[](https://www.google.nl/url?sa=i&url=https://www.era-edta.org/en/&psig=AOvVaw2-fY0scyQh5l5YaR3Hrut3&ust=1586359668842000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCLjvwbbQ1ugCFQAAAAAdAAAAABAE)

**Establishing a European database of patients on dialysis or living with a kidney transplant that have COVID-19**

**ERACODA**

(The **ERA**-EDTA **CO**VID-19 **Dat**abase for KRT patients)

Local Research Register number: ?????

(an observational, non-interventional study)

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# 1. STUDY ORGANIZATION

|  |  |
| --- | --- |
| **Study title** | The ERA-EDTA COVID-19 Database for patients on Kidney Replacement Therapy |
| **Planned start date** | 01-04-2020 |
| **Estimated completion date** | 01-04-2023 |
| **Overall project leader** | Prof. dr. R.T. Gansevoort, nephrologist  Dept. Internal Medicine, Division of Nephrology  University Medical Center  P.O. Box 30.001  9700 RB Groningen  The Netherlands  [R.T.Gansevoort@umcg.nl](mailto:R.T.Gansevoort@umcg.nl)  0031-50-3619023 |
| **Local principal investigator** | [[[Name]]]  [[[Department]]]  [[[Institution]]]  [[[Adress]]]  [[[Country]]]  [[[E-mail address]]]  [[[Telephone number]]] |
| **Other local researcher(s)** | [[[Name]]]  [[[Department]]]  [[[Institution]]]  [[[Adress]]]  [[[Country]]]  [[[E-mail address]]]  [[[Telephone number]]]  [[[Name]]]  [[[Department]]]  [[[Institution]]]  [[[Adress]]]  [[[Country]]]  [[[E-mail address]]]  [[[Telephone number]]]  . |
| **Central working group** | Prof. dr. R.T. Gansevoort, nephrologist  Overall project leader  Dept. Nephrology  University Medical Center Groningen  P.O. Box 30.001  9700 RB Groningen  The Netherlands  [R.T.Gansevoort@umcg.nl](mailto:R.T.Gansevoort@umcg.nl)  0031-50-3619023  Prof. dr. L. Hilbrands, nephrologist  Lead Sub-database Kidney Transpantation  Dept. Nephrology  Radboud University Medical Center Nijmegen  Geert Grooteplein Zuid 10  6525 GA Nijmegen  The Netherlands  [Luuk.Hilbrands@Radboudumc.nl](mailto:Luuk.Hilbrands@Radboudumc.nl)  0031-24-3614761  Prof. Kitty Jager, epidemiologist  Director ERA-EDTA Registry  Department of Medical Informatics  Amsterdam University Medical Centre  Meibergdreef 9  1105 AZ Amsterdam  The Netherlands  [K.J.Jager@amsterdamumc.nl](mailto:K.J.Jager@amsterdamumc.nl)  0031-20-5667645  Dr. Marc Hemmelder, nephrologist  Director Dutch KRT Registry (RENINE)  Nefrovisie  Moreelsepark 1  3511 EP Utrecht  The Netherlands  [M.Hemmelder@nefrovisie.nl](mailto:M.Hemmelder@nefrovisie.nl)  0031-88-7705500  Dr. L.M. Kieneker, epidemiologist  Central project coordinator  Dept. Nephrology  University Medical Center Groningen  P.O. Box 30.001  9700 RB Groningen  The Netherlands  [L.M.Kieneker@umcg.nl](mailto:L.M.Kieneker@umcg.nl)  0031-50-3613221 |
| **Sponsor** | University Medical Center Groningen  P.O. Box 30.001  9700RB Groningen  The Netherlands |
| **Financial support** | NA |
| **Collaboration with non-profit Laboratory / research sites** | European Renal Association-European Dialysis and Transplant Association (ERA-EDTA)  Via XXIV Maggio 38 I-43123 Parma  Italy  Research Data Support  University Medical Center Groningen  P.O. Box 30.001  9700RB Groningen  The Netherlands |
| **Collaboration with commercial parties / companies** | NA |
| **Name databank**  **Name databank manager** | ERACODA (acronym for ERA-EDTA COVID-19 Database for patients on kidney replacement therapy)  Dr. L.M. Kieneker, epidemiologist  Dept. Nephrology  University Medical Center Groningen  P.O. Box 30.001  9700 RB Groningen  The Netherlands  [L.M.Kieneker@umcg.nl](mailto:L.M.Kieneker@umcg.nl)  0031-50-3613221 |

