22$, $p = 0.12$	620	187 (30.2)	0.39 (60.7)
	Not sure		130 (21.1)	112 (24.6)			135 (21.8)	
	Probably false		268 (43.6)	171 (37.5)			298 (48.1)	
Little control over catching flu	Probably true	1076	318 (51.3)	222 (48.7)	$\chi^2 = 1.28$, $p = 0.53$	619	325 (52.5)	0.29 (59.1)
	Not sure		74 (11.9)	64 (14.0)			58 (9.4)	
	Probably false		228 (36.8)	170 (37.3)			236 (38.1)	
Flu from food contamination	Probably true	1069	274 (44.5)	216 (47.7)	$\chi^2 = 1.09$, $p = 0.58$	619	311 (50.2)	0.42 (62.8)
	Not sure		176 (28.6)	123 (27.1)			146 (23.6)	
	Probably false		166 (26.9)	114 (25.2)			162 (26.2)	
Flu from surfaces	Probably true	1078	555 (89.5)	412 (90.0)	$\chi^2 = 1.87$, $p = 0.39$	621	571 (91.9)	0.24 (86.9)
	Not sure		37 (6.0)	32 (7.0)			33 (5.3)	
	Probably false		28 (4.5)	14 (3.0)			17 (2.7)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Flu from coughs and sneezes	Probably true	1079	599 (96.5)	428 (93.4)	$\chi^2 = 5.30$, $p = 0.07$	620	596 (96.1)	0.06 (93.2)
	Not sure		10 (1.6)	15 (3.3)			16 (2.6)	
	Probably false		12 (1.9)	15 (3.3)			8 (1.3)	
Easy to spot people with flu	Probably true	1074	101 (16.3)	97 (21.3)	$\chi^2 = 4.42$, $p = 0.11$	621	107 (17.2)	0.37 (72.2)
	Not sure		71 (11.5)	47 (10.3)			70 (11.3)	
	Probably false		447 (72.2)	311 (68.4)			444 (71.5)	
Antibiotics as effective treatment	Probably true	1079	87 (14.0)	92 (20.0)	$\chi^2 = 14.08$, $p = 0.00$	619	97 (15.7)	0.49 (77.5)
	Not sure		84 (13.5)	84 (18.3)			81 (13.1)	
	Probably false		449 (72.5)	283 (61.7)			441 (71.2)	
Sufficient information about flu	Probably true	1076	530 (85.8)	382 (83.4)	$\chi^2 = 1.45$, $p = 0.49$	621	538 (86.6)	0.27 (81.9)
	Not sure		35 (5.7)	27 (5.9)			41 (6.6)	
	Probably false		53 (8.6)	49 (10.7)			42 (6.8)	
Seeking help or advice about flu	Yes	1080	20 (3.2)	19 (4.1)	$\chi^2 = 0.64$, $p = 0.42$	621	10 (1.6)	Not applicable
	No		601 (96.8)	440 (95.9)			611 (98.4)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Behaviour if developed flu								
Staying at home	Probably true	1028	544 (90.7)	384 (89.7)	$\chi^2 = 0.61$, $p = 0.74$	597	548 (91.8)	0.58 (93.1)
	Not sure		16 (2.7)	15 (3.5)			10 (1.7)	
	Probably false		40 (6.7)	29 (6.8)			39 (6.5)	
Going to school, college, university or work as normal	Probably true	973	111 (19.4)	86 (21.4)	$\chi^2 = 1.74$, $p = 0.42$	583	94 (16.1)	0.58 (84.3)
	Not sure		25 (4.4)	23 (5.7)			31 (5.3)	
	Probably false		436 (76.2)	292 (72.8)			458 (78.6)	
Avoiding meeting people	Probably true	1029	504 (83.8)	351 (82.0)	$\chi^2 = 0.82$, $p = 0.66$	597	513 (85.9)	0.38 (84.0)
	Not sure		19 (3.2)	13 (3.0)			23 (3.9)	
	Probably false		78 (13.0)	64 (15.0)			61 (10.2)	
Taking over-the-counter remedies	Probably true	1029	525 (87.4)	366 (85.5)	$\chi^2 = 7.26$, $p = 0.03$	596	514 (86.2)	0.59 (90.3)
	Not sure		9 (1.5)	18 (4.2)			15 (2.5)	
	Probably false		67 (11.1)	44 (10.3)			67 (11.2)	
Taking complementary remedies	Probably true	1030	118 (19.6)	89 (20.7)	$\chi^2 = 0.29$, $p = 0.87$	596	120 (20.1)	0.49 (80.0)
	Not sure		26 (4.4)	20 (4.7)			33 (5.5)	
	Probably false		457 (76.0)	320 (74.6)			443 (74.3)	
Others could collect medicines or food	Probably true	1030	564 (93.8)	393 (91.6)	$\chi^2 = 1.90$, $p = 0.39$	597	568 (95.1)	0.35 (92.9)
	Not sure		6 (1.0)	6 (1.4)			8 (1.3)	
	Probably false		31 (5.2)	30 (7.0)			21 (3.5)	
Others could look after them	Probably true	1029	351 (58.4)	230 (53.7)	$\chi^2 = 2.23$, $p = 0.33$	596	359 (60.2)	0.62 (80.3)
	Not sure		31 (5.2)	25 (5.8)			31 (5.2)	
	Probably false		219 (36.4)	173 (40.4)			206 (34.6)	
Getting medical advice or treatment	Probably true	1030	276 (45.9)	203 (47.3)	$\chi^2 = 0.23$, $p = 0.89$	596	267 (44.8)	0.48 (70.0)
	Not sure		42 (7.0)	28 (6.5)			58 (9.7)	
	Probably false		283 (47.1)	198 (46.2)			271 (45.5)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Flu vaccinations								
Past vaccinations	Yes	1080	258 (41.5)	204 (44.4)	$\chi^2 = 1.58$, $p = 0.45$	621	261 (42.0)	0.79 (89.0)
	Not sure		16 (2.6)	15 (3.3)			11 (1.8)	
	No		347 (55.9)	240 (52.3)			349 (56.2)	
Vaccination this winter	Yes	1080	193 (31.1)	147 (32.0)	$\chi^2 = 1.11$, $p = 0.95$	621	194 (31.2)	0.97 (98.7)
	Not sure		4 (0.6)	3 (0.7)			3 (0.5)	
	No		424 (68.3)	309 (67.3)			424 (68.3)	
NHS vaccination offer (for those who have not been vaccinated)	Yes	740	91 (21.3)	51 (16.3)	$\chi^2 = 5.05$, $p = 0.08$	427	92 (21.5)	0.77 (91.5)
	Not sure		9 (2.1)	13 (4.2)			13 (3.0)	
	No		328 (76.6)	248 (79.5)			322 (75.4)	
NHS vaccination eligibility (for those who have not been vaccinated)	Yes	740	124 (29.0)	88 (28.2)	$\chi^2 = 1.86$, $p = 0.39$	427	130 (30.4)	0.69 (79.8)
	Not sure		118 (27.6)	100 (32.1)			121 (28.3)	
	No		186 (43.4)	124 (39.7)			176 (41.2)	
Paying to have a vaccination (for those who have not been vaccinated)	Yes	740	15 (3.5)	25 (8.0)	$\chi^2 = 7.48$, $p = 0.02$	427	9 (2.1)	0.41 (93.7)
	Not sure		13 (3.0)	7 (2.2)			11 (2.6)	
	No		400 (93.5)	280 (89.7)			407 (95.3)	
Vaccination intention (for those who have not been vaccinated)	Yes	740	22 (5.1)	30 (9.6)	$\chi^2 = 7.17$, $p = 0.03$	427	19 (4.4)	0.51 (91.8)
	Not sure		23 (5.4)	23 (7.4)			15 (3.5)	
	No		383 (89.5)	259 (83.0)			393 (92.0)	
Vaccination intention (if rules changed for ineligible respondents)	Yes	302	84 (46.7)	61 (50.0)	$\chi^2 = 2.56$, $p = 0.28$	175	74 (42.3)	0.67 (79.9)
	Not sure		17 (9.4)	17 (13.9)			24 (13.7)	
	No		79 (43.9)	44 (36.1)			77 (44.0)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Flu vaccinations in general								
Vaccinations disagreement	True	1075	47 (7.6)	38 (8.3)	$\chi^2 = 3.15$, $p = 0.21$	619	47 (7.6)	0.38 (85.9)
	Not sure		32 (5.2)	35 (7.7)			30 (4.8)	
	False		540 (87.2)	383 (84.0)			542 (87.6)	
Needle dislike	True	1070	188 (30.5)	158 (34.9)	$\chi^2 = 2.33$, $p = 0.31$	617	204 (33.1)	0.67 (84.7)
	Not sure		17 (2.8)	12 (2.6)			11 (1.8)	
	False		412 (66.8)	283 (62.5)			402 (65.2)	
Do not need the vaccine: healthy	True	1075	306 (49.5)	213 (46.6)	$\chi^2 = 2.90$, $p = 0.64$	618	288 (46.6)	0.64 (79.7)
	Not sure		44 (7.1)	35 (7.7)			40 (6.5)	
