Supplementary file.

Tuv et al. General practitioner phone calls to improve COVID-19 vaccine uptake among patients at increased risk of severe COVID-19: A randomised trial.

Study protocol

Conversation with your GP as a measure to increase vaccination coverage

Study protocol, 21.09.2021 (English translation of protocol in Norwegian submitted to Regional Ethics Committee in Norway).

Project group:

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• Ida Fattah (Chief Medical Officer, Oslo Municipality)
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• Ingeborg Hess Elgersma (Data analysist, Norwegian Institute of Public Health)
• Fredrik Aaeng Kristiansen (Research Coordinator, Norwegian Institute of Public Health)

Background

A small but not insignificant proportion of the population rejects COVID-19 vaccination (1). We have limited knowledge of the reasons for this, but important factors are probably both vaccine skepticism, lack of trust in government, practical barriers, and lack of information (2). A systematic review of efficacy studies to promote vaccination against influenza found several studies of interventions that involved in the health service contacting non-vaccinated persons, often by means of letters (3). The results indicated that such an approach contributes to more people being vaccinated. In a recent Canadian uncontrolled study, people who were registered as unvaccinated against the flu were called by a pharmacist offering a call about flu vaccination. Two thirds of the non-vaccinated who were called wanted to be vaccinated afterwards (4).

Healthcare personnel are in a key position to influence attitudes towards vaccines and to increase coverage in the risk groups – both by leading by example, and by communicating clear recommendations for vaccination to those who need it (5-9). Many have a trusting relationship with their GP (10). This can make it easier to discuss concerns, such as vaccination. It is therefore reasonable to assume that the GP can play an important role as a mediator of information about COVID-19 vaccination to people who are unsure whether they want to be vaccinated.

According to the Norwegian regulations for national vaccination programmes, GPs must help ensure that the patients they have responsibility for are offered vaccination against COVID-19, including by identifying persons on their own list who should be offered a vaccine (11). In England, GPs have also, on their own initiative, begun contacting their patients, to increase vaccine coverage (12). Since it is

uncertain whether, or to what extent, this contributes to more people accepting the vaccine, we want to conduct an evaluation where a selection of non-vaccinated people receive a phone call from their GP offering them a conversation about the COVID-19 vaccine.

Method

A number of GPs in Oslo who use the Infodoc medical record system will be recruited to participate in the project. This medical record program contains a data extraction function that allows you to extract a list of patients that are at risk of clinically severe COVID-19. This extraction function was used to identify priority groups for vaccination in early 2021. Infodoc also contains functionality that communicates with the Norwegian vaccination registry (SYSVAK), so that a list can be extracted that includes only unvaccinated patients in the risk groups, over 18 years of age.

To ensure a valid randomization procedure of patients to the intervention and control group while at the same time ensuring that all data processed by the research group are anonymous, the selection and distribution of patients will be done as follows:

A health secretary at the GP surgery draws out the list of unvaccinated patients belonging to each participating GP. The list is exported from Infodoc to Excel so that the patient name is numbered. The health secretary then prints the Excel list on paper. Among the number of numbered patient names on the list, ten numbers are randomly drawn to the intervention group and ten numbers to the control group that the health secretary marks on the list with two different colors. The patient name that has been extracted is then manually transferred by the health secretary to two separate handwritten lists. The two lists are placed in separate envelopes marked with the group's color and the doctor's name. The envelopes close. A project worker gives one closed envelope to the doctor and shreds the other.

The project worker does not know which patient names are on the lists. The health secretary doesn't know which envelope the doctor received. The doctor doesn't know which names are on the second list.

The personal data is handled exclusively by the doctor's office, which has access to it anyway. The original Excel list is stored in a closed envelope in a locked cabinet at the doctor's office until the project is finished. The list the doctor has received is the intervention group. The second list serves as a control group. Patients in the intervention group will be contacted by their GP by phone. The control group will not receive any intervention.

We have chosen to use randomised trials as a methodological approach, as this is widely considered the most solid methods for effect evaluation of interventions.

GPs will be given a guidance form for conducting a semi-structured patient interview with elements of motivational interviews. The expected time frame for each patient call is around 20 minutes. This will be a respectful dialogue on the patient's terms, and the conversation should resemble as much as possible normal clinical practice.

Patients belonging to the participating GP offices will be informed of the project by means of posters in the waiting room for one month before the start of the project and while the project is running (see appendix). It will be possible to opt from the study by contacting the health secretary at the doctor's office. All persons who are called by their GP will be explained the purpose of the conversation and the GP will ask if they agree to participate in the project, and at the same time emphasize that it is perfectly fine not to want to participate (see guidance form for GPs, appendix).

The project is planned to start at the end of October/November, with a duration of four weeks. In mid-December, just as at the start of the trial period, the same health secretary will extract lists of unvaccinated patients belonging to each participating GP, and count how many in the two groups are still unvaccinated. Those who have been vaccinated will have disappeared from the list. The number of unvaccinated in each group is given to the project researcher, who knows which group was to intervention or control. Only the number of unvaccinated patients are provided, no personal data. The proportion of patients in the intervention group who have been vaccinated may then be compared with the proportion in the control group.

GPs will receive optional post graduate education points for taking part in the project, as well as fees for the work. The fee is covered by the Norwegian Institute of Public health, and the total cost is estimated at around NOK 150,000. If we assume that the proportion of vaccinated among those contacted by GPs will be around 30 per cent, and the proportion in the control group will be 10 per cent, we will need 120-150 people who are included in the sample. If the proportion vaccinated among those who are called up becomes 20 percent, and it becomes 10 percent in the control group, we will need a sample of 400 people. There are considerable uncertainties in this estimate, not least in terms of how many patients the GPs will be able to get in touch with.

