

The infinite alleles model revisited: a Gibbs sampling approach

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Abstract

The SARS-CoV-2 outbreak started in late 2019 in the Hubei province in China and the first viral sequence was made available to the scientific community on early January 2020. From there, viral genomes from all over the world have followed at an outstanding rate, reaching already more than 10^5 on early May 2020, and more than 10^6 by early March 2021. Phylodynamics methods have been designed in recent years to process such datasets and infer population dynamics and sampling intensities in the past. However, the unprecedented scale of the SARS-CoV-2 dataset now calls for new methodological developments, relying e.g. on simplifying assumptions of the mutation process.

In this article, I build on the *infinite alleles model* stemming from the field of population genetics to develop a new Bayesian statistical method allowing the joint reconstruction of the outbreak's effective population sizes and sampling intensities through time. This relies on prior conjugacy properties that prove useful both to develop a Gibbs sampler and to gain intuition on the way different parameters of the model are linked and inferred. I finally illustrate the use of this method on SARS-CoV-2 genomes sequenced during the first wave of the outbreak in four distinct European countries, thus offering a new perspective on the evolution of the sampling intensity through time in these countries from genetic data only.

Keywords : population genetics | phylodynamics | infinite alleles | coalescent | prior conjugacy | Gibbs sampling |

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1 Introduction

The concept of *descent with modification* is central in modern biology, where biological entities evolving across various spatial and temporal scales (e.g. cells, individuals, species) can be seen as atomic particles carrying molecular sequences, that are passed on to their descent, while accumulating small gradual changes. As a result, the patterns of genetic differentiation obtained in a sample of particles depend on the underlying population dynamics, and can be analysed to retrieve information on this unobserved population dynamics. This is the aim shared by two related fields called *population genetics* and *phylogenetics*.

Population genetics and phylogenetics Molecular sequences are nowadays routinely being collected and analyzed throughout the tree of life, to address a wealth of biological questions, across fields such as ecology, anthropology, macroevolution, developmental biology, or epidemiology. In this manuscript, I focus on methods designed to investigate the *population dynamics* of a system through the analysis of genetic polymorphism. These methods have been applied across plenty of temporal and geographical scales, e.g. in ecology to study the population size trajectory of species (Parag et al. 2021), in epidemiology to estimate the prevalence of an infectious disease from sequences of pathogens sampled during an outbreak (Stadler et al. 2013), or in paleontology to study the species diversity trajectory of a clade over macroevolutionary time-scales (Morlon et al. 2011). While both fields address similar questions and may seem intertwined, their methodologies remained quite distinct, giving rise to two branches in the literature.

Population genetics approaches primarily aim at studying genetic variation within populations through time, based on genetic data. The recognition of the central influence of demography on genetic variation fostered the development of statistical methods aiming at inferring past demography from observed genetic polymorphism. The field has been very active since the beginning of the 70s, and most of the early theory is now digested in textbooks presenting the coalescent, with or without demography complications (Tavaré 2004; Hein et al. 2004; Durrett 2008). This early work relied on simplifying assumptions such as the *infinite alleles* or *infinite sites* models, when genetic data has been sampled at a single point in time. Elegant analytical developments of the probability distribution of summary statistics were derived, allowing one to investigate, e.g., population growth (Kuhner et al. 1998), population structure (Beerli and Felsenstein 1999), selection (McDonald and Kreitman 1991), or the presence of recombination (Hudson 1983). Contemporary empirical applications usually deal with more complicated demography scenarios and samples taken at multiple points in time, and have thus adopted two different strategies. First, some studies rely on Principal Component Analysis or summary statistics that have been previously derived in very simple settings (Novembre et al. 2008). This approach is extremely fast and appropriate for an initial exploration of the dataset, still it lacks a quantitative aspect. Second, the rise of computational power fostered the development of Approximate Bayesian Computation to fit parameter-rich models using computationally intensive procedures (Skoglund et al. 2014; Kim et al. 2017).