	False		268 (43.4)	209 (45.7)			290 (46.9)	
Do not need the vaccine: unlikely to catch flu	True	1073	120 (19.4)	70 (15.4)	$\chi^2 = 2.87$, $p = 0.24$	615	122 (19.8)	0.47 (74.6)
	Not sure		79 (12.8)	59 (13.0)			72 (11.7)	
	False		420 (67.9)	325 (71.6)			421 (68.5)	
Too busy to get vaccine	True	1076	93 (15.0)	77 (16.9)	$\chi^2 = 2.25$, $p = 0.32$	620	97 (15.6)	0.44 (82.7)
	Not sure		20 (3.2)	21 (4.6)			15 (2.4)	
	False		507 (81.8)	358 (78.5)			508 (81.9)	
Appointment difficulty	True	1071	95 (15.4)	96 (21.1)	$\chi^2 = 6.07$, $p = 0.05$	613	85 (13.9)	0.46 (72.6)
	Not sure		109 (17.7)	79 (17.4)			132 (21.5)	
	False		413 (66.9)	279 (61.5)			396 (64.6)	
Health care practitioner recommendation: get vaccine	True	1077	259 (41.9)	206 (44.9)	$\chi^2 = 0.97$, $p = 0.62$	619	250 (40.4)	0.63 (80.5)
	Not sure		23 (3.7)	17 (3.7)			20 (3.2)	
	False		336 (54.4)	236 (51.4)			349 (56.4)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Health care practitioner recommendation: do not get vaccine	True	1076	32 (5.2)	18 (4.0)	$\chi^2 = 1.93$, $p = 0.38$	619	22 (3.6)	0.21 (88.0)
	Not sure		23 (3.7)	23 (5.0)			22 (3.6)	
	False		566 (91.1)	414 (91.0)			575 (92.9)	
Insufficient information about vaccine	True	1074	197 (31.9)	183 (40.1)	$\chi^2 = 7.83$, $p = 0.02$	620	178 (28.7)	0.35 (63.4)
	Not sure		70 (11.3)	46 (10.1)			78 (12.6)	
	False		351 (56.8)	227 (49.8)			364 (58.7)	
Confusion about vaccine	True	1068	80 (13.0)	73 (16.1)	$\chi^2 = 6.79$, $p = 0.03$	615	73 (11.9)	0.35 (77.2)
	Not sure		57 (9.3)	59 (13.0)			49 (8.0)	
	False		478 (77.7)	321 (70.9)			493 (80.2)	
Lack of testing	True	1070	44 (7.1)	44 (9.7)	$\chi^2 = 4.95$, $p = 0.08$	610	50 (8.2)	0.50 (73.6)
	Not sure		206 (33.4)	168 (37.1)			187 (30.7)	
	False		367 (59.5)	241 (53.2)			373 (61.1)	
Short-term side effects	True	1074	269 (43.5)	210 (46.1)	$\chi^2 = 1.39$, $p = 0.50$	619	266 (43.0)	0.50 (67.7)
	Not sure		175 (28.3)	132 (28.9)			180 (29.1)	
	False		174 (28.2)	114 (25.0)			173 (27.9)	
Long-term health problems	True	1076	36 (5.8)	30 (6.6)	$\chi^2 = 0.28$, $p = 0.87$	617	32 (5.2)	0.47 (74.8)
	Not sure		187 (30.2)	137 (30.0)			154 (25.0)	
	False		397 (64.0)	289 (63.4)			431 (69.9)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Flu season protection	True	1076	502 (81.1)	312 (68.3)	$\chi^2 = 23.98$, $p < 0.001$	619	501 (80.9)	0.50 (84.0)
	Not sure		86 (13.9)	112 (24.5)			83 (13.4)	
	False		31 (5.0)	33 (7.2)			35 (5.7)	
Medication interaction	True	1070	73 (11.8)	50 (11.0)	$\chi^2 = 1.66$, $p = 0.44$	617	61 (9.9)	0.40 (67.4)
	Not sure		179 (29.0)	148 (32.7)			188 (30.5)	
	False		365 (59.2)	255 (56.3)			368 (59.6)	
Manufacturers making money	True	1072	51 (8.3)	42 (9.2)	$\chi^2 = 5.18$, $p = 0.08$	616	50 (8.1)	0.47 (78.9)
	Not sure		98 (15.9)	95 (20.9)			107 (17.4)	
	False		468 (75.9)	318 (69.9)			459 (74.5)	
Vaccine is effective	True	1076	447 (72.3)	337 (73.6)	$\chi^2 = 1.48$, $p = 0.48$	617	457 (74.1)	0.45 (76.7)
	Not sure		99 (16.0)	78 (17.0)			95 (15.4)	
	False		72 (11.7)	43 (9.4)			65 (10.5)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Flu vaccinations (child)								
Past vaccinations	Yes	315	22 (12.7)	12 (8.5)	$\chi^2 = 4.53$, $p = 0.10$	168	25 (14.9)	0.48[b] (87.5)
	Not sure		7 (4.0)	13 (9.2)			7 (4.2)	
	No		144 (83.2)	117 (82.4)			136 (81.0)	
Vaccination this winter	Yes	315	14 (8.1)	6 (4.2)	$\chi^2 = 2.86$, $p = 0.24$	168	12 (7.1)	0.59[b] (95.8)
	Not sure		3 (1.7)	5 (3.5)			6 (3.6)	
	No		156 (90.2)	131 (92.3)			150 (89.3)	
NHS vaccination offer	Yes	295	3 (1.9)	5 (3.7)	$\chi^2 = 0.99$, $p = 0.61$	156	1 (0.6)	0.42[b] (90.9)
	Not sure		16 (10.1)	12 (8.8)			12 (7.7)	
	No		140 (88.1)	119 (87.5)			143 (91.7)	
NHS vaccination eligibility	Yes	295	14 (8.8)	17 (12.5)	$\chi^2 = 1.26$, $p = 0.53$	156	13 (8.3)	0.47[b] (69.5)
	Not sure		74 (46.5)	64 (47.1)			57 (36.5)	
	No		71 (44.7)	55 (40.4)			86 (55.1)	
Paying to have NHS vaccination	Yes	295	5 (3.1)	6 (4.4)	$\chi^2 = 0.41$, $p = 0.81$	156	2 (1.3)	0.31[b] (91.6)
	Not sure		7 (4.4)	5 (3.7)			8 (5.1)	
	No		147 (92.5)	125 (91.9)			146 (93.6)	
Vaccination intention	Yes	295	5 (3.1)	10 (7.4)	$\chi^2 = 3.09$, $p = 0.21$	156	5 (3.2)	0.46[b] (88.3)
	Not sure		17 (10.7)	17 (12.5)			8 (5.1)	
	No		137 (86.2)	109 (80.1)			143 (91.7)	
Vaccination intention (if rules changed for ineligible respondents)	Yes	262	48 (33.6)	52 (43.7)	$\chi^2 = 3.97$, $p = 0.14$	143	51 (35.7)	0.55[b] (68.4)
	Not sure		45 (31.5)	26 (21.8)			33 (23.1)	
	No		50 (35.0)	41 (34.5)			59 (41.3)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Flu vaccinations in general (child)								
Needle dislike	True	315	104 (60.1)	77 (54.2)	$\chi^2 = 2.69$, $p = 0.26$	167	104 (62.3)	0.70[b] (79.6)
	Not sure		11 (6.4)	16 (11.3)			6 (3.6)	
	False		58 (33.5)	49 (34.5)			57 (34.1)	
Do not need the vaccine: healthy	True	314	99 (57.6)	86 (60.6)	$\chi^2 = 0.73$, $p = 0.69$	168	101 (60.1)	0.57[b] (73.7)
	Not sure		25 (14.5)	16 (11.3)			20 (11.9)	
	False		48 (27.9)	40 (28.2)			47 (28.0)	
Do not need the vaccine: unlikely to catch flu	True	314	29 (16.9)	25 (17.6)	$\chi^2 = 0.28$, $p = 0.87$	167	34 (20.4)	0.32[b] (67.5)
	Not sure		27 (15.7)	25 (17.6)			33 (19.8)	
	False		116 (67.4)	92 (64.8)			100 (59.9)	
Too busy to get vaccine	True	314	9 (5.2)	4 (2.8)	$\chi^2 = 1.50$, $p = 0.47$	168	11 (6.5)	0.51[b] (90.4)
	Not sure		4 (2.3)	5 (3.5)			4 (2.4)	
	False		159 (92.4)	133 (93.7)			153 (91.1)	
Health care practitioner recommendation: get vaccine	True	315	21 (12.1)	19 (13.4)	$\chi^2 = 2.66$, $p = 0.26$	168	21 (12.5)	0.49[b] (85.1)
	Not sure		11 (6.4)	16 (11.3)			5 (3.0)	
	False		141 (81.5)	107 (75.4)			142 (84.5)	
Health care practitioner recommendation: do not get vaccine	True	314	10 (5.8)	6 (4.3)	$\chi^2 = 0.51$, $p = 0.78$	168	7 (4.2)	0.26[b] (85.7)
	Not sure		16 (9.2)	15 (10.6)			6 (3.6)	
	False		147 (85.0)	120 (85.1)			155 (92.3)	
Medication interaction	True	314	6 (3.5)	6 (4.2)	$\chi^2 = 0.58$, $p = 0.75$	168	8 (4.8)	0.45[b] (79.6)
	Not sure		36 (20.9)	34 (23.9)			20 (11.9)	
	False		130 (75.6)	102 (71.8)			140 (83.3)	