Project management

Marit Tuv is a GP, temporarily employed at the Norwegian Institute of Public Health to lead this project, among other things. She has limited research experience, but is supported by a team with extensive research experience.

Ethical challenges

Participation in the project entails marginal risk and little inconvenience for those who are called by their GP, and no risk or inconvenience whatsoever for the participants in the control group. The results will form part of the knowledge base for decisions on whether it is worth investing in this measure as part of efforts to increase vaccination coverage.

Funding sources, competing interest s

The costs of projects are labour costs to the members of the research group and remuneration to the GPs who participate. The Norwegian Institute of Public Health and the City of Oslo will cover the labour costs, while the Norwegian Institute of Public Health will cover the costs of the participating GPs.

The project manager works as a GP, but beyond that there are no known possible conflicts of interest. Patients can be in an addiction relationship with their GP, and we therefore attach great importance to GPs stressing that participation is completely voluntary and that it is perfectly fine to decline participation.

Plan for publishing results and reusing data

The results of the study will be published on the Norwegian Institute of Public Health's website and through conventional scientific outlets (medical journals). All data processed is anonymous and will be shared with anyone who wishes to view or use it.

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Page Break**Appendix. Poster for GP offices waiting rooms (in Norwegian)**

Undersøkelse

I LØPET AV NOVEMBER 2021 GJENNOMFØRER FOLKEHELSEINSTITUTTET EN UNDERSØKELSE DER EN ELLER FLERE LEGER VED DETTE LEGEKONTOR DELTAR

- **Fastlegen vil ta kontakt per telefon med noen pasienter ved dette legekontoret med risiko for alvorlig forløp av koronavirussykdom som hittil ikke har tatt imot tilbudet om koronavaksine, og tilby en samtale om dette.**
- **Det er helt greit å takke nei til tilbudet om samtale.**
- **Noen pasienter med risiko for alvorlig forløp av koronavirussykdom vil havne i en kontrollgruppe som ikke mottar noen samtale fra fastlegen. Vi trenger denne gruppen for å kunne sammenligne med gruppen som mottar telefon fra fastlegen.**
- **Man kan reservere seg mot deltakelse i prosjektet ved å ta kontakt med resepsjonen på legekontoret.**
- **Det oppgis ingen personopplysninger til Folkehelseinstituttet.**
- **Formålet er å se om en samtale med fastlegen har noe å si for vaksinasjonsdekningen.**
- **Kostnadene ved fastlegens arbeid dekkes av Folkehelseinstituttet.**
- **Resultatene av undersøkelsen vil bli offentliggjort gjennom media, på Folkehelseinstituttets hjemmesider, og gjennom vitenskapelig publisering.**
- **Undersøkelsen gjennomføres i samarbeid med Oslo kommune, Helseetaten.**
- **Vi takker legekontorene som har sagt ja til å delta i undersøkelsen!**

Kontaktpersoner: Marit Tuv (marit.tuv@fhi.no) og Atle Fretheim (atle.fretheim@fhi.no).

FHI

Guidance for participating GPs (translated from Norwegian)

I'm calling because it seems that you have not received a corona-vaccine. Is that correct?
Vaccinated: Wrong list or recently vaccinated. SYSVAK search? Register? Not vaccinated: Is it okay for you for us to talk a little about the vaccine? I would like to hear what you think about being vaccinated.

Wants to talk
Open and friendly questions that invite reflection
What would it take for you to look at it differently? Can I do something for you? Do you want me to tell you more about the vaccine or the disease? Is there anything you are worried about? Summarizes: «So what you think is that the vaccine can make you (…). Have you thought about what the coronavirus can do to (…)? »
All answers are met with respect and acceptance of the patient's views
I respect that you think this way. It's your body. You need to decide for yourself.
Risk / benefit formulations
You who have had / have (…) should be vaccinated, because (…)
If movement in the conversation
I get the impression that you are considering taking the vaccine? I can help you book an appointment for vaccine, do you want me to do that? Direct number to the vaccine centers (should be available all city districts?)

Does not want to talk / is determined not to take the vaccine
Slip in some information
I respect that you do not want to talk about it / that you mean this. You should know that I recommend you take the vaccine. Feel free to get in touch if you change your mind.

Page Break

Original Norwegian version:

Veiledning til deltakende fastleger

Jeg ringer fordi det ser ut til at du ikke har fått koronavaksine. Stemmer det?
Vaksinert: Feil i lista eller fått vaksine nylig. SYSVAK-søk? Registrere? Ikke vaksinert: Er det greit for deg at vi snakker litt om vaksinen? Jeg vil gjerne høre hva du tenker om det å bli vaksinert.

Ønsker å snakke
Åpne og vennlige spørsmål som inviterer til refleksjon

Hva skal til for at du kan se annerledes på det? Kan jeg gjøre noe for deg? Vil du at jeg skal fortelle deg mer om vaksinen eller sykdommen? Er det noe du bekymrer deg for? Oppsummer: «Så det du tenker er at vaksinen kan gjøre at du (…). Har du tenkt over hva koronaviruset kan gjøre med (…) ?»
Alle svar møtes med respekt og aksept for pasientens oppfatninger
Jeg respekterer at du tenker slik. Det er din kropp. Dette må du bestemme selv.
Risiko/nytte-formuleringer
Du som har hatt/har (…) bør vaksineres, fordi (…)
Hvis bevegelse i samtalen
Jeg får inntrykk av at du vurderer å la deg vaksinere? Jeg kan hjelpe deg med å bestille time til vaksinering, ønsker du det? Direktenummer til vaksinesentrene (bør vel være alle bydeler?)

