

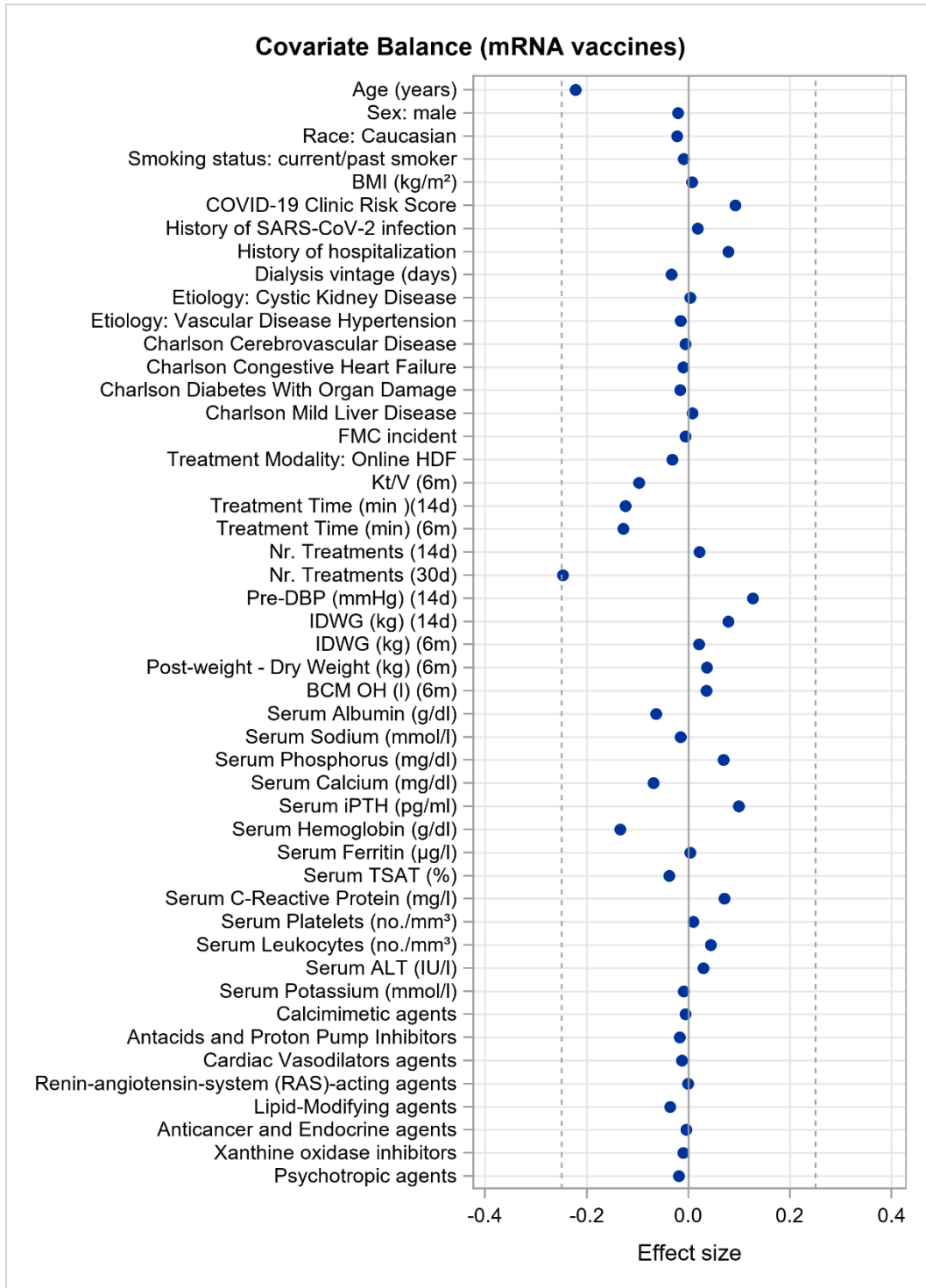
## *Supplementary Material*

### Contents

|    |  |    |
|----|--|----|
| 1  | Supplementary Figure S1 - Covariate balance distribution in the mRNA vaccines cohort.....          | 2  |
| 2  | Supplementary Figure S2 - Covariate balance distribution in the viral-carrier vaccines cohort .... | 3  |
| 3  | Supplementary Table S1 – Covariates included in the outcome risk score model .....                 | 4  |
| 4  | Supplementary Table S2 – Caliper matching.....   | 8  |
| 5  | Supplementary Table S3 – Data management .....   | 9  |
| 6  | Supplementary Table S4 – Vaccinated patients by country and vaccine type.....                      | 10 |
| 7  | Supplementary Table S5 - Baseline characteristics of the mRNA vaccines cohort.....                 | 11 |
| 8  | Supplementary Table S6 - Baseline characteristics of the viral-carrier vaccines cohort.....        | 14 |
| 9  | Supplementary Table S7 – No. At Risk and Events in the mRNA vaccines cohort.....                   | 17 |
| 10 | Supplementary Table S8 – No. At Risk and Events in the viral-carrier vaccines cohort.....          | 18 |
| 11 | Supplementary Table S9 – Cumulative patients with 2 doses of COVID-19 vaccine .....                | 19 |
| 12 | References .....   | 20 |