Item	Response scale	Sample size (time 1)[a]	Time 1 data for those who did respond at time 2 (%)	Time 1 data for those who did not respond at time 2 (%)	Difference in time 1 data between responders and non-responders	Sample size (time 2)[a]	Time 2 data (%)	Kappa coefficient for test–retest reliability (% agreement)
Emotions								
Anxiety (scale: responses of 4 to 20, with higher scores indicating greater anxiety)	Low anxiety (score of 5 or 6)	1041	300 (49.9)	191 (43.4)	$\chi^2 = 4.32$, $p = 0.04$	608	348 (57.2)	0.37 (68.4)
	High anxiety (score of ≥ 7)		301 (50.1)	249 (56.6)			260 (42.8)	

a Sample sizes exclude responses of 'don't know', 'not applicable' or 'no opinion'.
b Kappa coefficient based on subset of children who were believed to be the same at both time points (based on same sex and age).

Appendix 4 Protocol

Project Title

Evaluating and Improving Communication with the Public During a Pandemic, Using Rapid Turn-Around Telephone Surveys (NIHR Reference: 10/45/21)

How the Project has Changed since the Expression of Interest was Submitted:

The project has changed to take account of suggested revisions made by the funders and the peer reviewers during the course of the application process. Substantive changes include the translation of our survey into Welsh, increased public and patient involvement and the inclusion of questions relating to children.

Planned Investigation

Research objectives

1. To select outcome measures for a new telephone survey that will allow the Department of Health to track the uptake of key behavioural recommendations among the general public during a future influenza pandemic.

2. To select predictor variables for these outcomes that are well-grounded in psychological theory and are amenable to change using a multimedia communications campaign.

3. To test and refine the clarity and reliability of the outcome and predictor variables during a normal influenza season.

4. To test the feasibility of using a sampling strategy for the telephone survey that incorporates a prospective design.

5. To assist the Department of Health in launching our new survey design when a pandemic occurs, to analyse the results in real-time and to provide regular feedback to the Department of Health on the implications of the results for their communications strategy.

6. To adapt the survey as required during the pandemic, so as to meet the developing needs of the Department of Health and other key stakeholders, and to incorporate the results of any new research.

Existing research

The low uptake of recommended protective behaviours during a pandemic

During the 2009 to 2010 influenza H1N1/A ('swine flu') pandemic, the Department of Health used an extensive multimedia campaign to inform the public about the nature of swine flu and to encourage people to adopt various behaviours. Several types of behaviour were singled out as particularly important. First, people were asked to wash their hands regularly using soap and water or sanitising gel, and to use and dispose of tissues when coughing or sneezing. Second, people were given a series of recommendations about the most appropriate ways of accessing

information and healthcare services, such as using a nominated 'flu friend' to collect antiviral medication or telephoning a helpline if ill rather than presenting in person at a healthcare facility. Third, in the latter stages of the pandemic people in defined 'at-risk' groups were advised to have the new vaccination against swine flu. These behaviours would have reduced the overall impact of the pandemic by delaying or reducing the spread of illness (1;2) and by preventing frontline medical staff from being overwhelmed by patients who were experiencing mild symptoms (3;4). Unfortunately, the uptake for these behaviours was low (see Table 1 for rates).

Table 1: Uptake of behaviours recommended by the Government among the British population during the 2009/10 swine flu pandemic.