Ønsker ikke å snakke/er fast bestemt på å ikke ta vaksinen
Smett inn litt informasjon
Jeg respekterer at du ikke vil snakke om det/at du mener dette. Du skal vite at jeg anbefaler deg å ta vaksinen. Ta gjerne kontakt hvis du ombestemmer deg.

Suggestions for answers to common concerns and perceptions (translated from Norwegian)

Rapid vaccine development - how can it be safe?

Already during the SARS epidemic in 2000, research began on a corona virus vaccine. The work continued when MERS arrived 10 years later. There was therefore a base to build on. The vaccines we now use have been tested in large studies where several thousand people have received the vaccine. The studies were conducted in the same way and with the same quality requirements as for other vaccines, but the observation time before approval was somewhat shorter. This could be done, among other things, by running the processes needed for approval in parallel and not in succession, and by allocating enormous resources to the work. The vaccines have therefore received conditional approval. Vaccine manufacturers are required to continue submitting data from ongoing studies. In parallel with this, extensive monitoring is being done of side effects of vaccines given in vaccination programs around the world. This gives us a good overview of the side effects.

The vaccine has not been tested on people with chronic illnesses

The vaccine was also tested on groups with chronic diseases before it was approved, thought to a limited extent. We now have much more knowledge after the vaccine has been given to millions of patients with various chronic diseases. Side effects are closely monitored, and no increased risk has been found among vaccinated people with chronic disease. On the contrary, these are the ones who benefit most from the vaccine. Many chronic diseases increase the risk of severe COVID-19 disease. The vaccine may have a smaller effect on weakened immune systems, but it is important to take the vaccine to get the protection you can. If you become infected, the vaccine can still be important in mitigating the course of the disease.

Artificial vaccine in the body - better with natural immunity

The vaccine gives the body's own immune system something to train on to learn to defend itself against the coronavirus. Then the ingredients in the vaccine are broken down and disappear from the body after a short time. So, it is the body's own natural immune system that does the job. The immune system remembers this lesson long after the vaccine is out of the body. In the case of natural illness, some people have get serious ill and risk long term effects. The point of the vaccine is to become immune without having to take the risks associated with being ill from COVID-19.

Deaths after the vaccine, more than during the swine flu pandemic

Mortality is naturally high in the oldest age groups where 95% are vaccinated. During the previous pandemic, only 20% of the oldest were vaccinated. Now almost all the elderly have been vaccinated. Therefore many natural deaths also occur among those who are vaccinated.

COVID-19 is not dangerous for me – I don’t need the vaccine

The risk of a serious illness is low for those who are not in the risk groups. Among young, healthy people, there are still some who get seriously ill and some experience long term effects of COVID-19. We do not know in who it is that are at risk. Some also have vulnerable friends or family members, who you do not want to infect. Vaccination protects against disease, reduces the spread of infection and helps to open up society.

New variants mean that the vaccine does not work - no point in getting vaccinated

This is not correct. The protection against serious illness is high after both the first and second dose. After two doses, you also have good protection against being infected with the coronavirus. If the virus changes a lot, the vaccines can be changed so that they work better against new varieties, in the same way as for the annual flu vaccine.

Fully vaccinated get COVID-19 and can infect others - no point in getting vaccinated

The vaccine effectively protects against serious illness and death. Some vaccinated may still be infected, but the chance of this is much lower than for those who are unvaccinated. Most vaccinated people who become infected develop only mild illness. There have been some reports of high levels of virus in samples from vaccinated people. This does not mean that vaccinated people secrete as much virus as unvaccinated people, since the comparison is made for those who have been infected

with the corona virus. The vast majority of those who are vaccinated do not become infected with the virus.

We were fooled by the swine flu - why should believe this vaccine is safer?

Unfortunately, some children and young adults contracted the sleep disorder narcolepsy after receiving the swine flu vaccine. Today's extensive monitoring of the many millions of vaccines given in the world gives us a good overview of the side effects that may occur. The risk that there are side effects we do not know about, is small.

We had four COVID-19 vaccines, two have been stopped due to dangerous side effects - shows that the COVID-19 vaccine is a big experiment and a risky exercise

On the contrary, this shows that the authorities take the safety of COVID-19 vaccines very seriously. Bleeding and blood clots were very rare side effects, but the authorities chose to remove the vaccines from the program.

Fear that your own DNA/genetic material might be affected

The vaccines we use in Norway contain the recipe (messenger RNA) for the typical spikes of the coronavirus. Our own cells use the recipe to produce spike protein themselves, but outside the cell nucleus where our genetic material is located. Harmless copies of these spikes are formed for the immune system to train on. This is how the body learns to recognize and defend itself against real coronavirus if you later become infected. The messenger RNA from the vaccine is rapidly broken down by the body without affecting the genetic material.

Menstrual disorders and fertility

There have been a number of reports about this. To date, no evidence has been found for the affected menstrual cycle, but this cannot be ruled out. Reports of such incidents after vaccination are followed up both in Norway and in other countries to obtain more knowledge about this. The viral protein formed by vaccination is not the same as a protein found on the surface of the placenta. The two proteins are not similar. There is no evidence that the vaccine affects fertility.