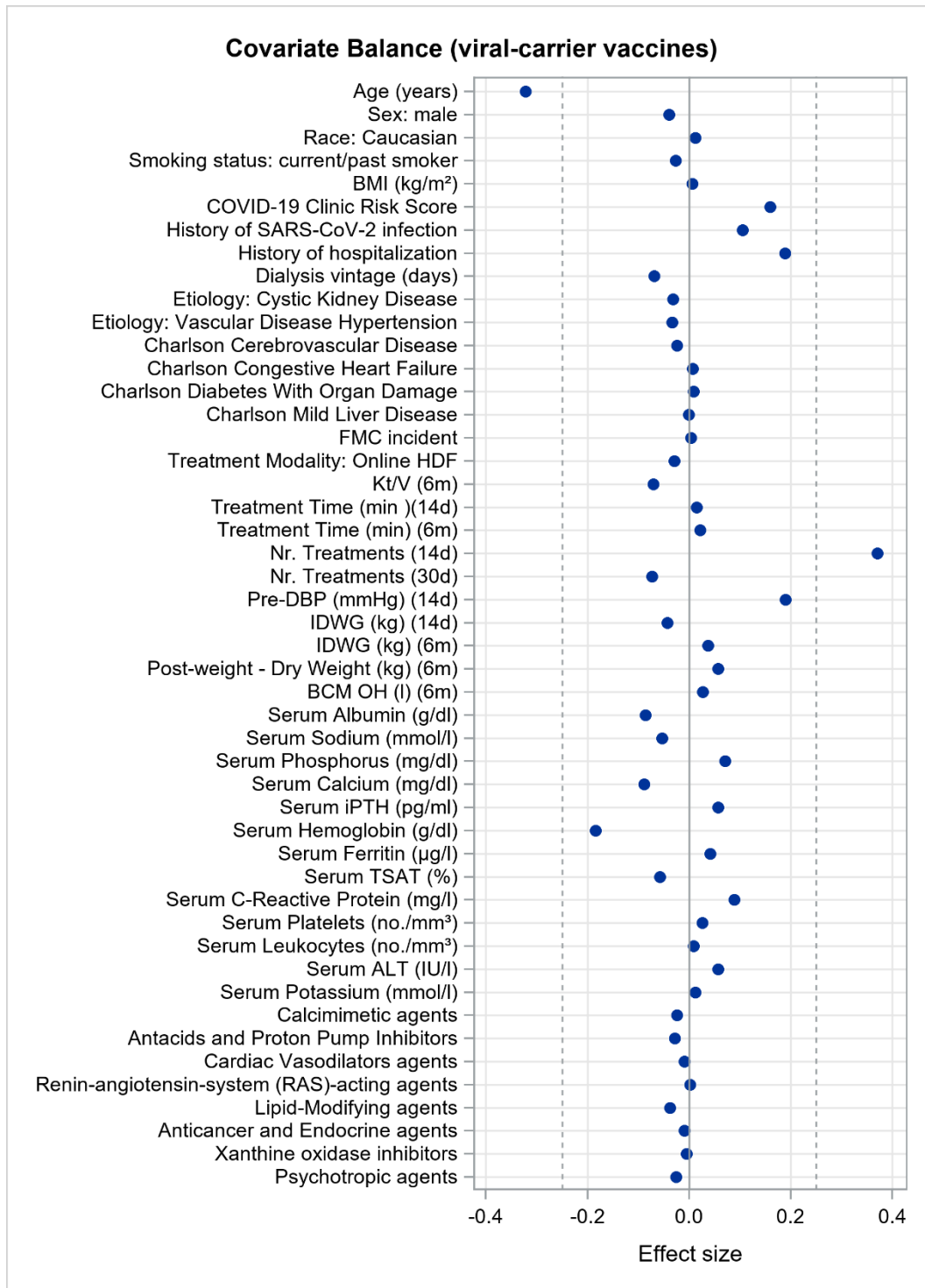
1 **Supplementary Figure S1 - Covariate balance distribution in the mRNA vaccines cohort**

**Figure S1.** Covariate balance distribution in the sample for mRNA vaccines showing the mean differences (unvaccinated group minus vaccinated group) for the significant covariates of the outcome risk score model. We used Cohen's d for continuous variables and Cramér's V for categorical ones considering acceptable difference of 0.25 or less.



## 2 Supplementary Figure S2 - Covariate balance distribution in the viral-carrier vaccines cohort

**Figure S2.** Covariate balance distribution in the sample for viral-carrier vaccines showing the mean differences (unvaccinated group minus vaccinated group) for the significant covariates of the outcome risk score model. We used Cohen's d for continuous variables and Cramér's V for categorical ones considering acceptable difference of 0.25 or less.



### 3 Supplementary Table S1 – Covariates included in the outcome risk score model

**Table S1.** The outcome risk score (ORS) model used to match the vaccinated and unvaccinated patients was assessed with a stepwise logistic regression model (with significance threshold of P-value less than 0.30 for variable entry and 0.15 for variable removal) predicting the SARS-CoV-2 infection in the following 14 days considering the variables listed in the table.

| Category  | Variable                                     | Reference Time                               |
|---|--|--|
| <b>Socio-Demographics</b>                           |  |  |
|   | Age (years)                                  | at index date                                |
|   | Sex  |  |
|   | Race   |  |
|   | Smoking status                               | at index date                                |
|   | Body Mass Index (BMI) (kg/m <sup>2</sup> )   | at index date                                |
|   | Lean Tissue Index (LTI) (Kg/m <sup>2</sup> ) | average of past 6 months prior to index date |
| <b>Etiology</b>                                     |  |  |
|   | Glomerulonephritis                           | any time prior to index date                 |
|   | Diabetic Nephropathy                         | any time prior to index date                 |
|   | Cystic Kidney Disease                        | any time prior to index date                 |
|   | Chronic Pyelonephritis                       | any time prior to index date                 |
|   | Vascular Disease Hypertension                | any time prior to index date                 |
|   | Miscellaneous                                | any time prior to index date                 |
| <b>Charlson Comorbidity Index Comorbidities (1)</b> |  |  |
|   | Aids   | any time prior to index date                 |
|   | Cerebrovascular Disease                      | any time prior to index date                 |
|   | Chronic Pulmonary Disease                    | any time prior to index date                 |
|   | Congestive Heart Failure                     | any time prior to index date                 |
|   | Connective Tissue Disorder                   | any time prior to index date                 |
|   | Coronary Artery Disease                      | any time prior to index date                 |
|   | Dementia                                     | any time prior to index date                 |
|   | Diabetes with Organ Damage                   | any time prior to index date                 |
|   | Diabetes without Complication                | any time prior to index date                 |
|   | Hemiplegia                                   | any time prior to index date                 |
|   | Metastatic Solid Tumor                       | any time prior to index date                 |