Reference	Recommended behaviour	Percentage of the population performing that behaviour	Method and date of data collection
Rubin et al 2009 (5)	Washing hands with soap and water more often than usual	28.1%	Cross-sectional telephone survey, 8 to 12 May 2009
Rubin et al 2009 (5)	Increasing the amount you clean or disinfect hard surfaces	17.3%	Cross-sectional telephone survey, 8 to 12 May 2009
Rubin et al 2009 (5)	Making a mutual support plan with a 'flu friend.'	15.2%	Cross-sectional telephone survey, 8 to 12 May 2009
Rubin et al 2010 (6)	Carrying tissues with you	33.1%	Cross-sectional telephone survey, 1 to 17 May 2009
Rubin et al 2010 (6)	Buying sanitising hand gel	9.5%	Cross-sectional telephone survey, 1 to 17 May 2009
Sethi & Pebody 2010 (7)	Having the swine flu vaccine	37.6% of at-risk patients	Primary care reporting system, cumulative data for period up to 31 March 2010

It is likely that the uptake of recommended behaviours will also be low during the next pandemic, particularly as the official response to the swine flu outbreak is now seen by some as having been an over-reaction (6). Persuading members of the public to view a new influenza outbreak as a personally relevant health threat and encouraging them to adopt those

behaviours that are being recommended by the Government will therefore pose a substantial challenge. The main burden of meeting this challenge will fall on the Department of Health's communications team (8).

Although encouraging people to change their behaviour over a short period of time and in the face of scientific uncertainty about the nature of the new influenza outbreak will not be easy, several strategies can help with this task. One of the most important strategies is to obtain regular feedback from the general population, ensuring that communication during the pandemic becomes a two-way process between the Government and the public. Among other things, this feedback can be used to identify current levels of uptake or likely uptake of recommended behaviours; to identify demographic or psychological variables that show strong correlations with uptake and which therefore suggest targets for future communication campaigns; and to assess whether new communication strategies, policy announcements or major events are associated with changes in the uptake of particular behaviours.

The potential for telephone surveys to provide feedback

In normal circumstances, several options are available for obtaining feedback from the general public about their behaviours and perceptions. During a pandemic, however, these options are heavily constrained by the need to obtain information quickly and by the speed with which the outbreak can develop. In practice, telephone surveys commissioned though market research companies remain the most pragmatic and robust way of obtaining the quantitative data about public reactions that is required to inform policy decisions in real time (9;10). Within Britain, such surveys typically use random digit dial (to ensure that every landline telephone number in the country has an equal chance of being called) and proportional quota sampling (to ensure that the eventual sample is demographically representative of the population, using Census data as the gold standard). Using these techniques, data from over 1000 participants can be collected within a period of three days, with a top-line summary of the results being available almost immediately and a spreadsheet of individual-level data being available for full analysis within a week. This speed reduces the risk that major events or news stories will disrupt the ongoing data collection. It also allows the findings to be used to inform policy quickly. The trade-off for this speed is a low response rate, with around 10% being typical. Importantly, however, these response rates are rarely associated with high levels of non-response bias for most outcomes of interest. Several studies have demonstrated that improving telephone survey response rates by 5, 25 or even 50 percentage points has little impact on their results (11-15), while one recent comparison of the results of a rapid turnaround telephone survey (response rate 9%) against a more traditional postal survey (response rate 51%) found that the telephone survey produced a more accurate estimate of the known level of healthcare use among the target population than the postal survey (16). As a result, the use of telephone surveys to obtain feedback from a population during a crisis has becoming an accepted part of any fully-formed public health response (10;17).

The telephone surveys used in Britain during the swine flu pandemic

During the swine flu outbreak, a series of 39 cross-sectional telephone surveys was commissioned by the Department of Health to obtain information on public perceptions of, and behavioural responses to, the pandemic. Questions for these surveys were designed by the Department of Health in collaboration with Ipsos MORI, the market research company that conducted the data collection. Each survey collected data from a new sample of approximately 1050 participants, with data collection taking three days to complete for each. As part of a previous NIHR grant, our team was given access to the resulting dataset, with a remit to add value by using psychological theories to understand the associations within the data. The four reports we provided to the Department of Health during the pandemic have since been published (6;18). These identified several important findings. Most notably, we were able to demonstrate that the Department's communications campaign was having a beneficial effect on people's behaviours and that this was mediated by the impact their advertising had on people's perceptions about the efficacy of the behaviours. We were also able to identify concern about the efficacy and side effects of the swine flu vaccine and low levels of worry about the illness itself as important reasons resulting in low intended uptake of the vaccine among the general public. Finally, we observed strong associations between the level of media reporting about the pandemic and the level of worry in the community in the first few months of the outbreak, although it appeared that people were not worried by media reporting until the first swine flu cases started to appear in Britain and that they had habituated to the high level of reporting by the time the second peak of swine flu occurred during the winter of 2009/10. Our work with this dataset later won an award for Best Scientific Work at the 2010 UK Society for Behavioural Medicine Conference.

One of the key learning points from our work, however, was that substantial room for improvement existed in the design of the surveys themselves. Four key problems hampered our ability to draw useful conclusions from the data. First, several important outcome variables were not measured at all. For example, although the importance of good hand hygiene was a central recommendation in most of the Department of Health's communications material, the early surveys did not include any questions relating to this behaviour. Second, the surveys lacked an underlying theoretical basis, meaning that many key variables specified by theories in health psychology that might have provided useful insight into the reasons why people were not taking up recommended behaviours were not assessed. Third, those questions which were included were sometimes poorly worded, making interpretation difficult. For example, the sole question used to assess worry about the outbreak asked participants "how worried, if at all, would you say you are now about the possibility of personally catching swine flu." This conflated feelings of worry about the illness with perceptions about the likelihood of catching it. Fourth, because a new sample was recruited for each survey, the data were cross-sectional, making it difficult to determine causality from the associations we observed.

Pre-pandemic research to improve the survey methodology

The speed with which the surveys needed to be designed, written and put into the field accounted for many of these shortcomings. So too did the limited contact that occurred at the start of the pandemic between the Department of Health's communications team and their behavioural science expert panel, the Behaviour and Communication sub-group of the Scientific Pandemic Influenza Advisory Committee (SPI-B&C). Expert review panels have since considered these difficulties and produced two relevant recommendations. First, in her official review of the UK's response to the pandemic, Dame Deirdre Hine recommended that "the Department of Health should build relationships between [SPI-B&C] and the Department of Health's policy and communications teams so that SPI-B&C's expertise can be used… in planning for vaccine uptake and other relevant policy areas" (Recommendation 13 (19)). Second, in their document on "Lessons to be learned from the A/H1N1 pandemic," the Council of the European Union observed that "polls and surveys are considered to be essential tools for understanding the perceptions and behaviours of our citizens in a health crisis. These methods make it possible to monitor changes in behaviour and, consequently, to assess whether we are passing on the right messages. A plan for conducting polls / surveys must be established *before* a crisis" (emphasis added (20)). In this application, we propose fulfilling both recommendations by having a team of behavioural scientists and survey specialists (including the Chair of SPI-B&C) work in partnership with the Department of Health to develop a new survey template and to complete the main preparatory work for this survey before the next pandemic occurs. Our preparatory work will result in a new survey template that offers four advantages over the existing approach:

1. We will ensure that the most relevant outcomes are included in the survey.
2. We will ensure that psychological predictor variables are selected for inclusion that are well-grounded in psychological theory and that are amenable to change through a communications campaign.
3. We will test all questions for clarity and reliability, revising them as necessary.
4. We will assess whether, in this instance, the benefits of using a prospective design for data collection outweigh the costs.

Our four preparatory aims are justified further below.