Concerns about the content of the vaccine (pigs, aborted fetuses, magnetic)

The vaccine does not contain products from pigs. The vaccine also does not contain products from aborted fetuses. It is true that there are other vaccines that have been grown on cell lines based on fetal tissue, but this does not apply to the COVID-19 vaccines we use in Norway. The vaccine does not make you magnetic. Where the vaccine is given, there is usually no hair growth and therefore more moist skin. For example, a coin will therefore be stick better there than on other parts of the body.

The authorities will not take responsibility if something goes wrong

This is not correct. The Norwegian state assumes liability if anyone should be harmed by a vaccine given in the Norwegian COVID-19 vaccination program. Applications are processed by the Norwegian System of Patient Injury Compensation (NPE). You are entitled to compensation when the vaccine may be the cause of the injury and there are no one or more other more probable causes.

Page Break

Original Norwegian version:
Forslag til svar på vanlige bekymringer og oppfatninger

Rask utvikling – hvordan kan vaksinen være trygg?

Allerede under SARS-epidemien i 2000 startet forskningen på en koronavaksine. Arbeidet fortsatte da MERS kom 10 år senere. Det eksisterte derfor en base å bygge videre på. Vaksinene vi nå bruker er testet ut i store studier hvor flere tusen personer har fått vaksinen. Studiene er gjennomført på samme måte og med samme kvalitetskrav som for andre vaksiner, men observasjonstiden før godkjenning var noe kortere. Dette lot seg gjøre blant annet ved å kjøre prosessene parallelt og ikke etter hverandre, og ved at enorme ressurser ble avsatt til arbeidet. Vaksinene har derfor fått betinget

godkjenning. Vaksineprodusentene er pålagt å fortsette å levere inn data fra studiene som fremdeles pågår. Parallelt med dette pågår det et omfattende overvåkningsarbeid på bivirkninger av vaksiner som gis i vaksinasjonsprogrammene rundt om i verden. Det gir oss god oversikt over bivirkningene.

Vaksinen er ikke testet på personer med kronisk sykdom

Jo, vaksinen ble testet ut også på grupper med kroniske sykdommer før den ble godkjent, men det var i begrenset omfang. Nå har vi mye mer kunnskap etter at vaksinen er gitt til flere millioner pasienter med ulike kroniske sykdommer. Bivirkninger overvåkes nøye og det er ikke funnet noen økt risiko ved å gi vaksine til de med kronisk sykdom. Tvert imot er det disse som har størst nytte av vaksinen. Mange kroniske sykdommer gir økt risiko for alvorlig koronainfeksjon. Vaksinen kan ha dårligere effekt ved svekket immunforsvar, men det er viktig å ta vaksinen for å få den beskyttelsen man kan. Om man blir smittet kan vaksinen likevel være viktig ved å mildne sykdomsforløpet.

Kunstig vaksine i kroppen – bedre med naturlig immunitet

Vaksinen gir kroppens eget immunforsvar noe å trene på for å lære seg å forsvare seg mot koronaviruset. Deretter brytes innholdsstoffene i vaksinen ned og forsvinner ut av kroppen etter kort tid. Det er altså kroppens eget naturlige immunforsvar som gjør jobben. Immunforsvaret husker denne lærdommen i lang tid etter at vaksinen er ute av kroppen. Ved naturlig sykdom får noen alvorlig forløp og senskader. Poenget med vaksine er å bli immun uten å måtte ta den risikoen.

Dødsfall etter vaksinen, flere enn under svineinfluensapandemien

Dødeligheten er naturlig høy i de eldste aldersgruppene hvor 95 % er vaksinert. Under forrige pandemi var kun 20 % av de eldste vaksinert. Nå er nesten alle eldre vaksinert. Dermed er det også flere naturlige dødsfall som tilfeldigvis oppstår i tidssammenheng nå.

Korona er ikke farlig for meg – trenger ikke vaksinen

Risikoen for alvorlig forløp er lav for de som ikke er i risikogruppene. Blant unge, friske personer er det likevel enkelte som får svært alvorlig sykdom og også senfølger av korona. Vi vet ikke på forhånd hvem. Noen har også sårbare personer i familie eller omgangskrets som man ikke vil smitte. Vaksinasjon beskytter mot sykdom, gir mindre smittespredning og bidrar til å åpne samfunnet.

Nye varianter gjør at vaksinen ikke virker – ingen vits i å vaksinere seg

Det er ikke riktig. Beskyttelsen mot alvorlig sykdom er høy etter både første og andre dose. Etter to har man god beskyttelse også mot å bli smittet med koronaviruset. Dersom viruset endrer seg mye, kan vaksinene endres slik at de virker bedre mot nye varianter, på samme måte som med den årlige influensavaksinen.

Fullvaksinerte får korona og kan smitte andre – ingen vits i å vaksinere seg

Fullvaksinerte er godt beskyttet mot alvorlig sykdomsforløp og død. Noen vil likevel kunne smittes, men sjansen er mye mindre enn hos uvaksinerte. De fleste vaksinerte som smittes får mild sykdom. Det er kommet enkelte forskningsrapporter om høy virusmengde i prøver fra koronasyke fullvaksinerte. Det er ikke det samme som at vaksinerte skiller ut like mye virus som uvaksinerte, da sammenligningen er gjort for de som er koronasyke. De aller fleste vaksinerte blir ikke koronasyke.