Phylogenetics approaches stem from the field of phylogenetics, which aims at reconstructing the ancestral relationships between individuals, together with their evolutionary parameters, based on genetic data. In this field as well, researchers have acknowledged the key role of the demography in shaping the phylogenetic tree and hence the observed molecular patterns. This in turn promoted the rise of a subfield called *phylogenetics*, aiming at inferring the demography using molecular sequences, by integrating over precise phylogenetic relationships. The two main demography frameworks used in the field are (i) the coalescent, borrowed from Kingman (1982)'s work in population genetics and (ii) birth-death processes, relying on seminal results by Kendall (1948) and Nee et al. (1994). Compared to population genetics methods, there has been a cultural change towards more precise estimation relying on computationally intensive Bayesian inference methods. These methods rely on many superimposed model

layers, among which e.g. models of clock evolution (Lepage et al. 2007), models of across-locus variation (Lartillot and Philippe 2004), and models of molecular substitution (Lanave et al. 1984). Moreover, phylodynamic methods have been developed to take into account serially sampled molecular data (Stadler 2010). Population dynamics has been modeled either in a coalescent framework using e.g. time-varying population size (Pybus and Harvey 2000; Drummond et al. 2002; Pybus et al. 2003), or in a birth-death framework, where the population is already free to fluctuate with constant birth and death rates, but larger variations can be allowed using time-varying parameters (Morlon et al. 2011; Stadler et al. 2013). As an alternative to time-dependent processes, some studies have attempted to introduce diversity-dependence processes in either a coalescent framework (Volz et al. 2009), or a birth-death framework (Etienne et al. 2012; Leventhal et al. 2013). Population structure can be modeled in a coalescent framework with discrete demes exchanging genes through migration (Ewing et al. 2004; Vaughan et al. 2014; Müller et al. 2017). In a birth-death process, structure is modeled using so-called multi-type birth-death processes, where different types are associated with different birth and death parameters, and individuals from a given type can either give birth to other types or directly change type (Maddison et al. 2007; Beaulieu and O’Meara 2016; Maliet et al. 2019; Barido-Sottani et al. 2020). Finally, methods have been developed to jointly consider occurrence and molecular data. In a coalescent framework, occurrences are assumed to be the result of a Poisson sampling process among the total population (Rasmussen et al. 2011; Parag et al. 2020). In a birth-death process, an individual can be sampled and *sequenced* at a given rate – in which case it appears in the tree – or sampled without being sequenced at another rate – in which case it is a simple occurrence (Vaughan et al. 2019; Gupta et al. 2020; Manceau et al. 2021).

Motivating example In this paper, I focus on inferring population dynamics for biological systems where (i) genetic polymorphism is sampled through time, and (ii) an ever increasing amount of sequences are being collected, challenging state-of-the-art methods for phylodynamic analysis.

The current SARS-CoV-2 pandemic provides the archetypal dataset that I propose to model. The outbreak survey started in late 2019, and the first viral genome was already published and made available for research on the 10th of January 2020. New sequences followed at an outstanding rate. By early May 2020, already more than 10^5 viral sequences were available from across the world. A bit less than a year after, 10^6 sequences have been reached before early March 2021. Developing statistical tools capable of keeping up with the pace of data acquisition thus represents a methodological challenge.

SARS-CoV-2 genomes have already been used to address a number of epidemiology-related questions, among which assessing the number and origins of introductions in a given locality (Gonzalez-Reiche et al. 2020; Lemey et al. 2020), the magnitude of super-spreading events (Li et al. 2020), or estimating the reproductive numbers of local outbreaks (Vaughan et al. 2020). Yet, phylogenetics/phylodynamics approaches do not scale well to large numbers of sequences and empirical applications typically require subsampling the original datasets.

