

IS4250

**Community Psychological and
Behavioral Responses through the
First Wave of the 2009 Influenza
A(H1N1) Pandemic in Hong Kong
Report**

By

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Introduction

Research Motivation

In the event of an influenza pandemic, there are often close to no available vaccine. The only way to prevent or slow down the spread of such a pandemic is through “non-pharmaceutical” community intervention. This intervention usually includes promotion of health and hygiene preventative measure, symptom of the pandemic disease and what to do when met with issue regarding the pandemic. Prior to this paper, there are very little data on about community psychological and behavioral responses to influenza.

In response to prior paper on Severe Acute Respiratory Syndrome (SARS), this research experiment takes into account perception of risk and anxiety which were not measured in prior SARS related paper. There have been others studies done to examine the initial response of the people in pandemic affected country. However, this paper focuses on the response of the general community in Hong Kong throughout the wave of the pandemic in 2009. It also seek to find out what factors will result in greater use of preventive measure which are the “non-pharmaceutical” community interventions.

Methodology

This experiment uses telephone surveys for collection of data. The surveys are designed to be cross-sectional in nature and it records information on the subjects without manipulating the study environment which in the case of this survey is the daily lives of the community in Hong Kong. The surveyors hence should not influence the subjects when conducting the survey in a way that it would change their behavior towards the pandemic of H1N1.

Cross-sectional studies are suitable for the research purpose as the research require comparison of multiple variables at the same time. This will allow them to reduce cost as addition of variables will result in very little costs hence given the amount of factors being measured, this would definitely lower the cost of the research study. Cross-sectional studies are useful to serve as a guide or springboard for future research which are similar or can a further research to test for causation.

Methods

This research uses phone calls to collect the results. The phone numbers are randomly selected by a random-digit dialing of all the valid land-based phone numbers which are generated by computer system using a randomization algorithm. Phone survey is used as more than 98% of the populations in Hong Kong have a valid land-based phone numbers.

Interviewers of the survey are trained to increase chance of gathering reliable and valid survey results. These phone calls were made outside of working hours to prevent the exclusion of the working groups and overrepresentations of the non-working group. The criteria of a valid survey respondent are as below:

- They must be aged 18 and above
- They must lived in the house for at least 5 days per week
- They must speak Cantonese which is to identify them as Hong Kong citizens and not foreign expats as most Hong Kong citizen speaks Cantonese amounting to 89.5% of the population ¹
- They must give their consent to participate in the survey before the questions are asked.

¹ Hong Kong – the Facts (Aug, 2015), From <http://www.gov.hk/en/about/abouthk/facts.htm>

- They must be available by the 5th Follow-up call if they are busy during the first 4 or else they will be deemed as an invalid survey target.

There are a total of 13 surveys being conducted throughout the research period. Participants are separated by demographics characteristics of gender and age for each survey in terms of means and proportion. Each survey took approximately 15 minutes to complete and response to the survey were ordinal Likert-type. Below shows an example of an ordinal Likert-type response:

Do you feel those masks are important during a pandemic outbreak?

☐ Strongly Agree ☒ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

The answer to the above sample survey is ‘Agree’. Participants were asked to answer around 100 of such question in a survey. 12 out of the 13 surveys have at least 1000 respondents and with that sample size, the sampling error is at most 3%. Sampling error is usually due to differences between the sample from the population and the population itself. Randomization is used in the selection process of the research in the form of randomly generated landline number by the computer and this helps to reduce sampling error in the research. Sampling error is impossible to eliminate as it require sampling of the entire population which is expensive and definitely not feasible. The sampling error of this research is within the confidence interval which is good.

The only survey to be deemed as invalid is the one with only 504 respondents which is well below the average of about 1000. Responses from people exhibiting flu like symptoms were also excluded as they behave differently from those who do not exhibit these symptoms.

Multivariable logistic regression is used for each of the survey data which give dichotomous outcome and uses more than one variable on the right side of the regression equation as opposed to linear regression which outcome is continuous and consist of one variable.

Survey number one and two psychological responses are somewhat different from the other eleven remaining surveys and the first local case did not happen until survey three. This means that the first two surveys are measuring psychological responses against a potential threat while the remaining surveys are measuring psychological responses against a confirmed or a real threat. The responses to the survey from survey 3 to 13 excluding survey 6 which have only 504 respondents were very consistent which shows that the sampling error is within a good range.

We will hence look at the results of the survey conducted and how they are being analyzed to show the impact of the study on the general population.

Results

Results obtained from this research do indicate correlation among the different factors that were being measured. However, it should be noted that these results do not infer causation as they are cross-sectional in nature.

The overall response rate for the survey was 69.9% which is defined as out of the number of suitable subjects who took part in the survey over the total number of suitable subjects identified.

We will first look at the overall trend before going into the multivariable logistic regression analysis part of the result. **Appendix A** shows that the State Trait Anxiety Inventory Score (STAI) of the general public remains fairly constant even at the peak number of case from September to October. There are 2 subscales within this measure of STAI. First, the State Anxiety Scale (S-Anxiety) evaluates the current state of anxiety, asking how respondents feel at that point in time and using items that measure subjective feelings of apprehension, tension, nervousness, worry, and arousal of the autonomic nervous system. The Trait Anxiety Scale (T-Anxiety) evaluates relatively stable aspects of “anxiety proneness,” including general states of calmness, confidence, and security.

Appendix A shows the results of perceived risk and worry. Perceived risk of infection in the following month ("absolute susceptibility") was initially high, declined in May, and temporarily rose in June as the local epidemic began, before fluctuating between 10% and 15% for the remainder of the study period. Perceived risk of infection compared to others outside your family ("relative susceptibility") remained lower throughout. Perceived severity of H1N1 compared with SARS ("severity") was high in the initial survey in April and decline.

Appendix A shows the respondents knowledge on mode of transmission. Results show that the respondents have a misconception that H1N1 is spread via cold weather and oral-faecal. It could be due to previous cases. **Appendix A** shows it is a norm for them to wash their hands using liquid soap after coming back home. The level of hygiene behavior is also very consistent

throughout the pandemic period with no sudden peak or drop in proportion with the exception of disinfecting of homes which is significantly higher during earlier periods of the outbreak.

In **Appendix A**, social distancing declined as the pandemic proceed on and the only known peak is the participant avoiding crowded places during the period of end June around when the first local case was first identified.

We will now look at the multivariable logistic regression analysis result. Appendix B shows the plot replication of the results, we will explain the plot replication in more details in later part of the report as we focus on the results now. The study measures 5 factor of hygiene measure against personal variable like gender, age and educational level. It can be seen from the Table that female have higher hygiene behavior across all 5 factor that were measure.

Contribution of Paper

This paper has been the basis for research regarding psychological and community behavior for pandemic. It identifies the correlation between hygiene behaviors and attributes like age, gender and education level. It could be a baseline for future researcher to do a more focus to infer causation. For example, an increase of anxiety is correlated to an increase in house disinfection which is one of the preventive behaviors that was measured in the study. Hence future researcher could do a longitudinal studies on these to infer causation whether indeed anxiety leads to them disinfection there house more than usual during a pandemic outbreak.

