

# COVID-19 revaccination of hematology patients after cell therapy or B-cell-depleting immunochemotherapy

<b>Submission date</b> 17/04/2024	<b>Recruitment status</b> Recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
<b>Registration date</b> 28/10/2024	<b>Overall study status</b> Ongoing	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 28/10/2024	<b>Condition category</b> Infections and Infestations	<input type="checkbox"/> Individual participant data <input checked="" type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

Current guidelines in The Netherlands and abroad advise revaccination for patients who were B cell depleted at the time of the primary COVID-19 vaccination series and for patients who received a hematopoietic cell transplantation (HCT) (bone marrow transplant) after the primary COVID-19 vaccination series. It is advised to revaccinate with three doses of a mRNA vaccine given 4 weeks apart, followed by a booster vaccination over 3 months later, although data substantiating this schedule are lacking. In order to design revaccination schedules for hematology patients who lost protective immunity against COVID-19 after HCT, or who were B cell depleted after they had received vaccination, we need to investigate who needs to be revaccinated and how many vaccinations are necessary.

### Who can participate?

The following patient groups are advised to be revaccinated and will be eligible for enrolment in this study:

Group 1: Patients who received B-cell-depleting immunochemotherapy or B-cell-depleting CAR T cell therapy (CD19 directed)

Group 2: Patients who received autologous HCT after myeloablative chemotherapy for multiple myeloma (myeloablative chemotherapy: high dose melphalan [HDM]) or non-Hodgkin or Hodgkin lymphoma (myeloablative chemotherapy: BCNU-etoposide-Ara-C-Melphalan [BEAM] or BCNU-thiotepa)

Group 3: Patients who received allogeneic HCT

### What does the study involve?

Patients will be revaccinated against COVID-19 as part of the standard of care regarding revaccination after cell therapy or B-cell-depleting immunochemotherapy. Patients give blood samples at each vaccination timepoint and also additional timepoints to evaluate responses to COVID-19 revaccination.

### What are the possible benefits and risks of participating?

The risks of this study are negligible to none. Only mild bruising after blood draws. There are no

direct benefits for patients participating in this study. However, patients will be informed about their antibody concentrations after they have been measured.

Where is the study run from?  
Amsterdam UMC (Netherlands)

When is the study starting and how long is it expected to run for?  
October 2023 to December 2026

Who is funding the study?  
ZonMw (Netherlands)

Who is the main contact?  
1. P. den Tex MD, p.dentex@amsterdamumc.nl  
2. Prof dr M.D. Hazenberg, m.d.hazenberg@amsterdamumc.nl

## Contact information

**Type(s)**  
Scientific, Principal Investigator

**Contact name**  
Prof Mette Hazenberg

**Contact details**  
Meibergdreef 9  
Amsterdam  
Netherlands  
1105 AZ  
+31 (0)20 566 9111  
m.d.hazenberg@amsterdamumc.nl

**Type(s)**  
Public, Scientific

**Contact name**  
Mr Paul den Tex

**Contact details**  
Meibergdreef 9  
Amsterdam  
Netherlands  
1105 AZ  
+31 (0)20 566 9111  
p.dentex@amsterdamumc.nl

## Additional identifiers

**EudraCT/CTIS number**  
Nil known

**IRAS number**

**ClinicalTrials.gov number**

Nil known

**Secondary identifying numbers**

NL85613.018.23

## Study information

**Scientific Title**

COBRA re-KAI study: COVID-19 vaccination in patients with reduced B-cell and T-cell immunity: response after re-vaccination of a kaleidoscopic group of hematological patients: what's the impact?

**Acronym**

COBRA re-KAI

**Study objectives**

Current guidelines in The Netherlands and abroad advise revaccination for patients who were B-cell-depleted at the time of the primary COVID-19 vaccination series and for patients who received an autologous or allogeneic hematopoietic cell transplantation (HCT) after the primary COVID-19 vaccination series. It is advised to revaccinate with three doses of a mRNA vaccine given 4 weeks apart, followed by a booster vaccination >3 months later, although data substantiating this schedule are lacking. In order to design revaccination schedules for hematology patients who lost protective immunity against COVID-19 after HCT, or who were B cell depleted after they had received vaccination, researchers want to investigate how many revaccinations against COVID-19 are needed to restore immunity. They hypothesize that a substantial part of the study group does not require a complete COVID-19 vaccine schedule.