The virus genome is approximately 3×10^4 nucleotides long, and its mutation rate, quite heterogeneous across the genome, has been estimated around 22 mutations per year per genome (Hadfield et al. 2018). As a result, new alleles and polymorphic sites of the genome have accumulated in the data at a slow pace. Together with the outstanding number of sequences, this rather slow mutation rate advocates for the use of simplifying assumptions of the mutation process.

The infinite alleles model Phylodynamic analyses generally assume a very realistic mutation process. Sequences have a finite number of sites, and each mutation hits a randomly chosen nucleotide, with a realistic substitution process ranging from the Jukes-Cantor to the Generalized Time Reversible model. Selection might even be modeled

and nucleotides might have different mutation rates along the sequence. While these realistic models are very well designed to study fine-grain processes or processes happening over long timescales, they do not appear to be the best option to process large numbers of similar sequences. In this manuscript, I take a step back and aim at bringing back into fashion a simplifying assumption that has been traditionally considered in the early days of the neighbouring field of population genetics, namely the *infinite alleles model*. Under this model, each mutation hitting a sequence always creates a new *allele* never observed before. If we imagine that each sequence is a ball and an allele is a colour, genetic data thus simplifies as a sampling record of coloured balls through time, as illustrated in Figure 1 (Durrett 2008).

Analytical tractability is the main reason why the infinite alleles model is used nowadays. Following the past history of one genetic sequence backward in time, it can either (i) coalesce with another lineage that belongs to the same allele; or (ii) if it is the only representative of its allele, it can find the mutation that gave rise to it. Once this original mutation is found, everything else in the past is forgotten. The infinite alleles model was studied extensively during the golden age of population genetics, in combination with the coalescent model and for sequences sampled at a unique point in time. A closed-form analytical characterization of the probability distribution of the allele frequency spectrum in this setting exists, called *Ewen’s sampling formula* (Ewens 1972).

The dynamics of the colour assemblage through time is informative of the underlying population dynamics that we are interested in inferring. I propose to work under a Bayesian framework, and to rely on population dynamics and sampling process assumptions similar to what has been recently used in phylodynamics. To ensure fast convergence of the Markov Chain Monte Carlo (MCMC) method that is used for inference, the model is (i) carefully built such that data augmentation can be performed efficiently, and (ii) relies on prior conjugacy properties and Gibbs sampling moves. This approach has been successfully applied to other phylogenetics methods before, and has shown a much faster convergence of MCMC methods relying on Gibbs sampling moves as compared to Metropolis-Hastings moves (Lartillot 2006). Further, prior conjugacy properties allow one to build a better intuition on the interactions between different parameters, which proves particularly convenient for the choice of prior distributions. As compared to state of the art phylodynamics methods, I aim at integrating over the unknown ancestral relationships more efficiently, with the hope to warrant dataset analysis on a larger scale.

Manuscript outline In Section 2, I introduce in more details the model assumptions, before turning to the inference strategy in Section 3. I then present in Section 4 some sanity checks and validate the inference method on simulated data. An empirical application in Section 5 illustrates the use of the method on the SARS-CoV-2 sequences sampled during the first wave hitting Europe in 2020. Finally, I discuss in Section 6 the results of this paper as well as the future research challenges it opens. This manuscript is released along with the code implementing the method, and details on the implementation and use of the code are provided in Supp. Mat. C.

2 Model and notation

I build here on work by Parag et al. (2021) and Karcher et al. (2020), who both consider a sampling process on top of a coalescent model with piecewise-constant effective population sizes. The coalescent process is very conveniently described backward in time, and time will thus be, throughout the manuscript, the calendar time before present, in units of days for empirical applications, with $t = 0$ at present and $t \rightarrow \infty$ in the past.

2.1 Model parameters

The model is built around the following four key parameters.