Government in Hong Kong could use the results from this study to adjust their containment and preventive campaign to prevent the spread of this epidemic which is the only measure which could be taken during the spread of a new virus since current medication and vaccination does not work on new strains of virus. Government can see the difference between their recommended measure and how the general public really reacts to the pandemic. They can then adjust their recommended measure on how to educate the general public whether be it through a period of time or through some incentive. This study shows that the general public does not have significant behavioral change despite government effort to improve hygiene and preventive behavior.

The study also reported that males have poorer hygiene and preventive behavior than female hence government could make use of this information to develop different measure targeting the different demographics as identified by the study which is gender, age or education level. This will allow them to formulate measure to target smaller section of the popular for more effective counter-measure against the pandemic outbreak to mitigate the impact of it on the economical and social stability of the country.

This paper have been cited by a total of 71 research paper according to **Appendix E**. Majority of the paper that cite it are related to influenza and H1N1 related with some on psychological behavior not relating to influenza or H1N1. It can be noted that some of the paper are research conducted outside of Hong Kong and Asia Pacific which might have different influential and external factor. They are countries like Norway and Czech Republic in Europe.

Challenges & Limitation

Limitations

As with many researches, there will be challenges faced while performing the experiment and also limitation of the methodology and resulted gathered.

The first limitation is that due to the cross-sectional nature of the survey conducted, we cannot infer any causation from any of the analysis done. This means that the correlation mentioned in the result does not means causation. For example, males having poor hygiene and protective behavior does not means that being male caused them to have such a behavior.

Factors associated with the results could suffer from reverse causation. Reverse causation means that the outcome caused the initial exposure instead of the other way else. In the case of greater hand hygiene leading to lower anxiety could very well mean that lower anxiety lead to greater hand hygiene.

Biasness will always be present in any surveys. In the case of this experiment, selection bias could be potentially found in the case of exclusion of the working class. Additionally, there is no data from non-respondent hence we cannot be truly sure of extend of the selection bias.

Although, telephone interview have been accepted as methodology for this type of study on preventive behavior during pandemic; limitation still exists. It suffers from recall and social conformity bias which may affect the result as the response they gave might not be what they really did in the real situation. This may affect the accuracy of the survey results when what they recall is different from what they actually did or when they choose to reply the standard answer which they think other will most likely answer.

There is also difficulty in checking validity of the information supplied by the respondent to match to the requirement as it is over the phone and the person might not provide the true information. This is shown in the huge of number of invalid responses which is nearly about 90% of the total number of landline dialed.

This study is conducted in Hong Kong and hence might not be applicable to pandemic in other region for instant the spread of Ebola in Saudi Arabia. These two countries could have very little similarities between community behavior and psychological response to a pandemic since their standards and way of living is very much different from each other. Hence, this study might not be able to be a strong base for studies of pandemic in very different region. However, it could be used for similar area in the same region such as Taiwan or South East Asian countries. There should be some similarities between them which could prove useful to support and become the basis of research in countries like Saudi Arabia as this paper have been cited by country outside of the Asia Pacific as mentioned in the contribution of the paper.

Challenges

The main challenge for this research experiment is that it is hard to infer causation from the results collected by this methodology of a cross-sectional survey. They will need to conduct longitudinal studies instead of the cross-sectional studies which will require long period of time. This will require more resources to conduct longitudinal studies hence resulting in a much more expensive study. There will also be a chance that research subject might drop out half way due to the long duration of such studies hence reducing the sample size and data point which can be obtained. If this experiment is conducted as a longitudinal study, they will need to monitor over 10,000 study subjects over a period of time and constantly gather input from them instead of the current one time off survey. Hence, it is not that feasible given the large amount of sample and

limited resources of the research. It would be best to set up the foundation in this paper and let it be a reference for future research since some correlation can be spotted which can be further developed into a more focus longitudinal studies to infer causation.

Another challenge would be to gather sufficient amount of samples for the research which is shown when survey 6 only have 504 participants which is half of the desired sample size. There were 38,817 cases where interviewers are unable to determine if the participant was eligible to participate in the survey despite having given pre-requisite requirement. This shows that the pre-requisite requirement should be more specific and less general. Additionally, 10,302 of the number dialed did not pass the initial requirement of it being a home number. These are potentially close to 50,000 cases of potential sample being wasted as there is not clear answer whether they are valid or not with time wasted in attempting to conduct the survey on them.

This might give rise to the cases of false negative as even though the interviewers are trained, they are unable to determine 38,817 of the cases. In addition, we can't be sure that false positives exist in the cases which are deemed as valid.

Possible Recommendation to Overcome Challenges

We recommend that the researcher use the random-digit generated number and match it to an online telephone address database to search for valid respondent. This will allow them to match the information gathered from participant against reliable sources. If possible, cooperation from local government would be good in ensuring reliability of the source of data since they can verify the demographics of the participant.