1. Choice of outcomes for the survey

The choice of which outcome variables to assess will be determined as part of the project, in collaboration with the Department of Health, the Health Protection Agency and other stakeholders. However, existing literature suggests five types of outcome will be particularly important to assess:

- Hand hygiene using soap and water or sanitising gel, which is known to reduce the spread of respiratory infections and is likely to be recommended in any future pandemic (1).

- Carrying and using tissues, which is also known to reduce the spread of respiratory infections and is likely to be recommended in any future pandemic (1).

- Intended and actual vaccine uptake. Vaccination represents our best weapon against an influenza pandemic. During the early phases of a pandemic, however, a vaccine will not be available and decisions as to who should receive it may not have been made. Initially, it will therefore be important to assess intended uptake across the entire population, followed by actual uptake amongst those who are eligible to receive it.

- The presence of influenza-like symptoms and the propensity to use healthcare services if ill. Measuring changes in the prevalence of influenza-like illness among the general population is a pressing concern for infectious disease modellers who wish to predict the likely future course of an outbreak. Basing models on the known consultation rates for influenza-like illness is problematic, however, as a person's propensity to seek medical attention for flu-like symptoms is influenced by fluctuating levels of worry and media reporting (21;22). Telephone surveys provide a quick and cost-effective way to assess the prevalence of influenza-like symptoms in the community (23) and were used for this purpose by some countries during the swine flu pandemic (24;25). They may also help in the analysis of more traditional consultation-based data by providing information on the likelihood of someone seeking care if symptomatic.

- Appropriate use of healthcare facilities. Assessing where an individual will go to seek help if ill is also likely to be relevant data for communicators, who may wish to divert patients with mild illness away from front line services and ensure that people with information needs and health care needs access the most appropriate type of care (3;4).

2. Use of theory to select predictor variables

Two recent systematic reviews by members of our team have assessed psychological predictors of behaviour during pandemics and analogous infectious disease outbreaks (26;27). These have suggested that variables associated with a psychological model called Protection Motivation Theory (28) are well suited to explaining whether a person will perform behaviours such as washing hands or being vaccinated. This theory states that an individual's motivation to protect themselves from a threat is influenced by their appraisal of the threat and by their appraisal of the techniques that are available to protect themselves. Threat appraisal encompasses perceptions about the severity of the threat and the likelihood of being affected by it, factors which may in turn trigger anxiety or worry. Coping appraisal is composed of perceptions about the efficacy of specific protective behaviours, the costs associated with them, and the person's

own ability to perform the behaviours (their 'self efficacy'). In line with the theory, the two systematic reviews observed repeated associations in the literature between behaviour and each of these components (26;27). In the case of vaccination, for example, low perceived threat, low worry, fears about the safety of the vaccine and a perceived lack of benefit to the vaccine were particularly associated with lower likelihood of uptake (27). Remarkably few of the studies included in the reviews measured all aspects of the model, however, limiting the usefulness of any single study in informing policy.

In addition to measuring the psychological factors that are likely to predict behaviour during a pandemic, identifying where people are receiving pandemic information from and how much they trust that information source is another key requirement for any survey if it is to be of practical use to a communications team. Assessing whether people who have received information via a particular source such as Government advertising, their primary care physician or Twitter are more or less likely to engage in particular behaviours, and whether that association is mediated by any of the variables specified by Protection Motivation Theory, would make it possible for communications teams to specifically target those sources with better information.

3. Testing questions for clarity and reliability

At present, no psychometrically tested set of items exist which can be used to measure most of the outcome or predictor variables that we would wish to assess. While a small number of items have been developed for use in a pandemic within Australia (29), their usefulness in a British sample has not been tested. Similarly, although some existing generic scales might be used to measure concepts such as anxiety or worry during a pandemic, their length often makes it difficult to incorporate them within a telephone survey which should be, at most, about 15 minutes long. As a result, many previous studies in this field have relied on questionnaires that were developed quickly after the outbreak of an infectious disease was detected. This has resulted in questions that are ambiguous to participants (e.g. (18)), conflate different theoretical concepts (e.g.(30)) or have unknown test-retest reliability, making it difficult to assess changes over time. Spending time prior to a pandemic developing, testing and refining a questionnaire is essential if these problems are to be avoided.

4. Use of a prospective design

Another weakness noted in the literature to date is the heavy reliance on cross-sectional surveys (26;27). This creates problems in interpreting the direction of causality within the data. Prospective designs are often seen as preferable, but these too come at a cost. In particular, the

accumulating attrition of participants over time may result in accumulating bias. As such, prospective designs can be inappropriate when the main aim of a study is to track aggregate trends over time (17). Ways exist of minimizing attrition, however. For example, following Hurricane Katrina, prospective surveys of mental health needs within the New Orleans area achieved 90% follow-up rates by asking participants to commit to a future follow-up at the initial recruitment stage and by increasing their 'ownership' of the survey by designating participants as Members of the New Orleans Consumer Advisory Group. Assessing whether such strategies can reduce attrition to reasonable levels within a British study relating to influenza remains to be seen.

Aims during the pandemic

Our four pre-pandemic aims are essential in ensuring that a useful, robust survey template is available for immediate use in the next pandemic. However, it is also important that the data from these surveys are analysed appropriately during the pandemic, that their implications are discussed with policy makers in a timely manner, and that unexpected changes in the pandemic or developments in research are reflected by timely changes to the survey questions. Our fifth and sixth aims for this research relate to work which will be conducted during the pandemic period and which will meet these challenges.

5. We will analyse the survey data in real-time during the next pandemic, liaising closely with the Department of Health communications team and other stakeholders to ensure that our analyses produce policy-relevant results.

6. We will adjust the survey template to meet unexpected developments in policy, the outbreak, or other research findings.

Research methods

Our study will include four stages. The first three concern the selection of variables, preliminary testing and refinement of survey questions, and the piloting of the full survey during a normal influenza season. The study will then be put on hold until a pandemic occurs. At this point, the survey will be deployed as required by the Department of Health. The fourth stage of our research will consist of our team analysing the data during the pandemic, reporting on it for the Department of Health and adapting the survey as required.

Stage One: Selection of Outcome and Predictor Variables, and Item Generation

A kick-off meeting will be held at the start of Month One for our study. This will include representatives from our key stakeholders: namely, the Department of Health communications team, the Health Protection Agency's Modelling and Economics Unit, the Health Protection Agency's Emergency Response Department and the SPI B&C sub-committee. A prioritised list of outcome variables that are of importance to these groups will be developed, though initial contact suggests that behaviours linked to respiratory and hand hygiene, healthcare use, information seeking and vaccine uptake are likely to predominate.

Based on these priorities, we will re-review the literature that has already been compiled in our earlier systematic reviews (26;27). This re-review will be used to highlight those psychological and demographic variables that have previously been shown to predict selected outcome variables. We will use Protection Motivation Theory as an overarching guide to ensure that we develop items relevant to the perceived likelihood and severity of catching pandemic flu, the perceived efficacy and costs of the behaviour, self-efficacy and emotional response to the pandemic (including items relating to worry). In addition to asking items about the participant, we will also include items concerning their children (e.g. intended vaccination of the child). Item generation for outcome and predictor variables will be based on existing items identified in the literature (26;27) or in our own previous work in this area (5;6;31). As part of this work, we will also produce items to assess where a member of the public has received information from relating to influenza, and how much they trust that source, based on previous work by our group (5;6;21). The resulting 'long-list' of draft items will then be reviewed for clarity and usefulness by the project team and at a second stakeholder meeting to occur in Month Two.