First, the past effective population size is piecewise-constant on a partition of $(0, +\infty)$ into p successive disjoint intervals $(\Delta_j^{(N)})_{j=0}^{p-1}$ delimited by $0, \infty$, and the $p-1$ times $(t_j^{(N)})_{j=1}^{p-1}$, i.e.

$$N_t = \sum_{j=0}^{p-1} N_j \mathbb{1}_{\Delta_j^{(N)}}(t) \quad ,$$

where $\Delta_j^{(N)} = [t_j^{(N)}, t_{j+1}^{(N)})$, with convention $t_0^{(N)} = 0$ and $t_p^{(N)} = \infty$.

Second, following Parag et al. (2021), the past sampling intensity is also a piecewise-constant function, on a possibly different partition $(\Delta_j^{(S)})_{j=0}^{p'-1}$ of $(0, \infty)$, delimited by $0, \infty$, and the $p'-1$ times $(t_j^{(S)})_{j=1}^{p'-1}$, i.e.

$$S_t = \sum_{j=0}^{p'-1} S_j \mathbb{1}_{\Delta_j^{(S)}}(t) \quad ,$$

where $\Delta_j^{(S)} = [t_j^{(S)}, t_{j+1}^{(S)})$, with convention $t_0^{(S)} = 0$ and $t_{p'}^{(S)} = \infty$.

Last, the mutation rate μ and generation time g are constant through time.

In a Bayesian framework, these parameters are random variables which are assigned prior distributions. The effective population sizes $(N_j)_{j=0}^{p-1}$ are assumed to be *a priori* distributed according to a Generalized Inverse Gaussian distribution, while the sampling intensities $(S_j)_{j=0}^{p'-1}$ are assumed to be *a priori* distributed according to a Gamma distribution. Finally, the mutation rate μ and generation time g are respectively *a priori* distributed according to a Gamma and Inverse-Gamma distribution. The choice of these prior distributions will be explained in Section 3, when discussing the posterior inference of these variables.

2.2 Past sampling and coalescent history

We assume that the sampling history is given by a Poisson Point Process (PPP) with rate

$$\lambda_t^{(b)} := S_t N_t \quad (2.1)$$

generating the set of ordered sampling times $\mathcal{B} = (b_i)_{i=0}^{B-1}$ of all individuals. The total number of sampling events is denoted B , and individuals are numbered from 0 to $B-1$ in reverse birth time order. We will also call these sampling times the *birth times* of lineages when considering the history backward in time (hence the name $\mathcal{B}$). Lineages begin their backward-in-time journey as singletons $\{i\}$ where i corresponds to the individual's number.

The past history of these lineages is further assumed to follow a standard coalescent with effective population size N_t , generation time g and differentiation under an infinite alleles model with mutation rate μ . That is, while there are k_t lineages alive in the process, the next coalescent (resp. differentiation) event happens with rate,

$$\lambda_t^{(c)} := \binom{k_t}{2} (g N_t)^{-1} \quad (2.2)$$

$$\lambda_t^{(d)} := \mu k_t \quad . \quad (2.3)$$

When there is a coalescent event, two lineages L_i and L_j , uniformly sampled among the k_t living lineages at that time, are merged together in a unique lineage $L_i \cup L_j$. When there is a differentiation event, one of the k_t living lineages is uniformly chosen to be killed. Forward in time, a coalescence corresponds to an individual giving birth to another individual, whereas a differentiation event corresponds to the acquisition of an original mutation responsible for the creation of an allele.

The past coalescent history thus generates in particular a partition of individuals into an *allele partition* $\mathcal{A}$ corresponding to the collection of all lineages killed by a mutation. It also generates the times at which differentiation and coalescent events, – jointly referred to as *death* events – happened in history. In order to record these, we take the following approach. Lineages are initially numbered with the same number as the individual’s number it carries. Each coalescence involving two lineages numbered $j < i$ at time t is considered to kill lineage i , and to keep living in lineage j (see arrows on Fig. 1). By a slight abuse of language, we call such an event the death of *individual* i , and the time at which a mutation is found is the death time of the very first individual of the allele (see crosses on Fig. 1).