|                         |  |  |
|-------------------------|--|--|
|                         | Mild Liver Disease   | any time prior to index date   |
|                         | Moderate or Severe Liver Disease   | any time prior to index date   |
|                         | Moderate or Severe Renal Disease   | any time prior to index date   |
|                         | Peptic Ulcer Disease   | any time prior to index date   |
|                         | Peripheral Vascular Disease  | any time prior to index date   |
|                         | Tumor Without Metastasis   | any time prior to index date   |
| <b>COVID-19 related</b> |  |  |
|                         | History of SARS-CoV-2 infection  | any time prior to index date   |
|                         | Local (dialysis center) background risk of SARS-CoV-2 infection calculated from the machine learning enhanced sentinel surveillance system (2) | at index date  |
| <b>Hospitalizations</b> |  |  |
|                         | History of hospitalization   | number within 6 months prior to index date   |
| <b>Dialysis-related</b> |  |  |
|                         | Dialysis Vintage (days)  | at index date  |
|                         | FMC incident (yes/no): did the patient start the renal replacement therapy not more than 3 months before FMC admission?                        |  |
|                         | Treatment Modality   | the most used within 30 days prior to index date   |
|                         | Kt/V   | average of past 14 days and 6 months prior to index date   |
|                         | Treatment Time (min)   | average of past 14 days and 6 months prior to index date   |
|                         | Number of treatments   | number within 14 days and 30 days prior to index date  |
|                         | Access type  | the most used within 30 days prior to index date   |
|                         | Pre-dialysis systolic blood pressure (Pre-SBP) (mmHg)  | last and average value of past 14 days prior to index date, average of past 6 months prior to index date |
|                         | Pre-dialysis diastolic blood pressure (Pre-DBP) (mmHg)   | last and average value of past 14 days prior to index date, average of past 6 months prior to index date |

|  |  |  |
|--|--|--|
|  | Interdialytic weight gain (IDWG) (Kg)          | last and average value of past 14 days prior to index date, average of past 6 months prior to index date |
|  | Post-Dialysis Weight – Dry weight (Kg)         | last and average value of past 14 days prior to index date, average of past 6 months prior to index date |
| <b>Body Composition Monitor (BCM)</b>                  |  |  |
|  | Overhydration OH (l)                           | average of past 6 months prior to index date   |
|  | relative OH (OH/ECW) (%)                       | average of past 6 months prior to index date   |
| <b>Laboratory serum levels</b>                         |  |  |
|  | Serum Albumin (g/dl)                           | last value within 6 months prior to index date   |
|  | Serum Sodium (mmol/l)                          | last value within 6 months prior to index date   |
|  | Serum Phosphorus (mg/dl)                       | last value within 6 months prior to index date   |
|  | Serum Calcium (mg/dl)                          | last value within 6 months prior to index date   |
|  | Serum iPTH (pg/ml)                             | last value within 6 months prior to index date   |
|  | Serum Haemoglobin (g/dl)                       | last value within 6 months prior to index date   |
|  | Serum Ferritin ( $\mu\text{g/l}$ )             | last value within 6 months prior to index date   |
|  | Serum Transferrin Saturation (TSAT) (%)        | last value within 6 months prior to index date   |
|  | Serum C-Reactive Protein (mg/l)                | last value within 6 months prior to index date   |
|  | Serum Platelets (no./mm <sup>3</sup> )         | last value within 6 months prior to index date   |
|  | Serum Leukocytes (no./mm <sup>3</sup> )        | last value within 6 months prior to index date   |
|  | Serum Alanine Aminotransferase (ALT) (IU/l)    | last value within 6 months prior to index date   |
|  | Serum Potassium (mmol/l)                       | last value within 6 months prior to index date   |
| <b>Medications: occurrence of suggestive ATC codes</b> |  |  |
|  | Phosphate Binders (V03AE, A12A, A02A, A02A)    | active prescription at index date  |
|  | Vitamin D and Analogues (H05BX02, A11C)        | active prescription at index date  |
|  | Calcimimetic agents (H05BX01)                  | active prescription at index date  |
|  | Antacids and Proton Pump Inhibitors (A02B)     | active prescription at index date  |
|  | Anti-Inflammatory agents (A07E, H02, M01, L04) | active prescription at index date  |

|  |                                   |
|--|-----------------------------------|
| Anti-Diabetic Drugs (A10A, A10B, A10X)             | active prescription at index date |
| Anti-thrombotic agents (B01)                       | active prescription at index date |
| Iron Supplements (B03A)                            | active prescription at index date |
| Erythropoietin (B03X)                              | active prescription at index date |
| Inotropic agents (C01A, C01C)                      | active prescription at index date |
| Anti-Arrhythmic agents (C01B)                      | active prescription at index date |
| Cardiac Vasodilators agents (C01D)                 | active prescription at index date |
| Antihypertensive (C02, C03, C04, C08, C07)         | active prescription at index date |
| Renin-angiotensin-system (RAS)-acting agents (C09) | active prescription at index date |
| Lipid-Modifying agents (C10)                       | active prescription at index date |
| Anticancer and Endocrine agents (L01, L02)         | active prescription at index date |
| Xanthine Oxidase Inhibitors (M04AA)                | active prescription at index date |
| Psychotropic agents (N03, N04, N05, N06)           | active prescription at index date |
| Bronchodilators (R03, R06)                         | active prescription at index date |

#### 4 Supplementary Table S2 – Caliper matching

**Table S2.** We explored matching with different calipers of the outcome risk score to balance the trade-off between patients' similarity within pairs and sample size. The final caliper used was 0.1.

| <b>Caliper</b> | <b>Matched Patients</b> | <b>N per Group</b> | <b>SARS-CoV-2 infection among vaccinated (%)</b> | <b>SARS-CoV-2 infection among controls (%)</b> | <b>P-value</b> |
|----------------|-------------------------|--------------------|--|--|----------------|
| 0.001          | 30510                   | 15255              | 1.68   | 3.08   | <.0001         |
| 0.01           | 41962                   | 20981              | 1.82   | 3.34   | <.0001         |
| 0.1            | 44458                   | 22229              | 1.90   | 3.43   | <.0001         |
| 0.2            | 44718                   | 22359              | 1.89   | 3.44   | <.0001         |
| 1              | 45090                   | 22545              | 1.91   | 3.44   | <.0001         |