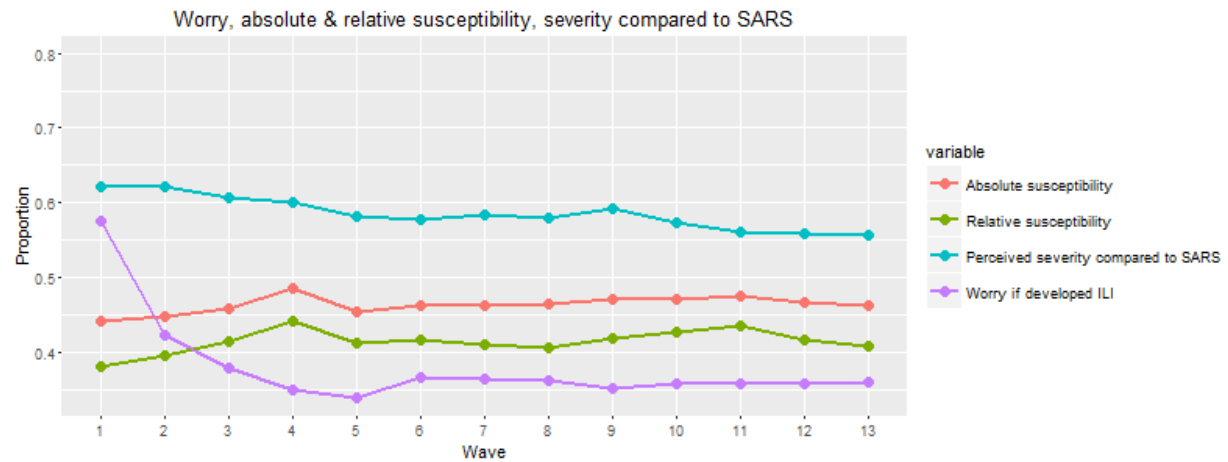
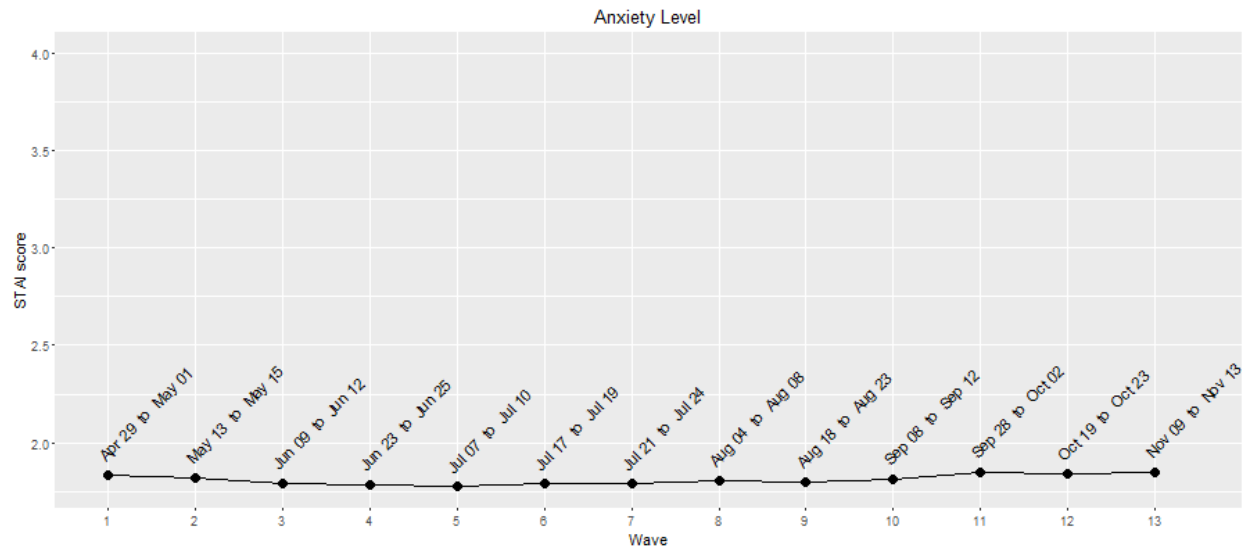
Electronic survey would be useful and can be used to test for consistency in answering the survey question which is similar to personality test and where they phase the same question differently to test for consistency. This is also better due to the fact that electronic survey remove interviewer biasness. Busy people also preferred to answer electronic survey compared to

telephone surveys.² It would reduce selection bias of the busy working class who would be unwilling to participate even though the call is made when they are at home.

We do not know the resource limitation of the research hence we do not know if these possible recommendations have already been thought of by the researcher.

² Online, face-to-face and telephone surveys—Comparing different sampling methods in wine consumer research (Dec, 2013) from <http://www.sciencedirect.com/science/article/pii/S2212977413000331>

Appendix A – Plot Replications



Appendix B – Table Replication

Personal variables	handwashing after sneezing, coughing or touching nose	use liquid soap when washing hands	wash hands after returning home	wash hands after touching common objects	clean or disinfect house more often
Male (n=4026)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Female (n=6308)	1.3 (1.18-1.43)	1.36 (1.24-1.5)	1.55 (1.39-1.74)	1.79 (1.64-1.96)	1.03 (0.9-1.18)
Age Group (years)					
18 to 24 (n=1371)	0.78 (0.66-0.91)	0.47 (0.4-0.56)	0.37 (0.3-0.45)	0.51 (0.44-0.59)	0.95 (0.76-1.19)
25 to 34 (n=1210)	0.78 (0.67-0.92)	1.1 (0.92-1.32)	0.76 (0.61-0.95)	0.77 (0.67-0.9)	1.01 (0.8-1.28)
35 to 44 (n=1915)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
45 to 54 (n=2575)	1.01 (0.88-1.16)	0.78 (0.68-0.9)	0.75 (0.62-0.9)	0.92 (0.81-1.04)	0.75 (0.62-0.92)
55 to 64 (n=1787)	1.24 (1.05-1.46)	0.87 (0.74-1.02)	0.8 (0.65-0.99)	1.11 (0.96-1.27)	0.97 (0.79-1.2)
65 or above (n=1377)	1.34 (1.12-1.61)	1.28 (1.07-1.55)	0.83 (0.66-1.04)	1.85 (1.58-2.17)	1.25 (0.98-1.58)
Educational Attainment					
Primary or below (n=1801)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Secondary (n=5317)	1.01 (0.88-1.16)	1.62 (1.42-1.85)	1.32 (1.12-1.56)	1.12 (1-1.27)	1.19 (0.98-1.44)
University or above (n=3123)	0.91 (0.78-1.07)	2 (1.71-2.34)	1.47 (1.22-1.78)	1.12 (0.97-1.29)	0.9 (0.72-1.13)
Anxiety score					
Low (1.00-1.99) (n=6303)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Medium (2.00-2.50) (n=2992)	0.79 (0.71-0.87)	0.83 (0.75-0.92)	0.83 (0.73-0.94)	0.86 (0.78-0.94)	1.17 (1.01-1.35)
High (2.50-4.00) (n=795)	0.71 (0.6-0.84)	0.85 (0.72-1.01)	0.69 (0.56-0.85)	0.9 (0.77-1.06)	1.41 (1.13-1.76)
Self-rated health					
Excellent (n=1394)	1.33 (1.13-1.56)	1.12 (0.96-1.31)	1.12 (0.93-1.34)	1.23 (1.07-1.41)	1.06 (0.85-1.32)
Very Good (n=3021)	1.17 (1.04-1.31)	1.03 (0.92-1.17)	1.18 (1.02-1.37)	1.08 (0.97-1.21)	0.98 (0.82-1.16)
Good (n=2796)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Fair (n=2763)	1.08 (0.96-1.22)	0.95 (0.84-1.08)	0.99 (0.85-1.15)	0.98 (0.87-1.1)	1.02 (0.86-1.21)
Poor (n=359)	0.98 (0.76-1.27)	0.94 (0.73-1.22)	1.36 (0.97-1.91)	0.99 (0.78-1.25)	0.82 (0.57-1.18)
Absolute susceptibility					
Never (n=1173)	1.09 (0.91-1.3)	0.99 (0.83-1.18)	0.88 (0.71-1.09)	1 (0.85-1.18)	0.88 (0.68-1.13)
Very unlikely (n=823)	0.99 (0.82-1.19)	1 (0.82-1.21)	0.88 (0.7-1.1)	0.96 (0.81-1.14)	0.71 (0.53-0.96)
Unlikely (n=3207)	0.91 (0.81-1.03)	0.93 (0.83-1.06)	0.83 (0.71-0.96)	0.96 (0.86-1.07)	0.9 (0.76-1.07)
Even (n=3384)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Likely (n=1086)	0.93 (0.8-1.09)	0.98 (0.83-1.15)	1.1 (0.89-1.36)	1.02 (0.88-1.18)	0.85 (0.68-1.06)
Very likely or certain (n=79)	1.24 (0.72-2.14)	1.43 (0.77-2.67)	0.84 (0.44-1.62)	1.67 (1.04-2.68)	1.42 (0.8-2.52)
Relative susceptibility					
Not at all (n=1586)	1.18 (0.99-1.41)	1.18 (0.99-1.4)	1.15 (0.94-1.4)	1.26 (1.08-1.47)	1.23 (0.97-1.57)
Much less (n=1654)	1.05 (0.91-1.22)	0.98 (0.85-1.14)	1.3 (1.07-1.57)	1.13 (0.99-1.3)	1.13 (0.9-1.42)
Less (n=3004)	1.06 (0.94-1.2)	0.95 (0.84-1.07)	1.17 (1-1.35)	1.09 (0.97-1.22)	1.14 (0.96-1.35)
Even (n=2967)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
More (n=445)	1.06 (0.85-1.32)	1.27 (0.98-1.64)	1.06 (0.79-1.42)	1.03 (0.83-1.28)	1.5 (1.12-2)