The coalescent history of all individuals is recorded in $\mathcal{H} = (h_i, o_i)_{i=0}^{B-1}$, where h_i is the death time of individual i and $o_i \in \{0, 1, \dots, i\}$ is the output of the death event, i.e. the number $j < i$ of the lineage in which lineage i is merged if there is a coalescence, or $o_i = i$ if there is a mutation. The total number of alleles is denoted $D = \sum_{i=0}^{B-1} \mathbb{1}_{o_i=i}$. Finally, the record of the B birth times (b_i) and death times (h_i) , together with boundaries $t = 0$ and $t = \infty$, yield a partition of the timeline into $2B + 1$ successive intervals that are denoted $(\Delta_l)_{l=0}^{2B}$. On any such interval Δ_l , the number of lineages remain constant and is denoted k_l .

2.3 Density of the full history

Figure 1 summarizes all notation introduced so far. Note already that, knowing $\mathcal{B}$ and $\mathcal{H}$, i.e. the full sampling and coalescent history, is enough to know the partition $\mathcal{A}$ of individuals into alleles. The density of this full past history $\mathcal{B}, \mathcal{H}$ given N, S, μ, g is further given by

$$\mathbb{P}(\mathcal{B}, \mathcal{H} \mid N, S, \mu, g) = \left(\prod_{i=0}^{B-1} \lambda_{b_i}^{(b)} (\lambda_{h_i}^{(c)} \mathbb{1}_{o_i \neq i} + \lambda_{h_i}^{(d)} \mathbb{1}_{o_i = i}) \right) \exp \left(- \int_0^\infty (\lambda_t^{(b)} + \lambda_t^{(c)} + \lambda_t^{(d)}) dt \right) \quad (2.4)$$

The above density belongs to the exponential family, and thus lends itself well to inference via a Gibbs sampling strategy, with priors that belong to other exponential family distributions. In the next Section, I turn to the description of this inference method.

3 Inference method

3.1 Observations and inference strategy

Data consist in the observation of the sampling times $\mathcal{B}$, together with the partition $\mathcal{A}$ of the set of B individuals into D alleles. I aim at inferring the posterior distribution of N, S, μ, g , which consists, in a Bayesian framework, in sampling from,

$$\mathbb{P}(N, S, \mu, g \mid \mathcal{A}, \mathcal{B}) = \int_{\mathcal{H}} \mathbb{P}(N, S, \mu, g, \mathcal{H} \mid \mathcal{A}, \mathcal{B}) \ ,$$