## 5 Supplementary Table S3 – Data management

**Table S3.** We applied data cleansing to 23 continuous variables considering as missing any data that lied outside the listed upper or lower values. The table S3 also shows the amount of missing data after cleansing procedure. We input missing values, resulting from the above-mentioned data cleansing procedure or native in the data, with the national average calculated on the extracted original dataset (i.e. vaccinated and eligible controls). Before matching, eligible control patients are duplicated on each vaccination date in which they were eligible. BMI, body mass index. LTI, lean tissue index. SBP, systolic blood pressure. DBP, diastolic blood pressure. IDWG, interdialytic weight gain. BCM OH, overhydration by the body composition monitor (BCM; Fresenius). BCM relative OH, relative overhydration by the BCM. TSAT, transferrin saturation.

| Variable                                | Min  | Max    | Missing (%) |
|---|------|--------|-------------|
| Dialysis Vintage (days)                 | 0    | 8000   | 2.6         |
| BMI (kg/m <sup>2</sup> )                | 15   | 50     | 0.7         |
| LTI (Kg/m <sup>2</sup> )                | 7    | 20     | 9.0         |
| Kt/V                                    | 0.5  | 3      | 1.9         |
| Pre-SBP (mmHg)                          | 70   | 250    | 0.2         |
| Pre-DBP (mmHg)                          | 40   | 110    | 2.2         |
| IDWG (Kg)                               | -0.6 | 5.3    | 2.8         |
| Post-Dialysis Weight – Dry weight (Kg)  | -2   | 4      | 2.3         |
| BCM OH (l)                              | -1.5 | 7      | 8.7         |
| BCM relative OH (%)                     | -8   | 30     | 9.7         |
| Serum Albumin (g/dl)                    | 2.5  | 5      | 1.8         |
| Serum Sodium (mmol/l)                   | 130  | 150    | 2.7         |
| Serum Phosphorus (mg/dl)                | 2    | 9      | 3.1         |
| Serum Calcium (mg/dl)                   | 7    | 11     | 2.6         |
| Serum iPTH (pg/ml)                      | 15   | 2000   | 4.6         |
| Serum Hemoglobin (g/dl)                 | 7    | 15     | 2.4         |
| Serum Ferritin (µg/l)                   | 15   | 2500   | 4.3         |
| Serum TSAT (%)                          | 0    | 100    | 5.1         |
| Serum C-Reactive Protein (mg/l)         | 0    | 100    | 11.2        |
| Serum Platelets (no./mm <sup>3</sup> )  | 100  | 400000 | 2.4         |
| Serum Leukocytes (no./mm <sup>3</sup> ) | 1000 | 15000  | 3.0         |
| Serum ALT (IU/L)                        | 0    | 60     | 3.1         |
| Serum Potassium (mmol/l)                | 3    | 8      | 1.4         |

**6 Supplementary Table S4 – Vaccinated patients by country and vaccine type****Table S4.** Vaccinated patients in the matched sample, by country and type of vaccine.

| Country         | Vaccine type  |                        | Total        |
|-----------------|---------------|------------------------|--------------|
|                 | mRNA vaccines | viral-carrier vaccines |              |
| Czech Republic  | 685           | 246                    | <b>931</b>   |
| Estonia         | 111           | 0                      | <b>111</b>   |
| France          | 1321          | 0                      | <b>1321</b>  |
| Croatia         | 143           | 0                      | <b>143</b>   |
| Hungary         | 858           | 391                    | <b>1249</b>  |
| Italy           | 1220          | 0                      | <b>1220</b>  |
| Poland          | 2243          | 0                      | <b>2243</b>  |
| Portugal        | 631           | 0                      | <b>631</b>   |
| Romania         | 3454          | 0                      | <b>3454</b>  |
| Russia          | 0             | 1839                   | <b>1839</b>  |
| Slovak Republic | 1094          | 0                      | <b>1094</b>  |
| Slovenia        | 164           | 55                     | <b>219</b>   |
| Spain           | 2071          | 56                     | <b>2127</b>  |
| Serbia          | 22            | 127                    | <b>149</b>   |
| Turkey          | 38            | 3730                   | <b>3768</b>  |
| <b>Total</b>    | <b>14055</b>  | <b>6444</b>            | <b>20499</b> |

## 7 Supplementary Table S5 - Baseline characteristics of the mRNA vaccines cohort

**Table S5.** Demographic and clinical characteristics of vaccinated persons and unvaccinated controls at baseline in the sample for mRNA vaccines. Continuous variables are expressed as mean  $\pm$  standard deviation, categorical variables are expressed as percentage. The mean differences and 95% confidence interval (CI) are related to unvaccinated group minus vaccinated group. For effect size, we used Cohen's d for continuous variables and Cramér's V for categorical ones considering acceptable difference of 0.25 or less. BMI, body mass index. FMC incident, if the patient started the renal replacement therapy not more than 3 months before FMC admission. Online HDF, Online hemodiafiltration. DBP, diastolic blood pressure. IDWG, interdialytic weight gain. BCM OH, overhydration by the body composition monitor (BCM; Fresenius). TSAT, transferrin saturation. ALT, alanine transaminase. 6m, 6 months prior to index date. 14d, past 14 days prior to index date. 30d, past 30 days prior to index date.