# 2. PROTOCOL SIGNATURE SHEET

The undersigned (principal) investigator and head of department confirm that the study and its procedures will comply with the present study protocol and prevailing laws, rules and local regulations. Without ethical approval the data will not be used for other (research) purposes.

|  |  |  |
| --- | --- | --- |
| **Name** | **Signature** | **Date** |
| **Local principal investigator:** | [[[Name]]]  [[[Department]]]  [[[Institution]]]  [[[Signature]]] | 10-04-2020 |
| **Head of the local department:** | [[[Name]]]  [[[Department]]]  [[[Institution]]]  [[[Signature]]] | 10-04-2020 |

# 3. ABSTRACT

**Background** With the present spread of the COVID-19 pandemic, **i**t may well be that in the coming months high percentage of the population with kidney replacement therapy will not survive. For this reason it is essential that very rapidly epidemiological data are collected of COVID-19 positive patients on kidney replacement therapy to identify modifiable risk factors for worse outcome that are amenable for intervention. Furthermore, prognostic information based on patient characteristics can support clinical decision making. In prior pandemics, data collection was not performed in a standardized manner. Data collection during the COVID-19 pandemic should therefore be standardized, to improve data quality and allow high-quality research with data collected across multiple centres in Europe.

**Main research question** To identify risk factors for morbidity and mortality of COVID-19 patients on various forms of kidney replacement therapy.

**Design** To establish a pan-European patient registry for patients ≥18 years old and on kidney replacement therapy (either living with a kidney transplantat or on dialysis) that have COVID-19 (either diagnosed by PCR for SARS-CoV-2 RNA on a nasopharyngeal swab / sputum and/or abnormalities on a CT or X-thorax highly suspicious for COVID-19). The registry is purely observational, and patients will not undergo any additional investigations or interventions. Only data that is generated during routine clinical care will be collected. Electronic case reports files (eCRF) have been developed to collect data, including type of kidney replacement therapy, patient characteristics (including use of (immunosuppressive) medication), comorbidities, COVID-19 related characteristics and disease outcome (admission to hospital, admission to ICU, and incidence of ventilator support, start of KRT in case of kidney transplant patients or death).   
  
**Expected results** Insight in risk factors for morbidity and mortality in patients on kidney replacement therapy with COVID-19, hopefully leading to the identification of modifiable risk factors on which we can intervene to improve prognosis.

# 4. BACKGROUND

# With the present spread of the COVID-19 pandemic, the Nephrological community faces difficult times. It may well be that in the coming months a high percentage of the population with end-stage kidney disease that are on kidney replacement therapy will not survive.

# It is generally assumed that patients with a kidney transplantation or on dialysis have a very high risk of experiencing severe COVID-19 complications. In triage processes they are therefore sometimes refused for admission to Intensive Care Units or ventilator support. There are, however, conflicting data coming from individual expert-clinicians that suggest that COVID-19 may actually have limited symptomatology in patients on dialysis or with a kidney transplant. It has been suggested that this is caused by the fact that these patients are less prone to develop an exaggerated immune response to their SARS-CoV-2 infection.

# So far, the information on the course of COVID-19 in patients on renal replacement therapy is very limited. There are some preliminary reports from China [Ma et al] and Italy [Rombola et al], but the prevalence and outcomes are highly heterogeneous. A center in Wuhan [Ma et al] reported that out of 230 hemodialysis patients 37 patients had been infected – and six of them died. This hints to a mortality rate of 16%. In a center of Lombardy [Rombola et al] 18 hemodialysis patients were infected, and only one was in critical condition. A first (unpublished) analysis after ten days after the launch of a Spanish Registry showed a mortality rate of 44% in hemodialysis patients, which would be an upsettingly high number. Several sources of bias might have interfered. First of all, the data might be highly selective after ten days in the midst of the crisis. Nephrologists are very busy these days, therefore it might be that many of them only registered the patients who had died, but not the ones who had recovered or were still struggling with the disease. Furthermore, Spain has the highest transplantation grade in Europe, which means that Spanish patients on dialysis are indeed particularly frail and old and cannot be compared to the dialysis population of other countries where organ transplantation rates are much lower.