Much more or certain (n=88)	1.26 (0.77-2.06)	1.65 (0.94-2.9)	1.16 (0.62-2.15)	1.32 (0.85-2.07)	2.43 (1.43-4.14)
Severity compared to SARS					
Much less (n=4143)	0.68 (0.58-0.8)	0.76 (0.64-0.89)	0.89 (0.73-1.09)	0.78 (0.67-0.91)	0.71 (0.57-0.89)
Less (n=4591)	0.88 (0.75-1.04)	0.89 (0.75-1.05)	0.98 (0.8-1.21)	0.97 (0.83-1.12)	0.84 (0.68-1.04)
About the same (n=961)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
More (n=365)	1.04 (0.77-1.4)	0.93 (0.7-1.24)	1.18 (0.82-1.71)	1.3 (1.01-1.67)	1.27 (0.91-1.76)
Much more (n=119)	0.85 (0.54-1.33)	1.29 (0.79-2.11)	0.89 (0.52-1.52)	1.08 (0.72-1.61)	1.48 (0.92-2.38)
Worry if develop ILI					
Not at all worried (n=1467)	0.95 (0.83-1.1)	0.93 (0.8-1.07)	0.89 (0.75-1.05)	0.89 (0.78-1.02)	0.61 (0.45-0.81)
Much less worried than normal (n=214)	1.15 (0.83-1.59)	0.9 (0.66-1.23)	1.25 (0.83-1.88)	0.99 (0.74-1.33)	1.96 (1.27-3.01)
Worried less than normal (n=696)	1.16 (0.95-1.41)	1.31 (1.08-1.59)	1.06 (0.84-1.33)	1.08 (0.91-1.29)	1.22 (0.9-1.64)
Same (n=3257)					
Worried more than normal (n=3535)	1.08 (0.97-1.21)	1.14 (1.02-1.27)	1.14 (0.99-1.3)	1.14 (1.03-1.27)	2.29 (1.94-2.71)
Worried much more than normal (n=681)	1.05 (0.86-1.27)	1.05 (0.86-1.27)	1.16 (0.91-1.48)	1.36 (1.14-1.62)	2.57 (2.02-3.27)
Extremely worried (n=423)	1.06 (0.83-1.35)	1.05 (0.83-1.34)	1.49 (1.07-2.07)	1.45 (1.17-1.79)	2.75 (2.07-3.64)
Modes of transmission					
Droplets (n=9597)	1.16 (0.93-1.44)	1.03 (0.84-1.26)	0.95 (0.74-1.22)	1.03 (0.85-1.24)	0.71 (0.54-0.93)
Indirect hand contact (n=6414)	1.07 (0.95-1.19)	1.11 (1-1.24)	1.07 (0.94-1.21)	1.07 (0.97-1.18)	1.07 (0.91-1.24)
Oral-faecal (n=6987)	1.12 (1-1.25)	1.29 (1.15-1.45)	1.37 (1.2-1.57)	1.56 (1.41-1.73)	1.3 (1.1-1.54)

Appendix C – Plot Replication Code

```

survey <- read.csv("H1N1_surveys.csv")

# Get wave starting and ending date: "MM dd to MM dd"
library(plyr)
mat <- ddply(survey, . (survey$wave, survey$date), nrow)
mat$V1 <- NULL
colnames(mat) <- c("wave", "date")
mat <- ddply(mat, . (wave), mutate, start = min(date), end=max(date))
mat$date <- NULL
mat <- unique(mat) # unique start and ending
rownames(mat) <- mat$wave
mat$start <- as.Date(as.character(mat$start), format='%Y%m%d')
mat$end <- as.Date(as.character(mat$end), format='%Y%m%d')
mat$text <- paste(format(mat$start, format='%b %d'), " to ", format(mat$end,
format='%b %d'))
# Calculate anxiety score

```

```

survey$ax1_1.1 <- 5-survey$ax1_1; survey$ax1_2.1 <- 5-survey$ax1_2; survey$ax1_3.1
<- 5-survey$ax1_3
survey$ax1_4.1 <- 5-survey$ax1_4; survey$ax1_5.1 <- 5-survey$ax1_5
survey$ascore <-
rowMeans(survey[c("ax1_1.1", "ax1_2.1", "ax1_3.1", "ax1_4.1", "ax1_5.1", "ax1_6", "ax1_7", "
ax1_8", "ax1_9", "ax1_10")], na.rm=T)

```

```

# Replication1:Plot the anxiety score graph
library(ggplot2)
dat <- aggregate(ascore ~ wave, survey, mean)
dat$ref <- c(1)
dat <- merge(dat, mat, by="wave")
ggplot(data=dat, aes(x=factor(wave), y=ascore, group=ref)) +
  # geom_line(size=1) +      # Set linetype by sex
  geom_point(size=3) +geom_line()+    # Use larger points
  expand_limits(y=4) +      # Set y range to include 4
  expand_limits(x=14) +      # Set x range to include 14
  xlab("Wave") + ylab("STAI score") + # Set axis labels
  ggtitle("Anxiety Level") +      # Set title
  geom_text(angle = 45, hjust=-0.05, vjust = -1, aes(label=text))

```

```

# Replication 2:worry, absolute & relative susceptibility, severity compared to SARS
dat_bf1 <- aggregate(bf1 ~ wave, survey, mean)#"Absolute susceptibility"
dat_bf2 <- aggregate(bf2 ~ wave, survey, mean)#"Relative susceptibility"
dat_bf4 <- aggregate(bf4 ~ wave, survey, mean)#"Perceived severity compared to SARS"
dat_bf5 <- aggregate(bf5 ~ wave, survey, mean)#"Worry if developed ILI"
dat_bf1$bf1 <- dat_bf1$bf1/max(na.omit(survey$"bf1"))
dat_bf2$bf2 <- dat_bf2$bf2/max(na.omit(survey$"bf2"))
dat_bf4$bf4 <- dat_bf4$bf4/max(na.omit(survey$"bf4"))
dat_bf5$bf5 <- dat_bf5$bf5/max(na.omit(survey$"bf5"))
dat2 <- Reduce(function(x, y) merge(x, y, all=TRUE),
list(dat_bf1, dat_bf2, dat_bf4, dat_bf5, mat))
colnames(dat2) <- c("wave", "Absolute susceptibility", "Relative susceptibility",
"Perceived severity compared to SARS", "Worry if developed ILI", "start", "end", "text" )
library(reshape2)
data <- melt(dat2, id=c("wave", "text", "start", "end"))
ggplot(data=data, aes(x=factor(wave), y=value, group=variable, colour=variable)) +
  geom_line(size=1) +      # Set linetype by sex
  geom_point(size=3) +geom_line()+    # Use larger points
  expand_limits(y=0.8) +      # Set y range to include 4
  xlab("Wave") + ylab("Proportion") + # Set axis labels
  ggtitle("Worry, absolute & relative susceptibility, severity compared to SARS")
# Set title