| Characteristics  | Unvaccinated<br>(N=20499) | Vaccinated<br>(N=20499) | Effect<br>Size | Mean Difference<br>[95% CI] |
|--|---------------------------|-------------------------|----------------|-----------------------------|
| Age (years)  | 64.7 $\pm$ 14.4           | 67.8 $\pm$ 13.8         | -0.222         | -3.144 [-3.474, -2.813]     |
| Sex: male  | 59.1                      | 61.2                    | -0.021         | -0.020 [-0.032, -0.009]     |
| Race: Caucasian  | 60.5                      | 62.7                    | -0.022         | -0.021 [-0.033, -0.010]     |
| Smoking status:<br>current/past smoker   | 20.9                      | 21.7                    | -0.009         | -0.008 [-0.017, 0.002]      |
| BMI (kg/m <sup>2</sup> )   | 27.5 $\pm$ 5.8            | 27.5 $\pm$ 5.5          | 0.007          | 0.039 [-0.094, 0.171]       |
| Local (dialysis center)<br>background risk of<br>SARS-CoV-2 infection<br>calculated from the<br>machine learning<br>enhanced sentinel<br>surveillance system (2) | 0.4 $\pm$ 0.4             | 0.3 $\pm$ 0.4           | 0.092          | 0.033 [0.025, 0.041]        |
| History of SARS-CoV-2<br>infection   | 23.5                      | 22                      | 0.018          | 0.015 [0.005, 0.025]        |
| History of<br>hospitalization  | 0.4 $\pm$ 0.8             | 0.3 $\pm$ 0.7           | 0.079          | 0.062 [0.044, 0.081]        |
| Dialysis vintage (days)  | 1782.0 $\pm$ 1690.2       | 1838.1 $\pm$ 1638.3     | -0.034         | -56.103 [-95.020, -17.186]  |
| Etiology: Cystic Kidney<br>Disease   | 6.9                       | 6.8                     | 0.003          | 0.002 [-0.004, 0.008]       |
| Etiology: Vascular<br>Disease Hypertension   | 10.2                      | 11.1                    | -0.015         | -0.009 [-0.017, -0.002]     |
| Charlson<br>Cerebrovascular Disease  | 14.3                      | 14.8                    | -0.006         | -0.004 [-0.013, 0.004]      |
| Charlson Congestive<br>Heart Failure   | 25.2                      | 26.1                    | -0.010         | -0.009 [-0.019, 0.001]      |
| Charlson Diabetes with<br>Organ Damage   | 27                        | 28.5                    | -0.016         | -0.015 [-0.025, -0.004]     |
| Charlson Mild Liver<br>Disease   | 11.4                      | 10.9                    | 0.008          | 0.005 [-0.002, 0.012]       |

|   |                       |                       |        |                                 |
|---|-----------------------|-----------------------|--------|---------------------------------|
| FMC incident  | 84                    | 84.4                  | -0.006 | -0.004 [-0.013, 0.004]          |
| Treatment Modality:<br>Online HDF                   | 53                    | 56.2                  | -0.032 | -0.032 [-0.043, -0.020]         |
| Kt/V (6m)   | 1.6 ± 0.4             | 1.7 ± 0.4             | -0.097 | -0.036 [-0.044, -0.027]         |
| Treatment Time (min)<br>(14d)                       | 239.2 ± 21.4          | 241.5 ± 15.3          | -0.124 | -2.306 [-2.741, -1.871]         |
| Treatment Time (min)<br>(6m)                        | 238.1 ± 21.0          | 240.5 ± 15.3          | -0.128 | -2.354 [-2.783, -1.924]         |
| Nr. Treatments (14d)                                | 6.6 ± 1.3             | 6.6 ± 0.8             | 0.022  | 0.024 [-0.001, 0.050]           |
| Nr. Treatments (30d)                                | 12.6 ± 3.0            | 13.2 ± 1.6            | -0.247 | -0.599 [-0.655, -0.542]         |
| Pre-DBP (mmHg) (14d)                                | 72.4 ± 12.4           | 70.8 ± 12.1           | 0.127  | 1.555 [1.268, 1.841]            |
| IDWG (kg) (14d)                                     | 2.1 ± 1.1             | 2.0 ± 1.0             | 0.079  | 0.082 [0.058, 0.107]            |
| IDWG (kg) (6m)                                      | 2.0 ± 0.8             | 2.0 ± 0.8             | 0.021  | 0.017 [-0.002, 0.036]           |
| Post-weight - Dry<br>Weight (kg) (6m)               | 0.3 ± 0.6             | 0.3 ± 0.5             | 0.037  | 0.021 [0.008, 0.035]            |
| BCM OH (l) (6m)                                     | 1.8 ± 1.4             | 1.8 ± 1.4             | 0.035  | 0.049 [0.017, 0.082]            |
| Serum Albumin (g/dl)                                | 3.9 ± 0.4             | 3.9 ± 0.4             | -0.064 | -0.024 [-0.033, -0.015]         |
| Serum Sodium (mmol/l)                               | 138.2 ± 3.1           | 138.2 ± 3.1           | -0.015 | -0.047 [-0.120, 0.025]          |
| Serum Phosphorus<br>(mg/dl)                         | 4.7 ± 1.3             | 4.6 ± 1.3             | 0.069  | 0.090 [0.060, 0.121]            |
| Serum Calcium (mg/dl)                               | 8.9 ± 0.7             | 8.9 ± 0.7             | -0.069 | -0.046 [-0.062, -0.030]         |
| Serum iPTH (pg/ml)                                  | 358.8 ± 310.7         | 329.0 ± 288.5         | 0.100  | 29.855 [22.845,<br>36.865]      |
| Serum Hemoglobin<br>(g/dl)                          | 11.0 ± 1.3            | 11.2 ± 1.2            | -0.134 | -0.172 [-0.202, -0.142]         |
| Serum Ferritin (µg/l)                               | 590.6 ± 430.4         | 589.0 ± 426.7         | 0.004  | 1.607 [-8.413, 11.627]          |
| Serum TSAT (%)                                      | 29.5 ± 14.3           | 30.0 ± 14.4           | -0.038 | -0.546 [-0.882, -0.211]         |
| Serum C-Reactive<br>Protein (mg/l)                  | 11.3 ± 14.3           | 10.4 ± 13.0           | 0.071  | 0.966 [0.646, 1.285]            |
| Serum Platelets<br>(no./mm <sup>3</sup> )           | 190701.4 ±<br>72546.0 | 190027.8 ±<br>67978.0 | 0.010  | 673.573 [-970.103,<br>2317.249] |
| Serum Leukocytes<br>(no./mm <sup>3</sup> )          | 6685.3 ± 2059.3       | 6596.1 ± 1979.5       | 0.044  | 89.236 [42.010,<br>136.462]     |
| Serum ALT (IU/l)                                    | 15.7 ± 8.5            | 15.4 ± 8.3            | 0.030  | 0.251 [0.054, 0.448]            |
| Serum Potassium<br>(mmol/l)                         | 4.9 ± 0.7             | 4.9 ± 0.7             | -0.009 | -0.007 [-0.024, 0.011]          |
| Calcimimetic agents                                 | 12.2                  | 12.6                  | -0.006 | -0.004 [-0.012, 0.004]          |
| Antacids and Proton<br>Pump Inhibitors              | 45.9                  | 47.5                  | -0.017 | -0.017 [-0.028, -0.005]         |
| Cardiac Vasodilators<br>agents                      | 7.7                   | 8.4                   | -0.013 | -0.007 [-0.013, -0.001]         |
| Renin-angiotensin-<br>system (RAS)-acting<br>agents | 28.7                  | 28.8                  | -0.001 | -0.001 [-0.011, 0.010]          |