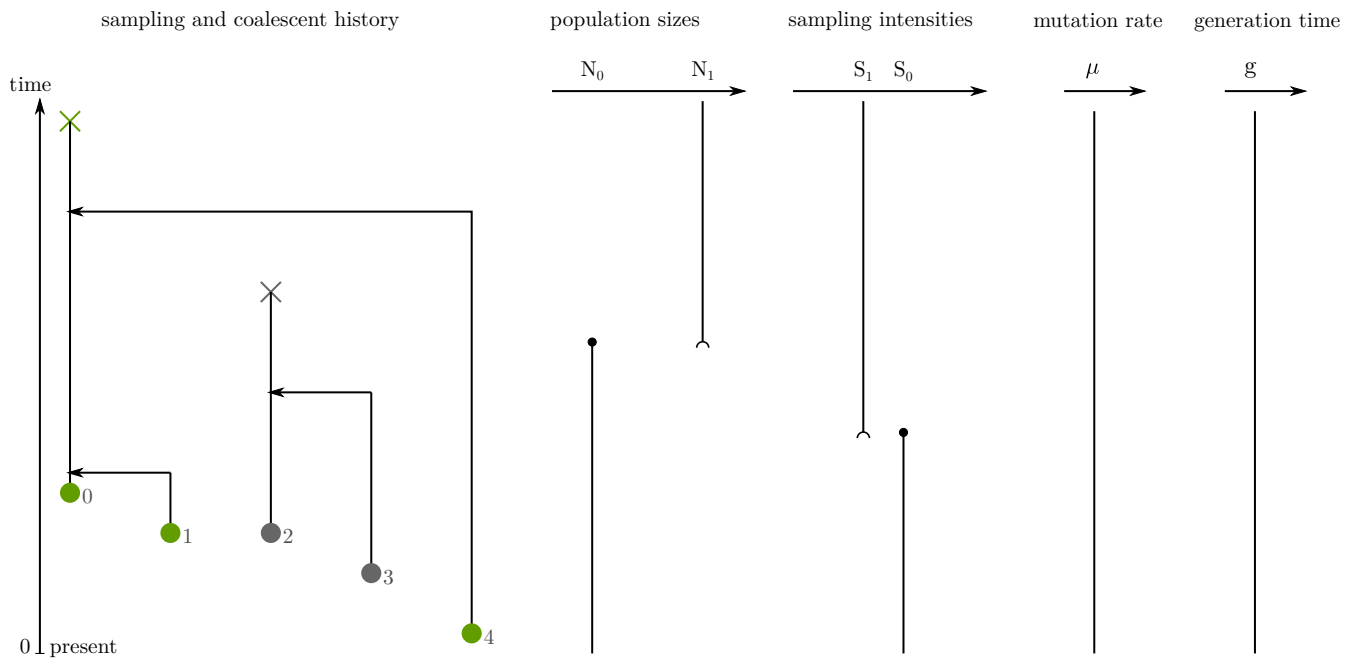


Figure 1: Model notation. Time is oriented from the present towards the past. To the left, individuals, represented as circles at their sampling time, are numbered in decreasing sampling times order and are colored according to the allele they belong to. Past coalescent events are represented with arrows, differentiation events are represented with crosses. The past coalescent history leads to the allele partition $\mathcal{A} = \{\{0, 1, 4\}, \{2, 3\}\}$. To the right, the parameters of the model that we are interested in inferring: the piecewise-constant past effective population sizes N , the piecewise-constant past sampling intensities S , the constant mutation rate μ , and the constant generation time g .

where the right-hand side is augmented using the past coalescent history.

I take a Gibbs sampling approach to design a MCMC which converges to the stationary distribution of the augmented target distribution $\mathbb{P}(N, S, \mu, g, \mathcal{H} \mid \mathcal{A}, \mathcal{B})$. To do so, I derive efficient ways to alternatively sample from the following conditional laws,

$$\begin{aligned} &\mathbb{P}(N_j \mid N_{-j}, S, \mu, g, \mathcal{B}, \mathcal{H}) \\ &\mathbb{P}(S_j \mid N, S_{-j}, \mu, g, \mathcal{B}, \mathcal{H}) \\ &\mathbb{P}(\mu \mid N, S, g, \mathcal{B}, \mathcal{H}) \\ &\mathbb{P}(g \mid N, S, \mu, \mathcal{B}, \mathcal{H}) \\ &\mathbb{P}(H_i, O_i \mid N, S, \mu, g, \mathcal{A}, \mathcal{B}, H_{-i}, O_{-i}) \quad , \end{aligned}$$

where N_{-j}, S_{-j} denote the effective population sizes and sampling intensities over all intervals other than the one numbered j , and (H_{-i}, O_{-i}) denotes the death information of all individuals other than the one numbered i . Remark here that, on the first three lines, $\mathcal{A}$ disappeared from the conditioning because $\mathcal{A}, \mathcal{B}, \mathcal{H} = \mathcal{B}, \mathcal{H}$, i.e. knowing the sampling times and the coalescent history is enough to know the allele partition.