**Ethics approval required**

Ethics approval required

**Ethics approval(s)**

Approved 19/02/2024, METC, Amsterdam UMC (Meibergdreef 9, Amsterdam, 1105 AZ, Netherlands; +31 (0)204445585; metc@amsterdamumc.nl), ref: 2023.0951

**Study design**

Observational cohort study

**Primary study design**

Observational

**Secondary study design**

Cohort study

**Study setting(s)**

Hospital

**Study type(s)**

Prevention, Efficacy

## **Participant information sheet**

Not applicable

## **Health condition(s) or problem(s) studied**

Hematology patients eligible for COVID-19 revaccination after cell therapy or B-cell-depleting immunochemotherapy

## **Interventions**

Observational cohort study among 250 hematology patients categorized into five different groups (n = 50 per group). All participants will receive three mRNA COVID-19 vaccination doses 4 weeks apart, followed by a booster vaccination >3 months later, per the Dutch guidelines. Cellular and humoral immunity will be measured at baseline (the day of the 1st vaccination), at 28 days after each vaccination and at 7 days after the first vaccination.

T0 = Baseline of study and first vaccination of revaccination schedule

T1 = Blood sampling 7 days after the first revaccination to test for recall responses.

T2 = 28 days after Revaccination 1, also Day 0 of the second vaccination.

T3 = 28 days after Revaccination 2, also Day 0 of the third vaccination.

T4 = 28 days after Revaccination 3

T5 = Booster vaccination day 0 and +6 months after the start of the primary schedule

T6 = 28 days after Booster vaccination.

The total duration of the study is 7 months.

## **Intervention Type**

Biological/Vaccine

## **Pharmaceutical study type(s)**

Not Applicable

## **Phase**

Not Applicable

## **Drug/device/biological/vaccine name(s)**

mRNA COVID-19 vaccine

## **Primary outcome measure**

1. Cellular antigen specific B and T cell responses. These will be measured with AIM (activation-induced marker) assays using flow cytometry. Humoral responses expressed in antibody concentration (BAU/ml), avidity, neutralization (expressed as ID50)) and SARS-CoV-2 specific immunity. Humoral responses will be measured by using bead-based multiplex immune assay against subunit 1 (S1), receptor binding domain (RBD), and nucleocapsid (N) antigen domains of SARS-CoV-2 determined quantitatively and centrally. Neutralization will be tested using lentiviral-based pseudoviruses expressing SARS-CoV-2 variants. Measured prior to the start of the revaccination schedule.

2. SARS-CoV-2 antibody concentrations measured using bead-based multiplex assays at 28 days after each revaccination. After the first vaccination the researchers will also measure antibody concentration 7 days after vaccination.

3. The number of revaccinations needed for each patient group to reach sufficient SARS-CoV-2

antibody concentrations (compared to average antibody concentrations obtained in healthy individuals after the primary series of 2 vaccinations followed by a booster vaccination), measured using bead-based multiplex assays at T0, T1, T2, T3, T4, T5 and T6.