|                                    |      |      |        |                         |
|------------------------------------|------|------|--------|-------------------------|
| Lipid-Modifying agents             | 36.5 | 40   | -0.036 | -0.035 [-0.046, -0.024] |
| Anticancer and<br>Endocrine agents | 1.2  | 1.3  | -0.004 | -0.001 [-0.003, 0.002]  |
| Xanthine oxidase<br>inhibitors     | 19   | 19.8 | -0.010 | -0.008 [-0.017, 0.002]  |
| Psychotropic agents                | 27.3 | 29   | -0.019 | -0.017 [-0.028, -0.007] |

**8 Supplementary Table S6 - Baseline characteristics of the viral-carrier vaccines cohort**

**Table S6.** Demographic and clinical characteristics of vaccinated persons and unvaccinated controls at baseline in the sample for viral-carrier vaccines. Continuous variables are expressed as mean  $\pm$  standard deviation, categorical variables are expressed as percentage. The mean differences and 95% confidence interval (CI) are related to unvaccinated group minus vaccinated group. For effect size, we used Cohen's d for continuous variables and Cramér's V for categorical ones considering acceptable difference of 0.25 or less. BMI, body mass index. FMC incident, if the patient started the renal replacement therapy not more than 3 months before FMC admission. Online HDF, Online hemodiafiltration. DBP, diastolic blood pressure. IDWG, interdialytic weight gain. BCM OH, overhydration by the body composition monitor (BCM; Fresenius). TSAT, transferrin saturation. ALT, alanine transaminase. 6m, 6 months prior to index date. 14d, past 14 days prior to index date. 30d, past 30 days prior to index date.

| <b>Characteristics</b>   | <b>Unvaccinated<br/>(N=6444)</b> | <b>Vaccinated<br/>(N=6444)</b> | <b>Effect<br/>Size</b> | <b>Mean Difference<br/>[95% CI]</b> |
|--|----------------------------------|--------------------------------|------------------------|-------------------------------------|
| Age (years)  | 58.5 $\pm$ 13.9                  | 62.9 $\pm$ 13.1                | -0.322                 | -4.351 [-4.819, -3.884]             |
| Sex: male  | 56.4                             | 60.3                           | -0.040                 | -0.039 [-0.056, -0.022]             |
| Race: Caucasian  | 50.1                             | 48.8                           | 0.012                  | 0.012 [-0.005, 0.030]               |
| Smoking status:<br>current/past smoker   | 26.7                             | 29.1                           | -0.026                 | -0.024 [-0.039, -0.008]             |
| BMI (kg/m <sup>2</sup> )   | 27.4 $\pm$ 5.7                   | 27.3 $\pm$ 5.5                 | 0.006                  | 0.036 [-0.157, 0.230]               |
| Local (dialysis center)<br>background risk of<br>SARS-CoV-2 infection<br>calculated from the<br>machine learning<br>enhanced sentinel<br>surveillance system (2) | 0.5 $\pm$ 0.4                    | 0.4 $\pm$ 0.4                  | 0.160                  | 0.059 [0.047, 0.072]                |
| History of SARS-CoV-2<br>infection   | 14.5                             | 7.8                            | 0.106                  | 0.067 [0.056, 0.077]                |
| History of<br>hospitalization  | 0.3 $\pm$ 0.7                    | 0.2 $\pm$ 0.6                  | 0.189                  | 0.121 [0.099, 0.143]                |
| Dialysis vintage (days)  | 2062.3 $\pm$ 1780.3              | 2183.3 $\pm$ 1762.6            | -0.068                 | -121.012 [-182.185, -59.838]        |
| Etiology: Cystic Kidney<br>Disease   | 5.1                              | 6.6                            | -0.032                 | -0.015 [-0.023, -0.007]             |
| Etiology: Vascular<br>Disease Hypertension   | 11.3                             | 13.5                           | -0.033                 | -0.022 [-0.033, -0.011]             |
| Charlson<br>Cerebrovascular Disease  | 13.3                             | 14.9                           | -0.024                 | -0.017 [-0.029, -0.005]             |
| Charlson Congestive<br>Heart Failure   | 23                               | 22.5                           | 0.007                  | 0.006 [-0.009, 0.020]               |
| Charlson Diabetes with<br>Organ Damage   | 26.4                             | 25.6                           | 0.009                  | 0.008 [-0.007, 0.023]               |