# All in all, it is likely that patients that receive kidney replacement therapy have a higher risk of getting a more severe COVID-19 disease course compared to the general public without comorbidity, but what exactly their risk is, is yet unknown and needs further study. Furthermore, it will be important to achieve insights in the patient and treatment characteristics that are related to outcome and learn about modifiable risk factors. Intervening on these modifiable risk factors may help to improve the prognosis of patients on kidney replacement therapy.

# For these reasons it is essential that very rapidly epidemiological data are collected of COVID-19 positive patients on kidney replacement therapy. In prior pandemics, data collection was not performed in a standardized manner. Data collection during the COVID-19 pandemic should therefore be standardized, to improve data quality and allow high-quality research with data collected across multiple centers in Europe. The aim is to obtain information on prognosis and to identify risk factors for mortality of patients on various forms of kidney replacement therapy. This is why the professional organization of nephrologists in Europe (the European Renal Association – European Dialysis and Transplantation Association, in short the ERA-EDTA) has launched an initiative to establish a database that will contain information on patients with COVID-19 that are receiving kidney replacement therapy: the ERACODA project.

# 5. METHOD

## 5.1 Description study design

# The ERACODA project concerns a mainly European patient registry for patients ≥ 18 years old and on kidney replacement therapy by either a kidney transplantation or dialysis that have COVID-19 (either diagnosed by PCR for SARS-CoV-2 RNA on a nasopharyngeal swab / sputum and/or abnormalities on a CT or X-thorax highly suspicious for COVID-19). This registry consists of a database that collects granular data on individual patient level. The standardized collection of these granular data will allow detailed analysis.

# This initiative is purely observational in nature. Patients will not undergo any additional investigations nor interventions. Only data that is generated during routine clinical care will be collected. All members of the ERA-EDTA will be directly asked via e-mail to participate and register their patients that receive kidney replacement therapy and that have COVID-19. In addition, it will be posted on the internet and communicated by national KRT registry representatives that all practicing nephrologists in these countries can participate in this initiative. Participation will be voluntary. Care will be taken during analysis and presentation that his may influence representativeness of data. Special sensitivity analyses will be performed to account for this. For this registry an electronic database has been designed with the acronym ERACODA (i.e. the ERA-EDTA COvid-19 DAtabase for patients on kidney replacement therapy). The database contains a core set of generic questions, and subsets of questions specific for patients living with a kidney transplantat and specific for patients on dialysis. In the future, additional data may be obtained by record linkage with existing registries/databases (for transplantation and for dialysis).

Electronic case reports files (eCRF) have been developed to collect data, including current type of kidney replacement therapy, patient characteristics (including use of (immunosuppressive) medication), comorbidities, COVID-19 characteristics and treatment, and outcome. The code book of this eCRF with a detailed description of variable to be collected is attached as Appendix A.

The ERA-EDTA has nominated a Working Group to design and run the ERA-EDTA COVID-19 Database for KRT patients, to be assisted by a team of study coordinators, epidemiologists and database managers, and by an International Advisory Board.

***The Working Group consists of:***

- Prof. Luuk Hilbrands (prof. of Nephrology, Radboud UMC Nijmegen, The Netherlands, and chair of Transplantation Subdatabase),

- Dr. Casper Franssen (nephrologist, UMC Groningen, The Netherlands, and chair of the Dialysis Subdatabase),

- Prof. Kitty Jager (prof. of Epidemiology, Amsterdam UMC, The Netherlands, and director of the ERA-EDTA renal registry),

- Dr. Marc Hemmelder (nephrologist, MS Leeuwarden, The Netherlands, and chair of the Dutch renal registry RENINE) and

- Prof. Ron Gansevoort (prof. of Internal Medicine, UMC Groningen, The Netherlands, and lead of the ERA-EDTA COVID-19 action team).