Vi ble lurt under svineinfluensaen – hvorfor tryggere nå?

Noen barn og unge voksne fikk dessverre søvnsykdommen narkolepsi etter å ha fått vaksinen mot svineinfluensa. Dagens omfattende overvåkningsarbeid fra de mange millioner gitte vaksiner i verden gir god oversikt over bivirkningene. Risikoen for at det nå er bivirkninger vi ikke vet om er liten.

Vi hadde fire koronavaksiner, to er stoppet grunnet farlige bivirkninger – viser at koronavaksine er et stort eksperiment og risikosport

Dette viser tvert imot at myndighetene tar sikkerheten ved bruk av koronavaksiner på stort alvor. Blødninger og blodpropp var veldig sjeldne bivirkninger, likevel valgte myndighetene å ta vaksinene ut av programmet.

Frykt for påvirkning av eget DNA/arvestoff

Vaksinene vi bruker i Norge inneholder oppskriften (budbringer-RNA) på de typiske piggene på koronaviruset. Våre egne celler bruker oppskriften til selv å produsere piggprotein, men utenfor cellekjernen hvor arvestoffet vårt befinner seg. Det dannes ufarlige kopier av disse piggene som immunforsvaret kan trene seg på. Sånn lærer kroppen seg å kjenne igjen og forsvare seg mot ekte koronavirus hvis man senere blir smittet. Budbringer-RNA fra vaksinen blir raskt brutt ned av kroppen uten å påvirke arvestoffet.

Menstruasjonsforstyrrelser og fertilitet

Det er kommet en del rapporter om dette. Hittil er det ikke funnet holdepunkter for påvirket menstruasjonssyklus, men det kan ikke utelukkes. Meldinger om slike hendelser i tiden etter vaksinasjon følges opp både i Norge og i andre land for å fremskaffe mer kunnskap om dette. Virusproteinet som dannes ved vaksinasjon er ikke det samme som et protein som finnes på overflaten av morkaken. De to proteinene ligner ikke på hverandre. Det er ingen holdepunkter for at vaksinen påvirker fertilitet.

Bekymring rundt innholdet i vaksinen (svin, aborterte fostre, magnetisk)

Vaksinen inneholder ikke produkter fra svin. Vaksinen inneholder heller ikke produkter fra aborterte fostre. Det er riktig at det finnes andre vaksiner som er dyrket fram på cellelinjer med utgangspunkt i fostervev, men det gjelder ikke koronavaksinene vi bruker i Norge. Vaksinen gjør oss ikke magnetiske. Der vaksinen settes er det som oftest ikke hårvekst og derfor mer fuktig hud. For eksempel en mynt vil derfor kunne sitte bedre der enn på andre deler av kroppen.

Myndighetene vil ikke ta ansvar om noe går galt

Det er ikke riktig. Den norske staten tar erstatningsansvaret hvis noen skulle få skader av vaksine gitt i det norske koronavaksinasjonsprogrammet. Søknader behandles av Norsk pasientskadeerstatning (NPE). Man har krav på erstatning når vaksinen kan være årsak til skaden og det ikke finnes én eller flere andre mer sannsynlige årsaker.