### **Secondary outcome measures**

1. Day 7 antibody concentrations correlated with pre-revaccination, and day 28 post-vaccination, cellular and humoral immunity, as a measure of residual immunity. Measured using bead-based multiplex assays.
2. Humoral and cellular immunity 28 days after each vaccination, measured using FACS analysis and bead-based multiplex assays.
3. B-cell maturation measured by avidity test/indices, (clonal) antigen-specific B cell analysis and antibody glycosylation prior to and 28 days after each vaccination.
4. The cellular immune response by cytokine production and expression of activation and exhaustion markers on CD4 and CD8 T cells prior to and 28 days after each vaccination, measured using FACS analysis.
5. Cellular and humoral SARS-CoV-2 specific immunity 5 months after the 3rd vaccination, measured using FACS analysis and bead-based multiplex assays.
6. Immune parameters (e.g. peripheral blood B and T cell numbers, IgG concentrations) associated with cellular and humoral responses to COVID-19 re-vaccination, measured by the immunological laboratory with FACS analysis.
7. Clinical parameters (e.g. hematologic diagnosis, current and past therapies including immunosuppressive drugs, date of last therapy) associated with responses to COVID-19 re-vaccination, measured using the Castor database which includes clinical parameters from patient files at all timepoints.
8. The effect of previous SARS-CoV2 infection on COVID-19 re-vaccination responses, type of measurement to be determined at later date. Will include subjects that contract COVID-19 during the study and will be studied with appropriate tests.
9. Serious adverse events (SAE) <7 days after each COVID-19 re-vaccination, reported yearly using a line listing since there are minimal risks associated with the study. They will report to the medical ethical testing committee as prescribed by the definitions of the METC.
10. SARS-CoV-2 breakthrough infection and severity (including death) after COVID-19 re-vaccination, measured using the Castor database, which will contain a short questionnaire on SARS-CoV-2 infection and severity.

\*Note that this study is also biobanking the majority of its collected material to use for in-depth immunological assays at a later date which have not been established at the present time.

### **Overall study start date**

01/10/2023

### **Completion date**

31/12/2026

## **Eligibility**

### **Key inclusion criteria**

Age ≥18 years

Group 1: Patients who received:

1. B cell depleting immunochemotherapy (n = 50), at least 8 months after the last B-cell depleting therapy before the first vaccination
2. B cell depleting CAR T cell therapy (n = 50); 3 months after treatment

Group 2: Patients who received autologous HCT for:

1. Multiple myeloma (myeloablative chemotherapy: high dose melphalan [HDM]) (n = 50); 3 months after treatment before the first vaccination
2. Non-Hodgkin or Hodgkin lymphoma (myeloablative chemotherapy: BCNU-etoposide-Ara-C-Melphalan (BEAM) or BCNU-thiotepa) (n = 50); at least 3 months after transplantation with a maximum of 6 months before the first vaccination

Group 3: Patients who received allogeneic HCT (various indications) (n = 50) 3 months after transplantation

**Participant type(s)**

Patient

**Age group**

Adult

**Lower age limit**

18 Years

**Upper age limit**

100 Years

**Sex**

Both

**Target number of participants**

250

**Key exclusion criteria**

1. Unwilling or unable to give informed consent
2. Known allergy to one of the components of the vaccine
3. Patients with a life expectancy of <12 months

**Date of first enrolment**

01/05/2024

**Date of final enrolment**

01/12/2026

**Locations**

**Countries of recruitment**

Netherlands

**Study participating centre**  
**Amsterdam UMC**  
Meibergdreef 9  
Amsterdam  
Netherlands  
1105 AZ

**Study participating centre**  
**UMCG Groningen**  
Hanzeplein 1  
Groningen  
Netherlands  
9713 GZ

## **Sponsor information**

**Organisation**  
Amsterdam University Medical Centers

**Sponsor details**  
Meibergdreef 9  
Amsterdam  
Netherlands  
1105 AZ  
+31 (0)20 566 2222  
metc@amsterdamumc.nl

**Sponsor type**  
Hospital/treatment centre

**Website**  
<https://www.amsterdamumc.org>

**ROR**  
<https://ror.org/05grdyy37>

## **Funder(s)**

**Funder type**  
Research organisation

**Funder Name**

ZonMw

**Alternative Name(s)**

Netherlands Organisation for Health Research and Development

**Funding Body Type**

Private sector organisation

**Funding Body Subtype**

Other non-profit organizations

**Location**

Netherlands

## **Results and Publications**

**Publication and dissemination plan**

Publication of data on COVID-19 immunogenicity in immunocomprised patients in high impact journals to shape future (inter)national guidelines on COVID-19 revaccination.

**Intention to publish date**

01/01/2027

**Individual participant data (IPD) sharing plan**

The data-sharing plans for the current study are unknown and will be made available at a later date.

**IPD sharing plan summary**

Data sharing statement to be made available at a later date