```

Appendix D – Table Replication Code

```
# Data Preparation
survey<-read.csv("H1N1_surveys.csv") #12965 obs
subset<-survey[survey$wave>2,] # Survey waves in mitigation phase, 10940
# Suvery waves with >=1000 success respondents, 10436 obs
for (waveIndex in 2:13) {
  if(sum(survey$wave==waveIndex)<1000)
    subset<-subset[subset$wave!=waveIndex,]
}
subset$sick<-1*((subset$sm1_1==1&subset$sm1_5==1) | (subset$sm1_1==1&subset$sm1_9==1))
# New attribute: sick=fever+cough OR fever+sore throat
subset<-subset[subset$sick==0&!is.na(subset$sick),] # Exclude sick/unknown status,
10334 observations
# Data validity check: Convert unauthorized data to NA
set12<-c(1:2) #1-Yes; 2-No
subset$bf3_1[!is.element(subset$bf3_1, set12)]<-NA # 1 and 2 are valid for qn bf3_1
subset$bf3_3[!is.element(subset$bf3_3, set12)]<-NA
subset$bf3_4[!is.element(subset$bf3_4, set12)]<-NA
subset$bf3_5[!is.element(subset$bf3_5, set12)]<-NA
subset$bf3_6[!is.element(subset$bf3_6, set12)]<-NA
set14<-c(1:4) #1-Always; 2-Usually; 3-Sometimes; 4-Never
subset$pm2[!is.element(subset$pm2, set14)]<-NA
subset$pm3[!is.element(subset$pm3, set14)]<-NA
subset$pm3a[!is.element(subset$pm3a, set14)]<-NA
subset$pm4[!is.element(subset$pm4, set14)]<-NA
subset$pm5[!is.element(subset$pm5, set14)]<-NA
subset$pm7[!is.element(subset$pm7, set14)]<-NA
subset$pm7b[!is.element(subset$pm7b, set14)]<-NA
set13<-c(1:3) #1-Yes, due to swine flu; 2-Yes, but not due to swine flu; 3-No
subset$pm10_1[!is.element(subset$pm10_1, set13)]<-NA
subset$pm10_2[!is.element(subset$pm10_2, set13)]<-NA
subset$pm10_3[!is.element(subset$pm10_3, set13)]<-NA
subset$pm10_5[!is.element(subset$pm10_5, set13)]<-NA
subset$pm10_6[!is.element(subset$pm10_6, set13)]<-NA
rm(set12, set13, set14)
# For invalid data, carry out Multiple Imputation using Additive Regression,
Bootstrapping, and Predictive Mean Matching
library(Hmisc)
set.seed(12345) # same as the Original R script
subset.i<-aregImpute( ~
  I (pm3)+I (pm5)+sex+I (age_gp)+I (edu)+I (ax1_1)+I (ax1_2)+I (ax1_3)+I (ax1_4)+I (ax1_5)+I (ax
  1_6)+I (ax1_7)+I (ax1_8)+I (ax1_9)+I (ax1_10)+I (ph1)+I (bf1)+I (bf2)+I (pm2)+I (pm3a)+I (pm4)
  +I (pm7)+I (pm7b)+I (pm10_1)+I (pm10_2)+I (pm10_3)+I (pm10_5)+I (pm10_6)+I (bf5)+I (bf4)+I (bf
  3_1)+I (bf3_3)+I (bf3_4)+wave, data=subset, n.impute=10) ##AsIs for each category
```



```

subset.nomiss<-list(subset, subset, subset, subset, subset, subset, subset, subset,
subset, subset) # List of df, containing 10 sets of data without na
for(i in 1:10){
  subset.nomiss[[i]]$pm3[is.na(subset.nomiss[[i]]$pm3)]<-subset.i$imputed$pm3[, i]
  subset.nomiss[[i]]$pm3a[is.na(subset.nomiss[[i]]$pm3a)]<-subset.i$imputed$pm3a[, i]
  subset.nomiss[[i]]$pm4[is.na(subset.nomiss[[i]]$pm4)]<-subset.i$imputed$pm4[, i]
  subset.nomiss[[i]]$pm5[is.na(subset.nomiss[[i]]$pm5)]<-subset.i$imputed$pm5[, i]
  subset.nomiss[[i]]$pm7[is.na(subset.nomiss[[i]]$pm7)]<-subset.i$imputed$pm7[, i]
  subset.nomiss[[i]]$pm7b[is.na(subset.nomiss[[i]]$pm7b)]<-subset.i$imputed$pm7b[, i]
  subset.nomiss[[i]]$sex[is.na(subset.nomiss[[i]]$sex)]<-subset.i$imputed$sex[, i]
  subset.nomiss[[i]]$age_gp[is.na(subset.nomiss[[i]]$age_gp)]<-
subset.i$imputed$age_gp[, i]
  subset.nomiss[[i]]$edu[is.na(subset.nomiss[[i]]$edu)]<-subset.i$imputed$edu[, i]
  subset.nomiss[[i]]$ax1_1[is.na(subset.nomiss[[i]]$ax1_1)]<-
subset.i$imputed$ax1_1[, i]
  subset.nomiss[[i]]$ax1_2[is.na(subset.nomiss[[i]]$ax1_2)]<-
subset.i$imputed$ax1_2[, i]
  subset.nomiss[[i]]$ax1_3[is.na(subset.nomiss[[i]]$ax1_3)]<-
subset.i$imputed$ax1_3[, i]
  subset.nomiss[[i]]$ax1_4[is.na(subset.nomiss[[i]]$ax1_4)]<-
subset.i$imputed$ax1_4[, i]
  subset.nomiss[[i]]$ax1_5[is.na(subset.nomiss[[i]]$ax1_5)]<-
subset.i$imputed$ax1_5[, i]
  subset.nomiss[[i]]$ax1_6[is.na(subset.nomiss[[i]]$ax1_6)]<-
subset.i$imputed$ax1_6[, i]
  subset.nomiss[[i]]$ax1_7[is.na(subset.nomiss[[i]]$ax1_7)]<-
subset.i$imputed$ax1_7[, i]
  subset.nomiss[[i]]$ax1_8[is.na(subset.nomiss[[i]]$ax1_8)]<-
subset.i$imputed$ax1_8[, i]
  subset.nomiss[[i]]$ax1_9[is.na(subset.nomiss[[i]]$ax1_9)]<-
subset.i$imputed$ax1_9[, i]
  subset.nomiss[[i]]$ax1_10[is.na(subset.nomiss[[i]]$ax1_10)]<-
subset.i$imputed$ax1_10[, i]
  subset.nomiss[[i]]$ph1[is.na(subset.nomiss[[i]]$ph1)]<-subset.i$imputed$ph1[, i]
  subset.nomiss[[i]]$bf1[is.na(subset.nomiss[[i]]$bf1)]<-subset.i$imputed$bf1[, i]
  subset.nomiss[[i]]$bf2[is.na(subset.nomiss[[i]]$bf2)]<-subset.i$imputed$bf2[, i]
  subset.nomiss[[i]]$pm10_1[is.na(subset.nomiss[[i]]$pm10_1)]<-
subset.i$imputed$pm10_1[, i]
  subset.nomiss[[i]]$pm10_2[is.na(subset.nomiss[[i]]$pm10_2)]<-
subset.i$imputed$pm10_2[, i]
  subset.nomiss[[i]]$pm10_3[is.na(subset.nomiss[[i]]$pm10_3)]<-
subset.i$imputed$pm10_3[, i]
  subset.nomiss[[i]]$pm10_5[is.na(subset.nomiss[[i]]$pm10_5)]<-
subset.i$imputed$pm10_5[, i]