R-script

```
################################################################################
## General practitioner phone calls to increase COVID-19 vaccine uptake among
## high-risk patients: A randomised trial.
## Overview file 04.05.2021
## Prepared by Ingeborg Hess Elgersma, ingeborghess.elgersma@fhi.no
################################################################################

# Set wd to folder
setwd("C:/Users/INEL/OneDrive - Folkehelseinstituttet/Skrivebord/calls")
Sys.setlocale("LC_TIME", "English")
wd <- getwd()
#lodc pkgs ----
pkgs <- c(
  "dplyr",
  "tidyverse",
  "magrittr",
  "epitrix",
  "flextable",
  "officer",
  "RStata",
  "readxl"

)
for(pkg in pkgs){
  if(!pkg %in% installed.packages()[,"Package"]) install.packages(pkg)
}

library(dplyr)
library(ggplot2)
library(magrittr)
```

```
library(flextable)



calls_results <- readxl::read_excel("anonymized_dataset.xlsx")


names(calls_results) <- epitrix::clean_labels(names(calls_results))

calls_results <- calls_results %>%

  mutate(diff_int = randomized_to_intervention-remaining_intervention) %>%

  mutate(diff_kont = randomized_to_control-remaining_control)


############################ Table 1 ################################################

# The statistical analysis is done in Stata

# Here the dataset is prepared

col1i <- cbind(gp =rep(calls_results$gp, calls_results$randomized_to_intervention), intervention =
rep("intervention", sum(calls_results$randomized_to_intervention))) %>%

  as.data.frame()%>%

  group_by(gp) %>%

  mutate(id = row_number())


col2i <- cbind(gp =rep(calls_results$gp, calls_results$remaining_intervention), intervention =
rep("intervention", sum(calls_results$remaining_intervention)))  %>%

  as.data.frame()%>%

  group_by(gp) %>%

  mutate(id = row_number()) %>%

  mutate(vaccinated = 0)


intervention <- col1i %>%

  left_join(col2i) %>%

  mutate(vaccinated = coalesce(vaccinated, 1))
```

```
col1i <- cbind(gp =rep(calls_results$gp, calls_results$randomized_to_control), intervention =
rep("control", sum(calls_results$randomized_to_control))) %>%
  as.data.frame()%>%
  group_by(gp) %>%
  mutate(id = row_number())

col2i <- cbind(gp =rep(calls_results$gp, calls_results$remaining_control), intervention =
rep("control", sum(calls_results$remaining_control)))  %>%
  as.data.frame()%>%
  group_by(gp) %>%
  mutate(id = row_number()) %>%
  mutate(vaccinated = 0)

control <- col1i %>%
  left_join(col2i) %>%
  mutate(vaccinated = coalesce(vaccinated, 1))
datasett <- rbind(control, intervention)
write.csv2(datasett, "datasett.csv", row.names = F)

stata_command <- paste0('
version 17
cd \"', wd, '\"
set seed 5914478
import delimited \"datasett.csv\", clear
gen arm = intervention == \"intervention\"
melogit vaccinated i.arm || gp:i.arm, difficult or')
RStata::chooseStataBin()
se <- capture.output(RStata::stata(stata_command, stata.version = 17))
result <- se[95]
or <- substr(result, 20, 25)
or_lwr <- substr(result, 59, 66)
or_upr <- substr(result, 70, 80)
```

```
p_value <- substr(result, 49, 53)


row1 <- c("Endpoint",
        paste0("Control (n=", sum(sum(calls_results$randomized_to_control)), ")"),
        paste0("Intervention (n=", sum(sum(calls_results$randomized_to_intervention)), ")"),
        "OR (95% CI)")
row2 <- c("Vaccinated", rep("", 3))
row3 <- c("No",
        paste0(sum(calls_results$remaining_control), " (",
            round(sum(calls_results$remaining_control)/sum(calls_results$randomized_to_control),
digits = 3)*100,")"),
        paste0(sum(calls_results$remaining_intervention), " (",

round(sum(calls_results$remaining_intervention)/sum(calls_results$randomized_to_intervention),
digits = 3)*100,")"),
        "1.00 (reference)")
row4 <- c("Yes",
     paste0(sum(calls_results$randomized_to_control)- sum(calls_results$remaining_control), " (",
          round(1 -sum(calls_results$remaining_control)/sum(calls_results$randomized_to_control),
digits = 3)*100,")"),
     paste0(sum(calls_results$randomized_to_intervention)-
sum(calls_results$remaining_intervention), " (",
          round(1 -
sum(calls_results$remaining_intervention)/sum(calls_results$randomized_to_intervention), digits =
3)*100,")"),
     paste0(round(as.numeric(or), digits = 2), " (", round(as.numeric(or_lwr), digits = 2), " to ",
round(as.numeric(or_upr), digits = 2) ,
          "),\nP=", round(as.numeric(p_value), digits = 2)))
row4


tab <- rbind(row1, row2, row3, row4) %>%
  as.data.frame()
library(flextable)
ft <- flextable::flextable(tab)
```

```
ft <- delete_part(ft, part= "header")

ft <- flextable::align(ft, j = 2:4, align = "center", part = "all")

ft <- flextable::hline(ft, i = 1, j = NULL, border = flextable::fp_border_default(), part = "body")

ft <- autofit(ft)

special_border <- officer::fp_border(width = 0.8)

ft <- hline(ft, i = 1, j=2:3, part = "header", border = special_border)

ft <- fontsize(ft, size=8, part = "all")

ft <- font(ft, part = "all", fontname = "Times New Roman")

doc <- officer::read_docx() %>%

 body_add_flextable(value = ft)


print(doc, target = "table1.docx")


############################ Plot 1 ##############################################

calls_results %>%

 mutate(date_of_extraction = as.Date(date_of_extraction),

       date_of_new_extraction = as.Date(date_of_new_extraction),

       date_start_intervention = as.Date(date_start_intervention),

       date_end_intervention = as.Date(date_end_intervention)) %>%

 arrange(date_of_extraction) %>%

 mutate(nr = row_number()) %>%

 mutate(GP = glue::glue("GP{row_number()} (n int: {randomized_to_intervention}; n
cont:{randomized_to_control})")) %>%

 ggplot() +

 geom_errorbarh(aes(xmin = date_of_extraction, xmax = date_of_new_extraction, y
=forcats::fct_reorder(GP, desc(nr)), color="Observation period") ) +

 geom_linerange(aes(xmin = date_start_intervention, xmax = date_end_intervention, y = GP,
color="Interval intervention"), size = 1) +

 scale_x_date(date_labels = "%d %b %y", breaks = "2 weeks") +

 scale_color_manual(values = c("#2A6EBB", "#747678")) +

 labs(y = "",

     x= "Timeline",
```

```
      color = "") +
  theme(legend.position = "bottom",
        panel.grid.major = element_blank(),
        panel.grid.minor = element_blank(),
        panel.background = element_blank(),
        legend.box.background = element_blank(),
        legend.key = element_blank()) +
  guides(color = guide_legend(override.aes = list(linetype=1) ) )


ggsave("timeline.png", dpi=340)


########################## Other statistics ####################################
# Average length of follow up
dur_follow_up <-  as.numeric(as.Date(calls_results$date_of_new_extraction) -
as.Date(calls_results$date_of_extraction))
wghts <- calls_results$randomized_to_intervention + calls_results$randomized_to_control
stats::weighted.mean(x=dur_follow_up, w= wghts)/7
min(dur_follow_up)/7
max(dur_follow_up)/7
```