|  |                    |                    |        |                               |
|--|--------------------|--------------------|--------|-------------------------------|
| Charlson Mild Liver Disease                  | 11.5               | 11.6               | -0.001 | -0.000 [-0.012, 0.011]        |
| FMC incident                                 | 66.4               | 66                 | 0.004  | 0.004 [-0.013, 0.020]         |
| Treatment Modality: Online HDF               | 49.6               | 52.5               | -0.029 | -0.029 [-0.046, -0.011]       |
| Kt/V (6m)                                    | 1.7 ± 0.3          | 1.7 ± 0.3          | -0.071 | -0.020 [-0.029, -0.010]       |
| Treatment Time (min) (14d)                   | 255.7 ± 46.6       | 255.0 ± 42.9       | 0.015  | 0.656 [-0.891, 2.203]         |
| Treatment Time (min) (6m)                    | 255.1 ± 45.8       | 254.2 ± 40.9       | 0.021  | 0.930 [-0.569, 2.429]         |
| Nr. Treatments (14d)                         | 6.6 ± 1.3          | 6.2 ± 0.9          | 0.371  | 0.398 [0.361, 0.435]          |
| Nr. Treatments (30d)                         | 12.6 ± 2.7         | 12.8 ± 1.7         | -0.073 | -0.167 [-0.245, -0.088]       |
| Pre-DBP (mmHg) (14d)                         | 74.1 ± 11.8        | 71.9 ± 11.8        | 0.189  | 2.236 [1.829, 2.644]          |
| IDWG (kg) (14d)                              | 2.2 ± 1.1          | 2.3 ± 1.1          | -0.043 | -0.047 [-0.084, -0.009]       |
| IDWG (kg) (6m)                               | 2.3 ± 0.9          | 2.2 ± 0.8          | 0.037  | 0.032 [0.002, 0.062]          |
| Post-weight - Dry Weight (kg) (6m)           | 0.3 ± 0.7          | 0.3 ± 0.6          | 0.057  | 0.035 [0.014, 0.057]          |
| BCM OH (l) (6m)                              | 1.7 ± 1.4          | 1.6 ± 1.3          | 0.027  | 0.037 [-0.010, 0.084]         |
| Serum Albumin (g/dl)                         | 3.9 ± 0.4          | 4.0 ± 0.3          | -0.086 | -0.031 [-0.043, -0.018]       |
| Serum Sodium (mmol/l)                        | 138.7 ± 3.1        | 138.9 ± 3.1        | -0.053 | -0.165 [-0.271, -0.058]       |
| Serum Phosphorus (mg/dl)                     | 4.8 ± 1.3          | 4.7 ± 1.2          | 0.071  | 0.088 [0.046, 0.131]          |
| Serum Calcium (mg/dl)                        | 8.8 ± 0.7          | 8.9 ± 0.7          | -0.089 | -0.062 [-0.086, -0.038]       |
| Serum iPTH (pg/ml)                           | 394.9 ± 331.4      | 376.4 ± 316.3      | 0.057  | 18.457 [7.271, 29.643]        |
| Serum Hemoglobin (g/dl)                      | 11.2 ± 1.5         | 11.5 ± 1.4         | -0.184 | -0.265 [-0.315, -0.215]       |
| Serum Ferritin (µg/l)                        | 673.5 ± 500.1      | 653.3 ± 475.5      | 0.041  | 20.150 [3.299, 37.000]        |
| Serum TSAT (%)                               | 35.0 ± 18.6        | 36.1 ± 18.7        | -0.058 | -1.080 [-1.724, -0.436]       |
| Serum C-Reactive Protein (mg/l)              | 12.6 ± 16.2        | 11.3 ± 14.6        | 0.089  | 1.377 [0.844, 1.909]          |
| Serum Platelets (no./mm <sup>3</sup> )       | 204859.1 ± 63749.0 | 203244.5 ± 61396.5 | 0.026  | 1614.678 [-546.488, 3775.844] |
| Serum Leukocytes (no./mm <sup>3</sup> )      | 6692.0 ± 2105.4    | 6673.8 ± 2018.3    | 0.009  | 18.242 [-52.974, 89.457]      |
| Serum ALT (IU/l)                             | 13.4 ± 8.3         | 12.9 ± 7.7         | 0.057  | 0.457 [0.180, 0.734]          |
| Serum Potassium (mmol/l)                     | 5.0 ± 0.7          | 5.0 ± 0.7          | 0.012  | 0.008 [-0.015, 0.032]         |
| Calcimimetic agents                          | 6.5                | 7.7                | -0.024 | -0.012 [-0.021, -0.003]       |
| Antacids and Proton Pump Inhibitors          | 29.2               | 31.8               | -0.028 | -0.026 [-0.042, -0.010]       |
| Cardiac Vasodilators agents                  | 4.3                | 4.7                | -0.009 | -0.004 [-0.011, 0.003]        |
| Renin-angiotensin-system (RAS)-acting agents | 22.4               | 22.2               | 0.002  | 0.002 [-0.013, 0.016]         |

|                                    |      |      |        |                         |
|------------------------------------|------|------|--------|-------------------------|
| Lipid-Modifying agents             | 12.5 | 15.1 | -0.038 | -0.026 [-0.038, -0.014] |
| Anticancer and<br>Endocrine agents | 0.6  | 0.8  | -0.009 | -0.002 [-0.004, 0.001]  |
| Xanthine oxidase<br>inhibitors     | 7.5  | 7.8  | -0.005 | -0.002 [-0.012, 0.007]  |
| Psychotropic agents                | 12.1 | 13.8 | -0.025 | -0.017 [-0.029, -0.005] |



**9 Supplementary Table S7 – No. At Risk and Events in the mRNA vaccines cohort**

**Table S7.** Number of patients at risk at each time point and cumulative number of events are shown for each outcome: SARS-CoV-2 infection (up) and COVID-19 related death (down).