Stage Two: Cognitive Testing of Items

Up to three rounds of cognitive interviews will be used to test the newly developed items for their comprehensibility, face validity and usability in the context of a telephone interview. Participants for these cognitive interviews will be recruited using an existing database of potential research volunteers maintained by King's College London (Mindsearch: http://mindsearch.iop.kcl.ac.uk/). Participants for each round of interviews will be purposively selected to ensure that sufficient numbers of people within predefined quotas for age, gender, ethnicity and educational level are included.

Participants will be asked to take part in a telephone interview in order to replicate the conditions under which our items will be used during a pandemic. Participants will be read each item in turn, asked to provide their answer and asked to explain the reasoning behind their response. Where required, they will also be asked to explain what they believe the question is asking and / or to suggest an alternative wording for the question. This process, which is a

standard way of piloting questionnaire items (32), will allow us to assess the comprehensibility and usability of the questions. By assessing whether participant perceptions of the meaning of items matches our own interpretation of them, we will also be able to assess the face validity of the items.

Items which are identified by two or more participants in any given round of interviews as being difficult to understand or answer will be reworded. These revisions will then be tested in the next round of interviews.

To enhance the patient and public involvement in this research, participants in Stage Two will be also asked their views on: whether questions are overlapping, whether questions seem to be missing entirely, the appropriateness of our proposed sampling strategy for Stage Three and the appropriateness of our informed consent procedure for Stage Three. Two participants from Stage Two will also be asked to join our stakeholder group.

Stage Three: Pilot Surveys

After we have produced a list of useable predictor and outcome variable items, we will pilot these further in a telephone survey of a representative sample of the general population of Britain (n=1,067), with a follow-up survey of the same sample occurring seven days later. We will use the first survey to assess the factor structure and internal consistency of any scales that are produced as a result of Stages One and Two, and to produce baseline data for eventual comparison against the pandemic data obtained in Stage Four. We will use the follow-up survey to assess the test-retest reliability of our items and scales, and to assess the possible non-response bias associated with a follow-up survey in this context.

The first survey will be conducted during a normal flu season and will use an identical sampling strategy to that which is conventionally used for rapid turn-around psychosocial surveillance surveys with Britain (6;10). This will use random digit dialling and proportional quota sampling, with quotas based on the most recent Census data for age, gender, geographical region and social grade (33). To be eligible for the survey, respondents will be aged 16 or over and speak English or Welsh (we will produce a Welsh language translation of the survey items). Data collection will be limited to a three or four day time-period, allowing us to obtain a stable snap-shot of perceptions and behaviours at a single period in time. Data collection for the survey will be subcontracted to a specialist market research company.

The first survey will be presented to potential respondents as a Healthcare Advisory Panel, which we would like them to join as members. The exact name for the panel will be confirmed with our stakeholders and piloted with the participants of our Stage Two cognitive interviews. Survey participants will be informed that if they would like to take part, we would require them to complete two surveys, one week apart. They will also be asked to make a firm date for the second survey with the interviewer and to provide at any additional telephone numbers that they can be contacted on. After verbal consent has been obtained, participants will be asked to complete our new survey template. This will be limited to 15 minutes in length. Participants will then be re-contacted seven days later and asked to complete the survey again. Up to seven attempts will be made to re-contact each participant.

On-Hold Period

At the end of Stage Three, the project will be placed on-hold until the commencement of a pandemic or other significant event that requires rapid psychosocial surveillance. To enable us to begin promptly when a pandemic occurs, we will produce an interim report at the end of Stage Three. This will include the full wording for all items in our survey template and details about the results of testing with these items. The report will serve as an easy-to-use instruction manual for the survey, for use when the pandemic occurs. At the end of Stage Three, we will also seek to produce a memorandum of understanding with our stakeholders. This will specify the expectations and responsibilities for the various parties for the final stage of our work, allowing us to begin work swiftly once a pandemic has been declared. At the end of Stage Three, an ethics application for our Stage Four pandemic work will also be submitted, requesting pre-emptive approval for the work. We will renew this application annually.

Stage Four: Analysis of Surveys Conducted During the Pandemic

When a pandemic or significant epidemic occurs, Stage Four of our research can be activated immediately. A first survey using our new template can be put into the field within a matter of days. The decision on when to launch the survey while be made in conjunction with the Department of Health. Data collection will be subcontracted to a market research company and will follow an identical sampling strategy to that used for the baseline survey in Stage Three. Repeated surveys incorporating a new sample of participants can then be run weekly, allowing us to track aggregate level changes in behaviour and perceptions over time. Depending on the results of Stage Three with respect to the extent of non-response bias, it will also be possible to commission additional follow-up studies for specific samples of participants, allowing us to assess changes in perceptions and behaviour over time using individual-level data.

Following the same successful working model that our team established with the Department of Health during the 2009/10 pandemic (6), we propose that data collection for the Stage Four surveys will be commissioned and managed by the Department of Health. The role of our research team will be to analyse the data, provide feedback to the Department of Health and other stakeholders as to the practical implications of our results, and to adapt the surveys as required should unexpected developments occur.

Two primary analyses are planned for Stage Four. First, weekly cross-sectional data will be pooled across surveys as required to increase statistical power. They will then be analysed multivariately to investigate associations between the use of specific information sources and behaviour. We will also assess the possible psychological mediators of these associations, using Protection Motivation Theory as our guiding model. Trust in information sources and variations across region, socioeconomic status and other demographic variables will be assessed as potential moderator variables. Analyses will be based on structural equation modelling, with separate models being constructed for each outcome variable.

Second, a longitudinal assessment of changes in aggregate perceptions or behaviour over time will be conducted to identify if specific events or major policy announcements are associated with shifts in perceptions or behaviour. It is unlikely that enough surveys will be conducted to allow us to perform a statistical analysis of these trends. However, plotting survey data over time will provide a useful indication of any large effects. The longitudinal data will also allow us to explore the association between perceptions and behaviour with other metrics relating to information dissemination, including the volume of reporting in the mass media (as measured using the Nexis database which catalogues all national and regional newspaper reports www.lexisnexis.com/nexis) and a range of Internet-based metrics including the volume of Twitter posts and blog comments. These analyses will require us to use data from as many surveys as possible, to increase statistical power. By necessity they will therefore occur at the end of Stage Four and will assist academics and policy makers to learn the lessons of the pandemic.

Throughout Stage Four, we will hold meetings with our stakeholders on at least a monthly basis. This will provide an opportunity to discuss the practical implications of our results for the on-going communications strategy and other work. It will also provide an opportunity to discuss any recent developments with the pandemic, public health policy or research from other teams which necessitate changes being made to the survey.

Planned inclusion / exclusion criteria

Participants for Stages 2 to 4 will be eligible for inclusion if they are aged 16 or over and speak English or Welsh.

Ethical arrangements

Ethics applications for Stages Two, Three and Four will be submitted to the King's College London Research Ethics Committee. Participants for Stage Two will be drawn from an existing database of people who wish to be considered for inclusion in research of this type. Members of this database will be sent our information sheet and invited to contact us if they wish to take part. We foresee no particular ethical issues for this Stage. Participants for Stages Three and Four will consist of members of the public whose telephone number has been selected at random by the market research company. This is a standard procedure for telephone surveys of this nature and has been approved by our Ethics Committee for several similar studies (5;34-36). All participants for these stages will be informed that the survey relates to their thoughts, behaviours and opinions about pandemic flu within the first minute or so of their interview.