Dataset

GP	Medical centre	Municipality	Length of list	Date of extraction	Date start intervention	Date end intervention	Randomized to intervention	Randomized to control	Number of unvaccinated risk group patients	Date of new extraction	Remaining intervention	Remaining control	Total Remaining	Reached by phone
GP 01	MC10	Oslo	2300	13.01.2022	17.01.2022	07.02.2022	10	29	39	28.02.2022	9	28	37	8
GP 02	MC6	Oslo	1450	25.02.2022	28.02.2022	21.03.2022	9	18	27	11.04.2022	9	14	23	6
GP 03	MC4	Gjerdrum	900	17.12.2021	24.12.2021	14.01.2022	7	6	13	03.02.2022	7	6	13	5
GP 04	MC3	Oslo	1650	15.12.2021	17.12.2021	07.01.2022	10	40	50	28.01.2022	9	35	44	7
GP 05	MC1	Bamble	500	06.01.2022	07.01.2022	28.01.2022	3	2	5	18.02.2022	3	2	5	3
GP 06	MC6	Oslo	1450	14.12.2021	03.01.2022	24.01.2022	10	46	56	14.02.2022	10	43	53	6
GP 07	MC9	Oslo	1400	11.02.2022	14.02.2022	07.03.2022	6	5	11	28.03.2022	5	5	10	6
GP 08	MC1	Bamble	650	06.01.2022	07.01.2022	28.01.2022	4	3	7	18.02.2022	4	3	7	3
GP 09	MC4	Gjerdrum	900	17.12.2021	22.12.2021	12.01.2022	6	5	11	01.02.2022	6	5	11	6
GP 10	MC9	Oslo	1450	11.02.2022	14.02.2022	07.03.2022	8	7	15	28.03.2022	7	7	14	4
GP 11	MC4	Gjerdrum	1300	21.12.2021	24.12.2021	14.01.2022	7	7	14	03.02.2022	5	7	12	4

GP 12	MC3	Oslo	1650	14.12.2021	17.12.2021	07.01.2022	10	31	41	28.01.2022	7	31	38	8
GP 13	MC6	Oslo	1600	16.12.2021	03.01.2022	24.01.2022	10	34	44	14.02.2022	9	32	41	10
GP 14	MC4	Gjerdrum	1000	21.12.2021	22.12.2021	12.01.2022	6	6	12	01.02.2022	6	6	12	4
GP 15	MC4	Gjerdrum	1000	21.12.2021	22.12.2021	12.01.2022	6	6	12	01.02.2022	6	6	12	5
GP 16	MC6	Oslo	1450	14.12.2021	03.01.2022	24.01.2022	10	38	48	14.02.2022	9	36	45	7
GP 17	MC6	Oslo	1500	14.12.2021	03.01.2022	24.01.2022	10	14	24	14.02.2022	10	13	23	8
GP 18	MC1	Bamble	1000	04.01.2022	07.01.2022	28.01.2022	6	5	11	18.02.2022	6	5	11	5
GP 19	MC7	Oslo	1500	14.12.2021	20.12.2021	10.01.2022	10	11	21	31.01.2022	8	10	18	9
GP 20	MC11	Oslo	1250	05.01.2022	07.01.2022	28.01.2022	10	11	21	18.02.2022	8	8	16	9
GP 21	MC2	Oslo	1100	10.12.2021	10.12.2021	31.12.2021	4	3	7	21.01.2022	4	3	7	4
GP 22	MC7	Oslo	1400	14.12.2021	20.12.2021	10.01.2022	10	25	35	31.01.2022	8	24	32	8
GP 23	MC5	Oslo	1400	14.12.2021	31.12.2021	21.01.2022	10	11	21	11.02.2022	10	11	21	8
GP 24	MC10	Oslo	1700	13.01.2022	17.01.2022	07.02.2022	10	10	20	28.02.2022	10	10	20	6
GP 25	MC8	Oslo	1950	17.12.2021	10.01.2022	31.01.2022	10	79	89	21.02.2022	9	78	87	5

Supplemental Material

Summary of focus group discussion

FGD-team: Christine Holst, Marit Tuv, Arnfinn Helleve

Methods

We conducted a focus group discussion (FGD) with five of the participating GPs in June 2022, conveniently sampled and recruited by MT. The aim of the FGD was to explore the GPs overall impressions and reflections around the project and process. A researcher (AH) led the session, while another researcher (CH) observed and took notes during the session. The FGD was done through Teams and was digitally recorded. The data file was stored at FHIs password protected server and deleted from the recording device. The file was transcribed and analysed thematically.

Results

Intervention

In general, the GPs experienced the project as exciting and interesting. A GP mentioned that phone calls like the ones applied in the intervention, could potentially save time. During the pandemic, GPs had experienced that several patients booked consultations only to discuss COVID-19 related issues and vaccination. In that perspective, time could be saved using the phone calls, also in other settings where patients had an unmet need for information.

With regards to transferability to other settings where a phone call from the GP could be effective, it was pointed out during the FGD that such interventions require a reorganization of the GPs responsibility, with a large burden on the GPs. Even though the GP expressed that it would be good to approach certain patients with a phone call, the GPs agreed that it could be challenging to do this on an everyday basis, as the busy schedule simply leaves insufficient time for that.

Implementation

The implementation proceeded without much additional time spent, as the procedure and lists with names of the patients and their mobile number, was all provided by the GP assistants. Some of the GPs followed the instructions for the calls, while others used it more as inspiration. A few GPs pointed out that several of the patients had already taken the vaccine, between the list with unvaccinated at-risk patients was generated, until the calls were conducted.