***The team of study coordinators, epidemiologists and database managers consists of:***

- Dr. Lyanne Kieneker, chief project coordinator and epidemiologist, dept. Nephrology, UMC Groningen, The Netherlands

- Dr. Michelle Pena, epidemiologist, dept. Clinical Pharmacy and Pharmacology, UMC Groningen, The Netherlands

- Ms. Hanne de Vries, project coordinator, dept. Nephrology, UMC Groningen, The Netherlands

- Ms. Anne Rixt Epema, database manager, IM Research, UMC Groningen, The Netherlands

***The International Advisory Board consists of:***

- The Chair of the ERA-EDTA Registry: Prof. Ziad Mass (prof. Nephrology, Toulouse, France)

- The Chair and two additional members of the ERA-EDTA Working Group EUDIAL (for dialysis): Prof. Carlo Basile (prof. Nephrology, Martina Franca, Italy);

Prof. Adrian Covic (prof. Nephrology, Iasi, Rumania);

Prof. Sandip Mitra (prof. Nephrology, Manchester, United Kingdom)

- The Chair and two additional members of the ERA-EDTA Working Group DESCARTES (for kidney transplantation):

Prof. Luuk Hilbrands (prof. Nephrology, Nijmegen, The Netherlands);

Dr. Marta Crespo (nephrologist, Barcelona, Spain);

Prof. Daniel Abramowicz (prof. Nephrology, Antwerp, Belgium).

## 5.2 Design

|  |  |  |
| --- | --- | --- |
| **5.2.1 Mono- or multicenter study** | **Mono-center study**  no | **Multicenter study**  yes |
| *As many centers as possible across Europe will participate* | | |
| **5.2.2 Retrospective study (available data/ biomaterials only) or prospective study (data/ biomaterials from participants will be collected in the future).** | **Retrospective study**  yes | **Prospective study**  no |
| *Only data obtained during routine clinical care will be collected, as can be found in patient records* | | |
| **5.2.3 Cross-sectional or follow-up study** | **Cross-sectional study**  no | **Follow-up study**  yes |
| *Patient data will be entered in the database of patient characteristics, disease characteristics, treatment and outcome.* | | |
| **5.2.4 Quantitative or qualitative study (click both if mixed-method)** | **Quantitative study**  yes | **Qualitative study**  no |
|  | | |
| **5.2.4 Pilot study** | no | |
|  | | |

## 5.3 Population

|  |  |
| --- | --- |
| 5.3.1 Inclusion and exclusion criteria | |
| * *Inclusion criteria:*    + *Patients on kidney replacement therapy, by either a kidney transplantation or dialysis*   + *COVID-19 disease (confirmed by PCR on* SARS-CoV-2 RNA nasopharyngeal swab / sputum and/or abnormalities on a CT or X-thorax *highly suspecious for a SARS-COV-2 infection)* * *Exclusion criteria:*   + *Patients <18 years old*   + *Patients that developed Acute Kidney Injury (AKI) due to COVID-19 for which Kidney Replacement Therapy (KRT) was started during hospital admission* | |
| 5.3.2 Number of participants  *Considering the number of patients on kidney replacement therapy across Europe and the current COVID-19 pandemic, we expect several hundreds of patients to be entered in our database.* | |
|  | |
| 5.3.3 Study subjects | |
| * Healthy volunteers * Patients | no  yes |
|  |  |
| 5.3.4 Subject classification |  |
| * Participants ≥ 16 years * Children between 12 and 16 years * Children < 12 years | yes  no  no |
|  |  |
| 5.3.5 Incapacitated adults |  |
| Participants are incapacitated/decisionally incompetent adults | yes |
| *A certain percentage of patients will be critically ill and admitted in the ICU (and be on ventilator support) and therefore be decisionally incompetent.* | |