| <b>mRNA vaccine cohort: documented SARS-CoV-2 infection</b> |          |           |           |           |           |           |           |                                       |    |
|---|----------|-----------|-----------|-----------|-----------|-----------|-----------|---------------------------------------|----|
| <b>Follow-Up (days)</b>                                     | <b>0</b> | <b>15</b> | <b>30</b> | <b>45</b> | <b>60</b> | <b>75</b> | <b>90</b> | <b>Residual<br/>No. of<br/>Events</b> |    |
| <b>No. at Risk</b>  |          |           |           |           |           |           |           |                                       |    |
| ALL   | 28110    | 18602     | 13771     | 10466     | 7813      | 6317      | 4796      |                                       |    |
| Unvaccinated  | 14055    | 9249      | 6741      | 5016      | 3666      | 2911      | 2188      |                                       |    |
| Vaccinated  | 14055    | 9353      | 7030      | 5450      | 4147      | 3406      | 2608      |                                       |    |
| <b>Cumulative No. of Events</b>                             |          |           |           |           |           |           |           |                                       |    |
| ALL   | 0        | 382       | 568       | 683       | 753       | 811       | 829       |                                       | 21 |
| Unvaccinated  | 0        | 234       | 341       | 425       | 485       | 535       | 546       |                                       | 16 |
| Vaccinated  | 0        | 148       | 227       | 258       | 268       | 276       | 283       |                                       | 5  |
| <b>mRNA vaccine cohort: COVID-19 related death</b>          |          |           |           |           |           |           |           |                                       |    |
| <b>Follow-Up (days)</b>                                     | <b>0</b> | <b>15</b> | <b>30</b> | <b>45</b> | <b>60</b> | <b>75</b> | <b>90</b> | <b>Residual<br/>No. of<br/>Events</b> |    |
| <b>No. at Risk</b>  |          |           |           |           |           |           |           |                                       |    |
| ALL   | 28110    | 18933     | 14199     | 10922     | 8267      | 6733      | 5129      |                                       |    |
| Unvaccinated  | 14055    | 9463      | 7027      | 5346      | 4009      | 3232      | 2450      |                                       |    |
| Vaccinated  | 14055    | 9470      | 7172      | 5576      | 4258      | 3501      | 2679      |                                       |    |
| <b>Cumulative No. of Events</b>                             |          |           |           |           |           |           |           |                                       |    |
| ALL   | 0        | 29        | 89        | 124       | 155       | 179       | 186       |                                       | 15 |
| Unvaccinated  | 0        | 20        | 53        | 78        | 104       | 124       | 131       |                                       | 14 |
| Vaccinated  | 0        | 9         | 36        | 46        | 51        | 55        | 55        |                                       | 1  |

**10 Supplementary Table S8 – No. At Risk and Events in the viral-carrier vaccines cohort**

**Table S8.** Number of patients at risk at each time point and cumulative number of events are shown for each outcome: SARS-CoV-2 infection (up) and COVID-19 related death (down).

| <b>Viral carrier vaccine cohort: documented SARS-CoV-2 infection</b> |          |           |           |           |           |           |           |                                       |   |
|--|----------|-----------|-----------|-----------|-----------|-----------|-----------|---------------------------------------|---|
| <b>Follow-Up (days)</b>  | <b>0</b> | <b>15</b> | <b>30</b> | <b>45</b> | <b>60</b> | <b>75</b> | <b>90</b> | <b>Residual<br/>No. of<br/>Events</b> |   |
| <b>No. at Risk</b>   |          |           |           |           |           |           |           |                                       |   |
| ALL  | 12888    | 10302     | 8615      | 6496      | 4201      | 2676      | 1728      |                                       |   |
| Unvaccinated   | 6444     | 5122      | 4268      | 3172      | 2011      | 1253      | 804       |                                       |   |
| Vaccinated   | 6444     | 5180      | 4347      | 3324      | 2190      | 1423      | 924       |                                       |   |
| <b>Cumulative No. of Events</b>                                      |          |           |           |           |           |           |           |                                       |   |
| ALL  | 0        | 95        | 167       | 221       | 258       | 282       | 293       |                                       | 4 |
| Unvaccinated   | 0        | 61        | 96        | 136       | 161       | 174       | 178       |                                       | 3 |
| Vaccinated   | 0        | 34        | 71        | 85        | 97        | 108       | 115       |                                       | 1 |
| <b>Viral carrier vaccine cohort: COVID-19 related death</b>          |          |           |           |           |           |           |           |                                       |   |
| <b>Follow-Up (days)</b>  | <b>0</b> | <b>15</b> | <b>30</b> | <b>45</b> | <b>60</b> | <b>75</b> | <b>90</b> | <b>Residual<br/>No. of<br/>Events</b> |   |
| <b>No. at Risk</b>   |          |           |           |           |           |           |           |                                       |   |
| ALL  | 12888    | 10390     | 8751      | 6646      | 4351      | 2792      | 1808      |                                       |   |
| Unvaccinated   | 6444     | 5177      | 4350      | 3273      | 2122      | 1341      | 859       |                                       |   |
| Vaccinated   | 6444     | 5213      | 4401      | 3373      | 2229      | 1451      | 949       |                                       |   |
| <b>Cumulative No. of Events</b>                                      |          |           |           |           |           |           |           |                                       |   |
| ALL  | 0        | 5         | 17        | 39        | 47        | 57        | 61        |                                       | 3 |
| Unvaccinated   | 0        | 5         | 12        | 30        | 38        | 47        | 51        |                                       | 3 |
| Vaccinated   | 0        | 0         | 5         | 9         | 9         | 10        | 10        |                                       | 0 |

## 11 Supplementary Table S9 – Cumulative patients with 2 doses of COVID-19 vaccine

**Table S9.** Cumulative patients with two doses administered in their follow-up period by vaccine type.

| <b>Cumulative patients with two doses of COVID-19 vaccine N (%)</b> |          |             |             |             |
|---|----------|-------------|-------------|-------------|
| <b>Follow-Up (days)</b>   | <b>0</b> | <b>30</b>   | <b>60</b>   | <b>90</b>   |
| mRNA vaccine  | 0 (0.0)  | 6308 (44.9) | 7445 (53.0) | 7465 (53.1) |
| Viral carrier vaccine *   | 0 (0.0)  | 3109 (48.2) | 3913 (60.7) | 3991 (61.9) |

\* The viral-carrier vaccines considered in our study were mostly administered in Eastern Europe countries. In those countries, only Sinovac-CoronaVac and Sputnik V COVID-19 vaccines were available. According to protocols, second doses for both these viral-carrier vaccines should be administered at 2-4 weeks and 3 weeks respectively.

## 12 References

1. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. *J Chronic Dis* [Internet]. 1987 Jan;40(5):373–83. Doi: 10.1016/0021-9681(87)90171-8
2. Bellocchio F, Carioni P, Garbelli M, Martínez-Martínez F, Larkin JW, Usvyat LA, et al. Enhanced sentinel surveillance system for COVID-19 outbreak prediction in a European dialysis clinics network. *J Am Soc Nephrol* [Internet]. 2020;31:275.