Designing an efficient Gibbs sampler in this context relies on the optimization of two critical steps: (i) one needs to derive the posterior distribution of the parameters conditioned on the augmented data; and (ii) one needs to efficiently perform a data augmentation step, i.e. simulate the past history $\mathcal{H}$ conditioned on the observed data and parameter values.

3.2 Prior conjugacy properties for parameters

3.2.1 Effective population size

Recall that N_j is *a priori* independent on N_{-j}, S, μ, g and is distributed according to a Generalized Inverse Gaussian distribution denoted $\mathcal{GIG}(\lambda, \chi, \psi)$. The following will justify this choice of prior. The GIG distribution belongs to the exponential family and is characterized by its density, usually parameterized as,

$$\mathbb{P}(N_j) \propto N_j^{\lambda-1} \exp\left(-\frac{1}{2}(\chi N_j^{-1} + \psi N_j)\right) .$$

Its posterior is thus given by,

$$\begin{aligned} \mathbb{P}(N_j \mid N_{-j}, S, \mu, g, \mathcal{B}, \mathcal{H}) &\propto \mathbb{P}(N_j) \mathbb{P}(\mathcal{B}, \mathcal{H} \mid N, S, \mu, g) \\ &\propto N_j^{\lambda-1} \exp\left(-\frac{1}{2}(\chi N_j^{-1} + \psi N_j)\right) \\ &\quad N_j^{\sum_{i=0}^{B-1} \mathbb{1}_{b_i \in \Delta_j^{(N)}} - \mathbb{1}_{o_i \neq i} \mathbb{1}_{h_i \in \Delta_j^{(N)}}} \\ &\quad \exp\left(-N_j^{-1} g^{-1} \sum_{l=0}^{2B} \binom{k_l}{2} |\Delta_l \cap \Delta_j^{(N)}| - N_j \sum_{k=0}^{p'-1} S_k |\Delta_k^{(S)} \cap \Delta_j^{(N)}|\right) , \end{aligned}$$

where the last line is obtained by substituting the density of $\mathcal{B}, \mathcal{H}$ using Equation (2.4), before dropping out all terms which do not depend on N_j .

This proves that the prior and posterior are conjugate distributions, with

$$\begin{aligned} N_j \mid N_{-j}, S, \mu, g, \mathcal{B}, \mathcal{H} \\ \sim \mathcal{GIG}\left(\lambda + B(\Delta_j^{(N)}) - C(\Delta_j^{(N)}), \chi + g^{-1} \sum_{l=0}^{2B} k_l(k_l - 1) |\Delta_l \cap \Delta_j^{(N)}|, \psi + 2 \sum_{k=0}^{p'-1} S_k |\Delta_k^{(S)} \cap \Delta_j^{(N)}|\right) , \end{aligned} \quad (3.5)$$

where $C(\Delta_j^{(N)})$ and $B(\Delta_j^{(N)})$ are respectively the number of coalescent and sampling events happening over interval $\Delta_j^{(N)}$.

The choice of a conjugate prior will help (i) simplify the Gibbs sampling process, and (ii) provide a better intuitive understanding of the factors that influence the distribution of N .

3.2.2 Sampling intensity

Recall that S_j is *a priori* independent on N, S_{-j}, μ, g and that $S_j \sim \Gamma(\alpha, \beta)$. Its posterior is thus given by,

$$\begin{aligned} \mathbb{P}(S_j \mid N, S_{-j}, \mu, g, \mathcal{B}, \mathcal{H}) &\propto \mathbb{P}(S_j) \mathbb{P}(\mathcal{B}, \mathcal{H} \mid N, S, \mu, g) \\ &\propto S_j^{\alpha-1} \exp(-\beta S_j) S_j^{\sum_{i=0}^{B-1} \mathbb{1}_{b_i \in \Delta_j^{(S)}}} \exp\left(-S_j \sum_{k=0}^{p-1} N_k |\Delta_k^{(N)} \cap \Delta_j^{(S)}|\right) \end{aligned}$$

where the last line is obtained again by substituting the density of $\mathcal{B}, \mathcal{H}$ using Equation (2.4), before dropping out all terms which do not depend on S_j .