Risks and benefits for participants and society

There is a small risk that some people who are contacted by the market research company in Stages Three and Four will find this contact intrusive. The impact of this intrusion on any given member of the public will be low. There is a small risk that some of those who take part in a Stage Four survey will find the interview topic upsetting, particularly if friends of family members are seriously ill or have died during the pandemic. Interviewers will be briefed to tactfully terminate an interview if a participant becomes overtly distressed and will be able to provide information on sources of support should this be necessary.

We do not expect participants to experience any direct benefits from the research. The benefits to society will accrue from the improvements that can be made to the Department of Health's communications strategy, which will improve uptake of protective behaviours and reduce the incidence and impact of the illness.

Informing potential participants of possible benefits and known risks

In order to reduce the risk of self-selection bias, potential survey participants will initially be informed that the survey relates to "important issues facing Britain." However, once consent to proceed with the interview has been given, participants will be informed of the true topic of the

interview. Those who feel they would find the topic distressing will then have the opportunity to withdraw at this stage.

Obtaining informed consent

Participants in Stage Two will receive an information sheet and will have the opportunity to discuss the study in detail with the Principal Investigator prior to participating. Participants in Stages Three and Four will receive a verbal briefing from the interviewer and will have the opportunity to ask the interviewer to call back at a later date if they wish to have more time to consider whether or not to participate. In accordance with normal industry practice for telephone interviews, all participants in this research will be asked to provide verbal, rather than written, consent for our study. This is also in line with best practice as specified by the King's College London Research Ethics Committee.

Retention of study documentation

All documents and datasets relating to the study will be retained for seven years and then reviewed.

Proposed sample size

A total sample size of 30 participants for each round of interviews in Stage Two will allow sufficient opportunity for any obvious difficulties with question wording to emerge.

Sample sizes of 1,067 participants for the surveys in Stages Three and Four will provide us with a sample error of plus or minus three percentage points for our prevalence rates. These sample sizes will also be sufficient for the structural equation modelling planned for Stage Four, particularly where data from two or more surveys are pooled together.

Statistical analyses

In Stage Three, we will use exploratory factor analysis to assess the clustering of those items that we intend to use as scales using data derived from the first survey. We will use principal axis factoring, examine scree plots to determine how many factors to extract and perform oblique rotation using direct oblimin. Internal reliability of scales will be tested using Cronbach's alphas, item-total correlations and inter-item correlations. Test-retest reliability will be calculated using data from both surveys, using intra-class coefficients (ICC (2,1)) for scales and

weighted Kappa coefficients for individual items. Non-response bias as a result of participant attrition in Stage Three will be assessed using *t*-tests and chi-squared tests to compare respondents and non-respondents in the second survey with respect to their baseline data from the first survey.

The Protection Motivation Theory and specific associations between variables will be tested in Stages Three and Four through the use of structural equation modelling, which will allow us to simultaneously test the relationships of predictor, outcome and moderator variables (the precise variables involved having been determined at Stages One and Two). In Stage Four, we will test whether the strength of relationships seen in Stage Three has changed in any significant manner using Wald tests, allowing us to update recommendations for the communication strategy

Along similar lines to our prior work (6), we will use ARIMA time series modelling, where possible, to analyse the cross-sectional data collected in the weekly surveys in Stage Four with respect to data collected on media reporting, online activity or measures of the pandemic's spread (e.g. hospitalisations).

Proposed outcome measures

The definition of relevant outcomes will be conducted as part of Stage One. Primary outcomes are likely to include respiratory and hand hygiene, vaccine uptake (intended and actual) and use of healthcare resources (actual and intended). Secondary outcomes will include the presence of self-reported influenza-like illness.

Research governance

The sponsor for this research will be King's College London.

Project timetable and milestones

Our timetable is based around the need to trial our Stage Three surveys during a normal influenza season. Given that we will not have sufficient lead-in time to do this in 2011, we have based the timetable around a start date in late 2012.

Study Stage	Date	Activity	Milestone
Stage One	1 Aug 2012	Kick off meeting of Stakeholder Group Definition of target outcome variables	
	Aug 2012	Submission of ethics application for Stage Two work	
	Aug 2012	Selection of predictor variables	
	Sept 2012	First draft of items presented to Stakeholder Group	
	1 Oct 2012	Agreed long list of items ready for cognitive testing	Production of long list of survey items
Stage Two	1 Oct 2012	First round of interviews	
	Oct 2012	Submission of ethics application for Stage Three work	
	Nov 2012	Second round of interviews	
	Nov 2012	Third round of interviews	
	20 Nov 2012	Final revisions made to survey items	Production of revised list of survey items
Stage Three	6 Dec 2013	Agree survey wording with market research company, who will then translate it into Welsh	
	16 Jan 2013	First survey launched	
	23 Jan 2013	Follow-up survey launched	
	Feb 2013	Data analysis and preparation of interim report	
	1 March 2013	Delivery of interim report	Production of interim report
PROJECT ON HOLD UNTIL PANDEMIC			
Stage Four	Pandemic month 1	Launch of first pandemic survey	
	Pandemic months 1 to 6	Monthly Stakeholder Group meetings to be held	
	Pandemic months 1 to 6	Analyse cross-sectional data, depending on needs of Stakeholder Group	

	Pandemic month 5	Analyse longitudinal data	
	Pandemic month 6	Final report	Production of final report

Expertise

Richard Amlôt leads the Behavioural Science Research Team within the Health Protection Agency's Emergency Response Department. His team runs a programme of research assessing psychological and behavioural responses to emergencies; risk and crisis communication; the evaluation of emergency preparedness exercises and operational research for mass causality decontamination. This has included several international studies assessing the best way to communicate with the public during a major public health crisis. Richard chairs the newly formed Psychosocial and Behavioural Issues sub-committee of the Health Protection Agency's Emergency Response Development Group. Richard will assist with selection and design of the survey items, and interpretation of the survey data.

Nicola Fear is a Reader in Epidemiology within the Department of Psychological Medicine, King's College London. Nicola's main areas of expertise are military and occupational epidemiology, statistics and the design and analysis of complex surveys. Nicola is currently a co-PI on an ESRC funded study to examine public attitudes to the military, this is part of the 2011 British Social Attitudes Survey. Nicola has led the development of the questions and will over-see the statistical analyses of the data collected. Nicola is fully funded by a grant from the UK Ministry of Defence. Nicola will assist with design of the survey sampling strategy and analysis of the data.

Susan Michie is a Professor of Health Psychology, leading the Health Psychology Unit in UCL's Division of Psychology and Language Sciences. She is known internationally for her work on understanding health related behaviours and applying psychological theory to designing interventions to change behaviour. She has worked for many years at the interface of science and policy, acting as part-time consultant to the Department of Health's Health Improvement Directorate to advise on several communication and behavioural intervention programmes. She is a member of the Government's Scientific Pandemic Influenza Advisory Committee and is Chair of its Behaviour and Communications subgroup. Susan was involved in several studies during the 2009/10 H1N1 outbreak and was Principal Investigator for our previous NIHR-funded work assessing the Department of Health's survey data. Susan will assist with the selection of items for the surveys, and interpretation of the survey data.

Henry Potts is a Senior Lecturer within the Centre for Health Informatics and Multiprofessional Education in UCL's Division of Population Health. He brings to the team expertise in statistical analysis for a health psychology context. He is also a recognised expert on new information and communication technologies and their role in health care, including non-traditional media and social networking. Henry has direct experience in the analysis of telephone survey data, and led on the statistical analysis of the Department of Health's swine flu survey data. Henry will assist with the statistical analysis of the survey data.