Timing of the intervention

The GPs experienced that the intervention was implemented too late in the pandemic, stating several reasons. First, the vaccine coverage was already very high at the time of intervention, and only a small group of people at risk for severe COVID-19 were not yet vaccinated. Second, the less frightening omicron variant was already dominating the viral landscape, resulting in less severe COVID-19. It was also recently detected that the vaccine would not prevent transmission, as initially assumed by the health authorities. Finally, the societal circumstances and public discourse around the pandemic and vaccination had changed rapidly prior to the rollout of the intervention and they experienced that many of the patients had reflected and taken their decisions with regards to

vaccination. In this FDG we did not explore the reasons why the majority of the patients in the study declined the vaccine, as the patients were not part of the FDG. However, we asked the GPs about their impressions of the patient reasons. The timing of the intervention, and especially the less frightening omicron variant and the fact that the vaccine did not prevent transmission was pointed out as the main reasons for declining the vaccine. According to the GPs, the overall premises for vaccine recommendations were changed, thus the GPs found it somehow difficult to argue for the importance of vaccination at the time the intervention. Some of the GPs pointed out that the project could have proceeded differently if the intervention was implemented earlier during the pandemic.

Patient group

The GPs summarised that the majority of patients that they had on their lists was either vaccination sceptics, patients with immigration background, patients dealing with drug abuse, psychiatric patients, and patients who generally had a dysfunctional way of living. One GP noted that she was not surprised when she saw her patient list, indicating she considered these patients as a sub-group of her patients. A GP reflected on whether it had been different if the intervention had started earlier, if it would have been easier to facilitate a conversation with the patient. The GP experienced that the vaccine-sceptic patients were locked in their views based on alternative sources of health-related information.

Patient reactions

In general, the GPs seemed to have a common understanding that the intervention was different to what they normally would do. They were concerned that some of the patients felt that the GP was intrusive by calling them up, which often happened after office hours. Some of the patients were reportedly surprised. The GPs described, however, both positive and negative reactions from the patients. A few patients became provoked, annoyed, or upset. This was mainly patients who were against vaccination, at large, or at least very sceptic. In addition, some patients also reacted negatively to the process where their vaccine status had been monitored and that they had been identified by “the system”.

Some GPs reported that a few patients appreciated the opportunity to discuss the issue more in depth with their GP. There were examples where the outcome of the discussion was that the patient moved ahead with the vaccination. These were mainly patients that for several reasons had postponed their vaccination appointment. Among some patients, there was a notion that it was no longer necessary to vaccinate against COVID-19, as the omicron variant was not that dangerous. A GP pointed out that some of the patients perceived the call as caring from the GP’s side. The patients in this case were thankful for the GP’s concern, and the GP experienced that this gratefulness was a derailment from the actual scope of the study.

The patient – practitioner relationship

One GP expressed that the intervention pushed the line for what he felt that a GP should do, in contrast to phone a patient as a response to the patient’s own initiative. The entrance to the conversation became different, as this was not information sought by the patient and he experienced that this made the conversation in some cases uncomfortable. According to the GP, the conservation did not have an impact on the relationship with the patients when they met in consultations later.

Another GP, on the other side, felt that all the conservations with the patients were unproblematic, also with the patients who disagreed to take the vaccination. This GP used the written script for the call freely and approached the patients in her own way. It might also be that she benefitted from having long term relations with her patients.

CONSORT 2010 checklist of information to include when reporting a randomised trial*

Section/Topic	Item No	Checklist item	Reported on page No
Title and abstract			
	1a	Identification as a randomised trial in the title	1
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	2
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale	3
	2b	Specific objectives or hypotheses	3
Methods			
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	3-4
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	N.A.
Participants	4a	Eligibility criteria for participants	3
	4b	Settings and locations where the data were collected	3
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	4
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	4
	6b	Any changes to trial outcomes after the trial commenced, with reasons	N.A.
Sample size	7a	How sample size was determined	4
	7b	When applicable, explanation of any interim analyses and stopping guidelines	N.A.

Randomisation:			
Sequence generation	8a	Method used to generate the random allocation sequence	4
	8b	Type of randomisation; details of any restriction (such as blocking and block size)	4
Allocation concealment mechanism	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	4
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	4
Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	4
	11b	If relevant, description of the similarity of interventions	N.A.
Statistical methods	12a	Statistical methods used to compare groups for primary and secondary outcomes	4-5
	12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	N.A.
Results			
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome	5
	13b	For each group, losses and exclusions after randomisation, together with reasons	5 (N.A.)
Recruitment	14a	Dates defining the periods of recruitment and follow-up	3 and 5
	14b	Why the trial ended or was stopped	N.A.

Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	N.A.
Numbers analysed	16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	5
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	5
	17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	5
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	N.A.
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	N.A.
Discussion			
Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	6
Generalisability	21	Generalisability (external validity, applicability) of the trial findings	6-7
Interpretation	22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	7
Other information			
Registration	23	Registration number and name of trial registry	1
Protocol	24	Where the full trial protocol can be accessed, if available	3
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	8

*We strongly recommend reading this statement in conjunction with the CONSORT 2010 Explanation and Elaboration for important clarifications on all the items. If relevant, we also recommend reading CONSORT extensions for cluster randomised trials, non-inferiority and equivalence trials, non-pharmacological treatments, herbal interventions, and pragmatic trials. Additional extensions are forthcoming: for those and for up to date references relevant to this checklist, see www.consort-statement.org.