```

```

subset.nomiss[[i]]$pm10_6[is.na(subset.nomiss[[i]]$pm10_6)]<-
subset.i$imputed$pm10_6[, i]
subset.nomiss[[i]]$bf5[is.na(subset.nomiss[[i]]$bf5)]<-subset.i$imputed$bf5[, i]
subset.nomiss[[i]]$bf4[is.na(subset.nomiss[[i]]$bf4)]<-subset.i$imputed$bf4[, i]
subset.nomiss[[i]]$bf3_1[is.na(subset.nomiss[[i]]$bf3_1)]<-
subset.i$imputed$bf3_1[, i]
subset.nomiss[[i]]$bf3_3[is.na(subset.nomiss[[i]]$bf3_3)]<-
subset.i$imputed$bf3_3[, i]
subset.nomiss[[i]]$bf3_4[is.na(subset.nomiss[[i]]$bf3_4)]<-
subset.i$imputed$bf3_4[, i]
}

# Setting ref X and combine categories for easier interpretation
for (i in 1:10) {
  # anxiety, with new calculated attribute ax1_score
  subset.nomiss[[i]]$ax1_1<-5-subset.nomiss[[i]]$ax1_1
  subset.nomiss[[i]]$ax1_2<-5-subset.nomiss[[i]]$ax1_2
  subset.nomiss[[i]]$ax1_3<-5-subset.nomiss[[i]]$ax1_3
  subset.nomiss[[i]]$ax1_4<-5-subset.nomiss[[i]]$ax1_4
  subset.nomiss[[i]]$ax1_5<-5-subset.nomiss[[i]]$ax1_5
  subset.nomiss[[i]]$ax1_score<-
(subset.nomiss[[i]]$ax1_1+subset.nomiss[[i]]$ax1_2+subset.nomiss[[i]]$ax1_3+subset.n
omiss[[i]]$ax1_4+subset.nomiss[[i]]$ax1_5+subset.nomiss[[i]]$ax1_6+subset.nomiss[[i]]
)$ax1_7+subset.nomiss[[i]]$ax1_8+subset.nomiss[[i]]$ax1_9+subset.nomiss[[i]]$ax1_10)
/10
  subset.nomiss[[i]]$ax1_score[subset.nomiss[[i]]$ax1_score<2]<-1
  subset.nomiss[[i]]$ax1_score[subset.nomiss[[i]]$ax1_score>=2&subset.nomiss[[i]]$ax1_
score<2.5]<-2
  subset.nomiss[[i]]$ax1_score[subset.nomiss[[i]]$ax1_score>=2.5&subset.nomiss[[i]]$ax
1_score<=4]<-3
  # sex ref:M
  subset.nomiss[[i]]$sex[subset.nomiss[[i]]$sex==1]<-0
  subset.nomiss[[i]]$sex[subset.nomiss[[i]]$sex==2]<-1
  # age ref: 35-44
  subset.nomiss[[i]]$age_gp[subset.nomiss[[i]]$age_gp==3]<-0
  # education ref:primary, grouping 1,2,3;4,5,6;7
  subset.nomiss[[i]]$edu[subset.nomiss[[i]]$edu<=3]<-1
  subset.nomiss[[i]]$edu[subset.nomiss[[i]]$edu<=6&subset.nomiss[[i]]$edu>=4]<-2
  subset.nomiss[[i]]$edu[subset.nomiss[[i]]$edu==7]<-3
  # perceived health
  subset.nomiss[[i]]$ph1[subset.nomiss[[i]]$ph1==3]<-0
  # absolute susceptibility, grouping 6,7
  subset.nomiss[[i]]$bf1[subset.nomiss[[i]]$bf1==4]<-0
  subset.nomiss[[i]]$bf1[subset.nomiss[[i]]$bf1==7]<-6
  # relative susceptibility, grouping 6,7