James Rubin is a Senior Research Fellow in the Department of Psychological Medicine, King's College London. He has a particular expertise in using telephone surveys to assess population reactions to public health crises and has previously used this technique to produce rapid reaction research during the swine flu outbreak, the 2007 flooding in the North of England, the polonium 210 incident and the 7 July London bombings. James was first author for our previous work with the Department of Health's swine flu survey data. James will supervise the literature reviewing and interviewing in Stages One and Two. He will also take main responsibility for the design and data analysis in Stages Three and Four. James will be responsible for the overall co-ordination of the project.

A suitably qualified *post-doctoral researcher* will also be appointed to work on Stages One, Two and Three. He or she will be based at King's College London, under the direct supervision of James Rubin. He or she will meet with Dr Rubin for supervision on at least a weekly basis and will be expected to meet with the core team and stakeholder group on a monthly basis. The researcher will receive training from the core team, if required, on literature reviewing, questionnaire design and survey methodology.

Stakeholder involvement and links to other studies

In order to maximise the relevance and impact of our work, we will form a stakeholder group for this study. This will help to guide the selection of variables for our survey, will provide a way of ensuring that our findings are disseminated and translated into policy, and will provide a means for us to learn about any new developments during the pandemic. By working closely with our stakeholders during the pre-pandemic period, we will strengthen our ability to work quickly and efficiently during the pandemic period.

The group will be chaired by the PI. Membership of the group will include:

- Representatives from the Department of Health communications team (to be confirmed on award of the grant by Dr Bruce Taylor, Deputy Director of the Department of Health's Pandemic Flu Team);

- Professor Susan Michie, Chair of SPI B&C subgroup;

- Dr Richard Amlôt, Chair of Health Protection Agency Psychosocial & Behavioural Issues sub-committee;

- Dr Peter White, Head of Modelling and Economics Unit, Health Protection Agency;

- Dr Ken Eames, Lecturer, Centre for Mathematical Modelling of Infectious Diseases, London School of Hygiene and Tropical Medicine.

- Two lay members, appointed from the participants recruited during Stage Two of the work.

Lay stakeholders will be asked to attend all meetings and to provide feedback and advice on all aspects of the study.

Justification of support required

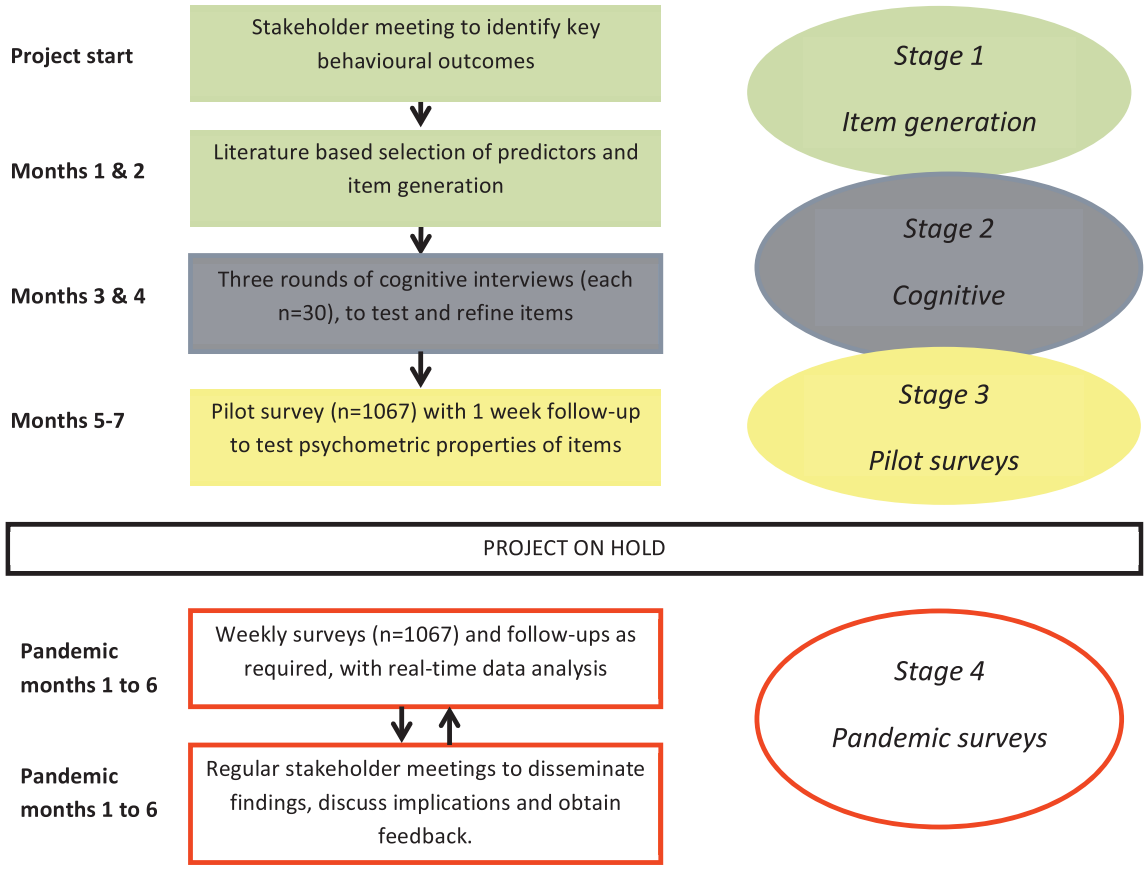
Dr Amlôt, Dr Potts and Professor Michie will each require 5% of their time throughout the study to cover time spent overseeing the design, analysis and reporting of the project. Dr Fear will devote the same amount of time to the project, but because she is currently employed on a Ministry of Defence grant, she will contribute this time for free. During the seven months of Stages One to Three, the bulk of the work will be conducted by a post-doctoral researcher (100% FTE), under the immediate supervision of the PI (Dr Rubin, at 10% FTE). To ensure that the project begins swiftly in the next pandemic, without delays caused by recruitment and training of staff, Dr Rubin will act as the main researcher during Stage Four (at 75% FTE). Please note that our salary costs have been calculated separately for the two periods of the pre-pandemic phase and the active phase, and then added together. Our pre-pandemic phase will start on 1 August 2012. For our active phase we have used the arbitrary start date recommended by NIHR of 1 November 2012. Salary costs for the active phase are estimates and may require revising depending on the actual start date of the pandemic.

For the cognitive interviews in Stage Two, we will require £1,800 to reimburse participants at a

rate of £20 each for 90 participants. An additional £5 per participant in Stage 2 (£450 total) is required to cover additional costs associated with participant recruitment and testing, including telephone charges. We will also require a one-off fee of £250 to access the volunteer database. We request £750 in travel and subsistence costs to cover intersite travel for the applicants, and £1,200 to cover publication fees. A £100 per diem will be provided for the two lay members of the stakeholder group to cover Stages Two to Three (total cost in pre-pandemic period: £1,600, total cost in pandemic period: £1,400).

Survey costs for Stage Three are based on a quotation from Ipsos MORI for £62,400. This cost includes the survey and VAT at 20%. We are not able to reclaim this VAT and must therefore charge it to the grant. The survey cost will be incurred in full at the end of the first six month period of our work. Because Ipsos are the same company that conducted the Department of Health swine flu surveys, using them will allow us to directly compare our results with the swine flu data.

Flow diagram



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