## 5.4 Recruitment and informed consent/objection

|  |  |  |
| --- | --- | --- |
| **5.4.1** | Retrospective study (tick all that apply)  Not applicable (see section 5.2.2)  Data will be copied from (electronic) patient records  Data/biomaterials will be obtained from an already existing internal or external bio- or databank (see Section 1).  Data/biomaterials will be obtained from a previous study (see Section 1).   * Eligible   All patients ≥18 years old and on kidney replacement therapy, by either a kidney transplantation or dialysis, treated in one of the participating centers are eligible if they have COVID-19 disease (either diagnosed by PCR for SARS-CoV-2 RNA on a nasopharyngeal swab / sputum and/or abnormalities on a CT or X-thorax highly suspicious for COVID-19)   * Informed consent [[[choose 1 of the 4 options below, as appropriate for your local situation, an delete the other three options]]]   [[[**Option 0:** **For The Netherlands only: use the local already applying opt-out system**]]]  The present study is purely observational. Only data will be used that have been collected during routine clinical care. Patients will not be exposed to any additional actions and/or treatments in the framework of this study. This research falls therefore not within the scope of the Medical Research Involving Human Subjects Act (“niet WMO”).  At the moment, our health-care system is under great pressure due to COVID-19 and obtaining more information on this disease is eminent. Due to the severity of this disease (with a considerable percentage being deceased and another percentage being admitted to ICU and sometimes on ventilator support), not all patients are able to give active permission for scientific research, and getting deferred permission is restricted due to the current isolation regime. If only permission is obtained of patients with a milder course of COVID-19 this will introduce bias for our study regarding the extent and the severity of the disease.  Given the abovementioned exceptional conditions, and the clinical need for and urgency of this project in the current COVID-19 outbreak, an opt-in ICF (informed consent form) is deemed not feasible. We have been in contact with IGJ (mr. H.R. Solleveld, Coordinating Specialist Inspector and Team Coordinator Hospital). This organization agreed that an opt-out procedure is sufficient.  When patients are referred or admitted to our hospital, they are informed that data from their medical dossier may be used for quality registrations and research. In case a patient does not agree, there is a possibility for an opt out. This opt-out procedure will be used for the present registry. To ensure optimal caution, we will in addition also check whether these patients on kidney replacement therapy have given consent to participate in data collections either by the Dutch KRT Registry (RENINE, managed by Nefrovisie) or the National Organ Transplant Registry (NOTR, managed by the Dutch Transplant Foundation). We will only include patients who are not listed in the hospital opt-out registry and who do participate in the existing national KRT registries. Only when patients meet both conditions, their data will be used for the present registry. In case a patient does not meet 1 (or both) conditions, all collected data will be destroyed.  [[[**Option 1:** **use the local already applying opt-out system**]]]  The present study is purely observational. Only data will be used that have been collected during routine clinical care. Patients will not be exposed to any additional actions and/or treatments in the framework of this study. This research falls therefore not within the scope of the Medical Research Involving Human Subjects Act.  At the moment, our health-care system is under great pressure due to COVID-19 and obtaining more information on this disease is eminent. Due to the severity of this disease (with a considerable percentage being deceased and another percentage being admitted to ICU and sometimes on ventilator support), not all patients are able to give active permission for scientific research, and getting deferred permission is restricted due to the current isolation regime. If only permission is obtained of patients with a milder course of COVID-19 this will introduce bias for our study regarding the extent and the severity of the disease.  Given the abovementioned conditions, and the clinical need for and urgency of this project in the current COVID-19 outbreak, the institutional committee for non-interventional research deemed an opt-in ICF (informed consent form) not feasible and not necessary.  When patients are referred or admitted to our hospital, they are informed that data out of their medical dossier may be used for quality registrations and research. In case they do not agree, they can opt out. This opt-out procedure will be used for the present registry. To ensure optimal caution, we will in addition also check whether these patients on kidney replacement therapy have given consent to participate in data collections either by national and international registries for patients on kidney replacement therapy (for instance the ERA-EDTA registry or Eurotransplant). We will only include patients who are not listed in the hospital opt-out registry and who do participate in the existing (inter)national KRT registries. Only when patients meet both conditions, their data will be used for the present registry. In case a patient does not meet 1 (or both) conditions, all collected data will be destroyed.  [[[**Option 2:** **use an opt-out system specifically made for this study**]]]  At the moment, our health-care system is under great pressure due to COVID-19 and obtaining more information on this disease is eminent. Due to the severity of this disease (with a considerable percentage being deceased and another percentage being admitted to ICU and sometimes on ventilator support), not all patients are able to give active permission for scientific research, and getting deferred permission is restricted due to the current isolation regime. If only permission is obtained of patients with a milder course of COVID-19 this will introduce bias for our study regarding the extent and the severity of the disease.  Given the abovementioned conditions, and the clinical need for and urgency of this project in the current COVID-19 outbreak, the institutional committee for non-interventional research deemed an opt-in ICF (informed consent form) not feasible and not necessary.  A patient information form (PIF) will be provided that can be handed out to patients or their relatives (in case patients are decisionally incompetent) that describes the possibility to opt-out of the registry by sending an e-mail. This opt-out PIF describes shortly and in general terms the background of the study, the aims, what data are collected and that possibly record linkage with the KRT registries for which they already gave informed consent may take place. In case a patient or their relatives (in case patients are decisionally incompetent) refuses the use of his/her data, all collected data will be destroyed.  [[[**Option 3:** **use an opt-in system specially made for this study**]]]  A patient information form (PIF) will be handed out to patients or their relatives (in case patients are decisionally incompetent) that describes shortly and in general terms the background of the study, the aims, what data are collected and that possibly record linkage with the KRT registries for which they already gave informed consent may take place. In the case that a patient or their relatives (in case patients are decisionally incompetent) refuses the use of his/her data, these data will not be used. | |
| **5.4.2** | Prospective study  Not applicable (see section 5.2.2) | |
| 5.4.3 Objection (Registry) | | |
| In case one or more participants will not be asked informed consent, the objection registry will be checked for these participants and the data from those who objected will be excluded from the analyses. | | Choose  Yes, or  NA in case option 2 or 3 is chosen above |
| *See section 5.4.1* | | |
| 5.4.4 Informed consent (IC): access to identifiable participant data | |  |
| In case one or more study team members will have access to direct/indirect identifiable participant data, informed consent will be/has been obtained for this access. | | NA |
| *Study team members will have no access to direct/indirect identifiable participant data. Only an independent employee of the CRO of the UMC Groningen (Research Data Support) will have the key that can link participant data to identifiable data.* | | |
| 5.4.5 IC: Collaboration with commercial parties | |  |
| In case of collaboration with commercial/profit organizations, informed consent will be/has been obtained for this type of collaboration | | NA |
| *There will be no collaboration with commercial/profit organizations* | | |
| 5.4.6 IC: Linking with other registries | |  |
| In case the data will be linked with other registries, informed consent will be/has been obtained for this linkage(s) | | yes |
| *In the future we may link the present registry with existing registries for quality control of clinical care for transplanted patients (such as the international Eurotransplant registry, or national registries) or patients on dialysis (such as the international ERA-EDTA Registry, or national registries) via the aforementioned opt-out / op-in procedure* [[[choose an option that in line with what has been chosen in section 5.4.1, and delete the other option as well as this sentence]]]*. This is described in the ICF. We will only do so in case patients have not an opt-out for the present registry, and have signed in the past consent for the aforementioned existing registries for quality control of clinical care.* | | |
| 5.4.7 IC: Incidental findings | |  |
| In case there is a risk of incidental findings, informed consent will be/has been obtained to return findings to the participant | | NA |
| *Only data will be collected as have been obtained during routine clinical care. There is therefore no risk of incidental findings.* | | |
| 5.4.8 IC: Future studies | |  |
| In case data collected for the present study will be shared for future studies, informed consent will be obtained for this. | | yes |
| [[[In case under 5.4.1 option 0 or 1 is chosen (local already applying opt-out system), choose NA]]]  [[[In case under 5.4.1 option 2 or 3 is chosen (generic opt-out or opt-in), choose yes]]] | | |
| 5.4.9 IC: other aspects | | NA |
|  | | |
| 5.4.10 Withdrawal | | |
| * Can participants withdraw informed consent before publication and will all data/ biomaterials of that participant be destroyed * Does the participant information letter contain information on how to withdraw | | yes  yes |
| [[[In case under 5.4.1 option 0 or 1 is chosen (local already applying opt-out system), choose NA]]]  [[[In case under 5.4.1 option 2 or 3 is chosen (generic opt-out or opt-in), choose yes]]] | | |