```

```

subset.nomiss[[i]]$bf2[subset.nomiss[[i]]$bf2==4]<-0
subset.nomiss[[i]]$bf2[subset.nomiss[[i]]$bf2==7]<-6
# severity vs SARS
subset.nomiss[[i]]$bf5[subset.nomiss[[i]]$bf5==3]<-0
# how worry if developed ILL tomorrow
subset.nomiss[[i]]$bf4[subset.nomiss[[i]]$bf4==4]<-0
# knowledge
subset.nomiss[[i]]$bf3_1[subset.nomiss[[i]]$bf3_1==2]<-0
subset.nomiss[[i]]$bf3_3[subset.nomiss[[i]]$bf3_3==2]<-0
subset.nomiss[[i]]$bf3_4[subset.nomiss[[i]]$bf3_4==2]<-0
# handwashing after sneezing
subset.nomiss[[i]]$pm3[subset.nomiss[[i]]$pm3<=2]<-1
subset.nomiss[[i]]$pm3[subset.nomiss[[i]]$pm3>=3&subset.nomiss[[i]]$pm3<=4]<-0
# handwashing-use liquid soap
subset.nomiss[[i]]$pm4[subset.nomiss[[i]]$pm4<=2]<-1
subset.nomiss[[i]]$pm4[subset.nomiss[[i]]$pm4>=3&subset.nomiss[[i]]$pm4<=4]<-0
# handwashing after home
subset.nomiss[[i]]$pm3a[subset.nomiss[[i]]$pm3a<=2]<-1
subset.nomiss[[i]]$pm3a[subset.nomiss[[i]]$pm3a>=3&subset.nomiss[[i]]$pm3a<=4]<-0
# adopt any preventive measures when touching common objects (pm7)
subset.nomiss[[i]]$pm7[subset.nomiss[[i]]$pm7<=2]<-1
subset.nomiss[[i]]$pm7[subset.nomiss[[i]]$pm7>=3&subset.nomiss[[i]]$pm7<=4]<-0
# wash hands after touching common objects (pm7b)
subset.nomiss[[i]]$pm7b[subset.nomiss[[i]]$pm7b<=2]<-1
subset.nomiss[[i]]$pm7b[subset.nomiss[[i]]$pm7b>=3&subset.nomiss[[i]]$pm7b<=4]<-0
}

# OR and IC calculation for the multiple logistic regression
combine.mi<-function(model, n.impute) {
  betas<-matrix(c(model[[1]][[4]]$fixed, model[[2]][[4]]$fixed,
model[[3]][[4]]$fixed,model[[4]][[4]]$fixed,model[[5]][[4]]$fixed,model[[6]][[4]]$fi
xed, model[[7]][[4]]$fixed,model[[8]][[4]]$fixed, model[[9]][[4]]$fixed,
model[[10]][[4]]$fixed),byrow=FALSE, ncol=n.impute) # coefficients
  vars<-matrix(c(diag(model[[1]][[5]]), diag(model[[2]][[5]]), diag(model[[3]][[5]]),
diag(model[[4]][[5]]), diag(model[[5]][[5]]),diag(model[[6]][[5]]),
diag(model[[7]][[5]]), diag(model[[8]][[5]]), diag(model[[9]][[5]]),
diag(model[[10]][[5]])),byrow=FALSE, ncol=n.impute) # variance (diagonal of the
variance-covariance matrix of the fixed effects)
  coef.names<-names(model[[1]][[4]]$fixed)
  mean.coefs<-rowMeans(betas) # mean of coefficients for imputed datasets without NA
  Ubar<-rowMeans(vars) # mean of variance
  B<-rowSums((betas-mean.coefs)^2/(n.impute-1)) #sigma square
  T<-(1 + 1/n.impute)*B+Ubar # s square

```

```

degf<-(n.impute-1)*(1+Ubar/((1+1/n.impute)*B))*(1+Ubar/((1+1/n.impute)*B)) #
degree of freedom
data.frame(OR = exp(mean.coefs), # odds ratio for a change in X (Xi vs ref )
            lowerCI = exp(mean.coefs-qt(0.975, df=degf)*sqrt(T)) #CI, alpha=0.05
            , upperCI = exp(mean.coefs + qt(0.975, df=degf)*sqrt(T))
            , row.names=coef.names)
}

```

```

# Multiple logistic regression for 5 interested attributes in the Table Replicated
# handwashing after sneezing, coughing or touching nose

```

```

fit.m<-list(NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA)

```

```

library(MASS)

```

```

for (i in 1:10) { #Fit Generalized Linear Mixed Models via PQL

```

```

  fit.m[[i]]<-glmmPQL(pm3~sex+factor(age_gp)+factor(edu)+factor(ax1_score)+
factor(ph1)+factor(bf1)+factor(bf2)+factor(bf5)+factor(bf4)+bf3_1+bf3_3+bf3_4,
random = ~ 1 | wave, family = binomial, data=subset.nomiss[[i]])
}

```

```

round(combine.mi(fit.m, 10), 2) # return OR and CI

```

```

# use liquid soap when washing hands

```

```

fit.m<-list(NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA)

```

```

for (i in 1:10) {

```

```

  fit.m[[i]]<-glmmPQL(pm4~sex+factor(age_gp)+factor(edu)+factor(ax1_score)+
factor(ph1)+factor(bf1)+factor(bf2)+factor(bf5)+factor(bf4)+bf3_1+bf3_3+bf3_4,
random = ~ 1 | wave, family = binomial, data=subset.nomiss[[i]])
}

```

```

round(combine.mi(fit.m, 10), 2)

```

```

# wash hands after returning home

```

```

fit.m<-list(NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA)

```

```

for (i in 1:10) {

```

```

  fit.m[[i]]<-glmmPQL(pm3a~sex+factor(age_gp)+factor(edu)+factor(ax1_score)+
factor(ph1)+factor(bf1)+factor(bf2)+factor(bf5)+factor(bf4)+bf3_1+bf3_3+bf3_4,
random = ~ 1 | wave, family = binomial, data=subset.nomiss[[i]])
}

```

```

round(combine.mi(fit.m, 10), 2)

```

```

# wash hands after touching common objects (pm7b)

```

```

fit.m<-list(NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA)

```

```

for (i in 1:10) {

```

```

  fit.m[[i]]<-glmmPQL(pm7b~sex+factor(age_gp)+factor(edu)+factor(ax1_score)+
factor(ph1)+factor(bf1)+factor(bf2)+factor(bf5)+factor(bf4)+bf3_1+bf3_3+bf3_4,
random = ~ 1 | wave, family = binomial, data=subset.nomiss[[i]])
}

```

```

round(combine.mi(fit.m, 10), 2)

```

```

# clean or disinfect house more often

```

```

fit.m<-list(NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA)

```

```

for (i in 1:10) {

```

```

fit.m[[i]]<-glmPQL(pm10_6~sex+factor(age_gp)+factor(edu)+factor(ax1_score)+
factor(ph1)+factor(bf1)+factor(bf2)+factor(bf5)+factor(bf4)+bf3_1+bf3_3+bf3_4,
random = ~ 1 | wave, family = binomial, data=subset.nomiss[[i]])
}
round(combine.mi(fit.m, 10), 2)

#Get the number of successful respondents in each category in the actual survey
library(plyr)
# Gender
ddply(subset, . (subset$sex), nrow)
# age group
ddply(subset, . (subset$age), nrow)
# educational level
ddply(subset, . (subset$edu), nrow)
(sum(284, 332, 1185)) #primary and below
(sum(1487, 2864, 966)) #Secondary
# ax1_score, with calculation
subset2<-subset
subset2$ax1_score<-(25-subset2$ax1_1-subset2$ax1_2-subset2$ax1_3-subset2$ax1_4-
subset2$ax1_5+subset2$ax1_6+subset2$ax1_7+subset2$ax1_8+subset2$ax1_9+subset2$ax1_10
)/10
subset2$ax1_score[subset2$ax1_score<2]<-1
subset2$ax1_score[subset2$ax1_score>=2&subset2$ax1_score<2.5]<-2
subset2$ax1_score[subset2$ax1_score>=2.5&subset2$ax1_score<=4]<-3
# perceived health
#1-Excellent; 2-Very good; 3-Good; 4-Fair; 5-Poor
ddply(subset, . (subset$ph1), nrow)
# absolute susceptibility
#1-Never; 2-Very unlikely; 3-Unlikely; 4-Evens; 5-Likely; 6-Very likely; 7-Certain.
ddply(subset, . (subset$bf1), nrow)
sum(64, 15) #combine 6 and 7 together
# relative susceptibility
#1-Not at all; 2-Much less; 3- Less; 4-Evens; 5-More; 6-Much more; 7-Certain.
ddply(subset, . (subset$bf2), nrow)
sum(44, 44) #combine 6 and 7 together
# severity vs SARS
#1-Much less; 2-Less; 3-About the same; 4-More; 5-Much more.
ddply(subset, . (subset$bf5), nrow)
# how worry if developed ILI tomorrow
ddply(subset, . (subset$bf4), nrow)
# knowledge
ddply(subset, . (subset$bf3_1), nrow) #droplets
ddply(subset, . (subset$bf3_3), nrow) #indirect hand contact
ddply(subset, . (subset$bf3_4), nrow) #oral-faecal