## 5.5 Research Data Management Plan (RDMP)

|  |  |  |
| --- | --- | --- |
| In this study the data will be collected, processed, and archived in accordance with the General Data Protection Regulation (GDPR) and the FAIR (Findable, Accessible, Interoperable, Reusable) principles under the responsibility of the Principal Investigator. The research data management plan (RDMP) is described in this section of the protocol. | | |
|  | | |
| 5.5.1 Data collection | | |
| * Only essential baseline characteristics and data required to answer the research question(s) will be collected. | | yes |
| *We will collect only essential patient and disease characteristics at baseline that are required to answer the research questions (i.e. which demographic and medical factors are associated with the outcome of a patient, with outcome being defined as admission to hospital, admission to ICU, intubation, CVVH/hemodialysis, death).We refer to the Code Book of the registry that is attached.* | | |
| * Tooling (eg. software and procedures) used for collecting, processing, analysing, and storing data will be compliant with the local policies and Standard Operating Procedures . | | yes |
| *The database that is used for this registry is Redcap, a commercially available, state-of-the-art database program, that is hosted on the secured servers of the UMC Groningen within the European Union.* | | |
| 5.5.2 Anonymization and pseudonymization | | |
| * Data will be anonymised during data collection (i.e. data cannot be linked back to the participant) | Yes  skip section 5.5.2 | **No** |
| *The reason for pseudonymisation instead of anonymisation is that it is necessary for the participating center to retrieve their patient record, to complete for example follow-up data. Also, this pseudonymisation prevents entering duplicate records. A SOP with a detailed description how to manage patient IDs is attached.* | | |
| * Data will be pseudonymized by use of an encryption key during data collection. | | yes |
| *A SOP with a detailed description how to manage patient IDs is attached.* | | |
| * Indirect and direct identifiable information collected will be minimized and only collected for the purpose of this study | | yes |
| *The attached Code Book shows that indeed indirect and direct identifiable information collected is minimized and only collected for the purpose of this study* | | |
| * Direct identifiable information (e.g. contact details, code list/encryption key/subject identification log) will be stored separately from pseudonymized data in the electronic case report files (eCRF). | | yes |
| *A SOP with a detailed description how to manage patient IDs is attached.* | | |
| 5.5.3 Data access (during the study) | | |
| * Direct identifiable information can only be accessed by the Principal Investigator and study delegates after authorization by the Principal Investigator. | | yes |
| *A SOP with a detailed description how to manage patient IDs is attached.* | | |
| * Pseudonymized data can only be accessed by the Principal Investigator and study delegates after authorization by the Principal Investigator. | | yes |
| *A SOP with a detailed description how to manage patient IDs is attached.* | | |
| * Data roles, responsibilities, access and authorization - during the study and after study completion - will be managed and documented. | | yes |
| *A SOP with a detailed description how to manage patient IDs is attached, that includes a description of data roles, responsibilities, access and authorization.* | | |
| 5.5.4 Data sharing (during and after study completion) | |  |
| In case data will leave the local institution, will you contact the appropriate persons to arrange the proper contracts? ([[[Enter name + function + address]]]) | | yes |
|  | |  |
| 5.5.5 Data storage (during and after study completion) | | |
| * Digital data will be archived on the local network complying with strict local security and back-up policies. | | NA |
| *Digital data will be archived on the network of the University Medical Center Groningen, The Netherlands complying with strict local, national and international security and back-up policies* | | |
| * Paper source data and study files will be archived. | | yes |
| *Only data obtained during routine clinical care will be collected. These data will remain and be archived in the local institution as usual for clinical care.* | | |
| * Source data, study files and digital data will be stored 15 years after the study is completed. | | yes |
| *Only data obtained during routine clinical care will be collected. These data will remain and be archived in the local institution as usual for clinical care.* | | |
| 5.5.6 Data re-use and access after completion of the present study | | NA    **skip section 5.5.6** |
| * Data will become available and shared for re-use and participants will be asked informed consent for this | | NA |
|  | | |
| * Data will be made findable by including the description of the study (and type of data (i.e. metadata) in data catalogue(s). | | NA |
|  | | |
| * Review procedure, conditions and agreements for re-use of data and access to data by other researchers will be drawn up. | | NA |
|  | | |
| * For this study a discipline specific metadata standard will be chosen (i.e. to increase interoperability and re-use). | | NA |
|  | | |