```

Appendix E – Articles Citing the Paper

The paper is cited by 71 other articles, which are further cited in 525 articles. Name of articles which cite the paper and their respective citing data can be found in Google Scholar. Data is crawled using import.io extractor and can be found at <https://import.io/data/set/?mode=loadSet&set=ae925e4d-5f28-40d6-9860-cad50632bc39>. After data verification, the list is shown below:

Name of Article	Cited by
Epidemiological characteristics of 2009 (H1N1) pandemic influenza based on paired sera from a longitudinal community cohort study	82
Factors affecting intention to receive and self-reported receipt of 2009 pandemic (H1N1) vaccine in Hong Kong: a longitudinal study	79
Acceptance of a vaccine against pandemic influenza A (H1N1) virus amongst healthcare workers in Beijing, China	45
Transmission characteristics of the 2009 H1N1 influenza pandemic: comparison of 8 Southern hemisphere countries	40
Did the pandemic have an impact on influenza vaccination attitude? A survey among health care workers	38
Computational epidemiology	32
The influence of social-cognitive factors on personal hygiene practices to protect against influenzas: using modelling to compare avian A/H5N1 and 2009 pandemic A/ ...	29
Surveillance of perceptions, knowledge, attitudes and behaviors of the Italian adult population (18–69 years) during the 2009–2010 A/H1N1 influenza pandemic	21
Determinants of refusal of A/H1N1 pandemic vaccination in a high risk population: a qualitative approach	17
Facemasks and intensified hand hygiene in a German household trial during the 2009/2010 influenza A (H1N1) pandemic: adherence and tolerability in children and ...	12
Knowledge, attitude, and behaviour of public health doctors towards pandemic influenza compared to the general population in Italy	10
Adoption of preventive measures during and after the 2009 influenza A (H1N1) virus pandemic peak in Spain	10
Examining the knowledge, attitudes and practices of domestic and international university students towards seasonal and pandemic influenza	10
The epidemiological and public health research response to 2009 pandemic influenza A	8

(H1N1): experiences from Hong Kong	
Human exposure to live poultry and psychological and behavioral responses to influenza A (H7N9), China	8
Prevalence and associated psychosocial factors of increased hand hygiene practice during the influenza A/H1N1 pandemic: findings and prevention ...	11
How do anticipated worry and regret predict seasonal influenza vaccination uptake among Chinese adults?	8
Influenza-like illness in general practice in Norway: clinical course and attitudes towards vaccination and preventive measures during the 2009 pandemic	6
Responses to threat of influenza A (H7N9) and support for live poultry markets, Hong Kong, 2013	5
Knowledge, risk perceptions, and preventive precautions among Hong Kong students during the 2009 influenza A (H1N1) pandemic	5
Anxiety and depression: linkages with viral diseases	6
Media Use and Communication Inequalities in a Public Health Emergency: A Case Study of 2009–2010 Pandemic Influenza A Virus Subtype H1N1.	5
Modelling the propagation of social response during a disease outbreak	5
Intentions to perform non-pharmaceutical protective behaviors during influenza outbreaks in Sweden: a cross-sectional study following a mass vaccination ...	5
Controlling epidemic viral infection	4
Attitudes of the medical students from two Czech universities to pandemic flu A (H1N1) 2009 and to influenza vaccination	3
Non-pharmaceutical measures to prevent influenza transmission: the evidence for individual protective measures	3
Comparison of different risk perception measures in predicting seasonal influenza vaccination among Healthy Chinese adults in Hong Kong: a prospective ...	4
Pandemic influenza A/H1N1 (pH1N1) in Hong Kong: Anatomy of a response	3
Effect of the H1N1 influenza pandemic on the incidence of epidemic keratoconjunctivitis and on hygiene behavior: a cross-sectional study	3
Anxiety, worry and cognitive risk estimate in relation to protective behaviors during the 2009 influenza A/H1N1 pandemic in Hong Kong: ten cross-sectional ...	5
Dimensiones culturales del concepto de influenza humana en estudiantes y docentes de ciencias de la salud que favorecen o dificultan su prevención	5

甲型 H1N1 流感不同流行时期农民知信行变化趋势分析 [J]	4
Contact behaviour of children and parental employment behaviour during school closures against the pandemic influenza A (H1N1-2009) in Japan	3
What have we learned about communication inequalities during the H1N1 pandemic: a systematic review of the literature	3
Attitudes and preventive behaviours adopted during the (H1N1) 2009 influenza virus epidemic in Spain	3
Health-care providers' preparedness for H1N1/09 influenza prevention and treatment in Dar es Salaam, Tanzania	2
Human behavior in epidemic modelling	1
The cost of double standard risk communication during the swine-flu epidemic: Reflections from Norway	1
Preventing the spread of H1N1 influenza infection during a pandemic: autonomy-supportive advice versus controlling instruction	1
Actitudes y comportamientos preventivos durante la pandemia de gripe (H1N1) 2009 en España	1
城乡居民人感染 H7N9 禽流感知信行调查	1
甲型 H1N1 流感防控建模分析	1
Modelling public adoption of health protective behaviours against novel respiratory infectious diseases in Hong Kong: the avianinfluenza A/H5N1 and the 2009 ...	0
Swine Flu in College: Early Campus Response to Outbreak Control Measures	0
SYSTEMATIC REVIEW	0
Homo-psychologicus: Reactionary Behavioural Aspects	0
The effects of SNS communication: How expressing and receiving information predict MERS-preventive behavioral intentions in South Korea	0
Exploring the Effect of School Closure in Mitigating Transmission of Pandemic (H1N1) 2009 in Hong Kong	0
Health seeking behavioral response through post pandemic H1N1 period in Hong Kong	0
TELL ME Design: Protective Behaviour During an Epidemic	0
Survey on the Likely Behavioural Changes of the General Public in Four European Countries During the 2009/2010 Pandemic	0
Influenza vaccination and its association with Guillain-barréSyndrome	0
Responses to Threat of Influenza A(H7N9) and Support for Live Poultry Markets, Hong	5

Kong, 2013	
Homo-psychologicus: Reactionary behavioural aspects of epidemics	0
Live Poultry Exposure and Public Response to Influenza A (H7N9) in Urban and Rural China during Two Epidemic Waves in 2013-2014	0
Public risk perception and attitudes towards live poultry markets before and after their closure due to influenza A (H7N9), Hong Kong, January–February 2014	1
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