## 5.6 Management of biomaterials

|  |  |
| --- | --- |
| Will biomaterials be collected, processed, analyzed and/or stored for the purpose of this study | No |

## 5.7 Burden, Risks & Benefits (Prospective studies only)

|  |  |  |  |
| --- | --- | --- | --- |
| * If participants are patients: Can be deviated from the standard care / diagnostic procedures (e.g. can medical treatment be postponed or limited) | | | NA |
| *The study is purely observational. There will therefore not be deviations from standard care / diagnostic procedures* | | | |
| * Burden | | | |
| *Patients will not undergo any additional investigations or interventions. Only data that is generated during routine clinical care will be collected.* | | | |
| * Will the participants risk any injuries and/or other discomfort when they participate in the proposed study | Yes, minimal risk/burden | Yes, more than minimal risk/burden | No |
| *The study is purely observational. Patients will not undergo any additional investigations or interventions. Only data that is generated during routine clinical care will be collected.* | | | |
| * Participant benefits/reward/incentives: | | | |
| *Patient reward can be indirect. In case modifiable risk factors are found that are related to worse outcome, it may be possible to intervene on these risk factors. In the future other patients than those analyzed may benefit from such knowledge.* | | | |

## 5.8 Incidental findings

|  |  |  |  |
| --- | --- | --- | --- |
| * Is there a risk of incidental findings? | yes,  minimal risk | yes, ≥ substantial risk | **No** |

## 5.9 Data analysis

|  |
| --- |
| * Justification of sample size (e.g. power analysis)   NA, the registry aims at including as much patients as possible to allow detailed analyses.   * Statistical analysis   Data analysis will be largely descriptive. Data on patient characteristics, COVID-characteristics and patient follow-up and outcome data will be summarized for continuous variables, in case of normal distribution by mean and standard deviation, and in case of non-normal distribution by median and interquartile range. For discrete variables (e.g., sex and race) data will be summarized by percentages. When possible it will be tried to compare these data also with data of patients on KRT without COVID-19. Again when possible, this control group will be matched for age, sex, type of KRT and center. |

## 5.10 Participant information after the study

|  |  |
| --- | --- |
| Will participants be informed about the study results | yes |
| *Study results will be shared with participants via general communication channels, such as those of national and international patient organizations.* | |

## 

## 5.11 Research revenue

|  |  |
| --- | --- |
| In case the study will result in revenues (e.g. as a result of the use of data/biomaterials or successful licensing of intellectual property or manufactured products), will you contact the loket Contract Research to arrange the proper contracts? | NA |
| *It is not expected that this study may result in financial revenues* | |

# 6. REFERENCES

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* Rombolà G, Heidempergher M, Pedrini L et al. Practical indications for the prevention and management of SARS-CoV-2 in ambulatory dialysis patients: lessons from the first phase of the epidemics in Lombardy. Journal of Nephrology 2020;33: 193-196;doi: https://doi.org/10.1007/s40620-020-00727-y

# 7. APPENDICES

A: List of abbreviations

B: Document “Accountability for use of personal data – Informed Consent” to support an opt-out

procedure

C: Standard Operating Procedure How to Manage Patient IDs

D: RedCap Code book

**Appendix A: List of abbreviations**

AKI Acute Kidney Injury

COVID-19 Corona Virus Disease 2019

ERACODA ERA-EDTA COVID-19 Database for patients on KRT

eGFR Estimated Glomerular Filtration Rate

ERA-EDTA European Renal Association – European Dialysis and Transplantation Association

HD Hemodialysis

KRT Kidney Replacement Therapy

NTX Kidney transplantation

SARS-CoV-2 Severe Acute Respiratory Syndrome Coronavirus 2

UMCG University Medical Center Groningen