This shows that the prior and posterior are conjugate distributions, with

$$S_j \mid N, S_{-j}, \mu, g, \mathcal{B}, \mathcal{H} \sim \Gamma \left(\alpha + B(\Delta_j^{(S)}) , \beta + \sum_{k=0}^{p-1} N_k |\Delta_k^{(N)} \cap \Delta_j^{(S)}| \right) . \quad (3.6)$$

3.2.3 Mutation rate

Recall that, *a priori*, $\mu \sim \Gamma(\alpha, \beta)$. Following the same strategy as above, its posterior is given by,

$$\begin{aligned} \mathbb{P}(\mu \mid N, S, g, \mathcal{B}, \mathcal{H}) &\propto \mathbb{P}(\mu, \mathcal{B}, \mathcal{H} \mid N, S, g) \\ &\propto \mathbb{P}(\mu) \mathbb{P}(\mathcal{B}, \mathcal{H} \mid N, S, \mu, g) \\ &\propto \mu^{\alpha-1} \exp(-\beta\mu) \mu^D \exp \left(-\mu \sum_{l=0}^{2B} k_l |\Delta_l| \right) . \end{aligned}$$

We conclude that the prior and posterior of μ are conjugate distributions, with,

$$\mu \mid N, S, g, \mathcal{B}, \mathcal{H} \sim \Gamma \left(\alpha + D , \beta + \sum_{l=0}^{2B} k_l |\Delta_l| \right) . \quad (3.7)$$

3.2.4 Generation time

Last, recall that g is *a priori* distributed according to an Inverse-Gamma distribution denoted $\Gamma^{-1}(\alpha, \beta)$. Its posterior is given by,

$$\begin{aligned} \mathbb{P}(g \mid N, S, \mu, \mathcal{B}, \mathcal{H}) &\propto \mathbb{P}(g) \mathbb{P}(\mathcal{B}, \mathcal{H} \mid N, S, \mu) \\ &\propto g^{-(\alpha+1)} \exp(-\beta g^{-1}) \\ &\quad g^{-\sum_{i=0}^{B-1} \mathbb{1}_{o_i \neq i}} \\ &\quad \exp \left(-g^{-1} \sum_{l=0}^{2B} \sum_{j=0}^{p-1} \binom{k_l}{2} N_j^{-1} |\Delta_l \cap \Delta_j^{(N)}| \right) , \end{aligned}$$

which means that the posterior is

$$g \mid N, S, \mu, \mathcal{B}, \mathcal{H} \sim \Gamma^{-1} \left(\alpha + B - D , \beta + \sum_{l=0}^{2B} \sum_{j=0}^{p-1} \binom{k_l}{2} N_j^{-1} |\Delta_l \cap \Delta_j^{(N)}| \right) . \quad (3.8)$$

This ends the description of the four conjugate priors used for N, S, μ, g . They will be used in the final Gibbs sampler to quickly update the posterior of these variables of interest, provided $\mathcal{B}, \mathcal{H}$ are observed.

3.3 Data augmentation with the past coalescent history

Under the assumption of an infinite alleles model with constant effective population size N and constant mutation rate μ , the distribution of the past history of a sample of n genes taken at a single point in time can be efficiently sampled using the equivalence with the *Hoppe's urn process* (Durrett 2008). Yet, when sequences are *heterochronous*

– i.e. have been sampled through time instead of at a single point in time – and when the population size is not constant anymore, an alternative strategy is needed.

Recall that $H_i \in \mathbb{R}^+$ is the death time of a focal individual i , and that $O_i \in \{0, 1, \dots, i\}$ is the death output. Death can happen either through coalescence with other lineages ($O_i = j < i$), or through mutation ($O_i = i$). We aim here at sampling death information (H_i, O_i) of each sequence in turn, conditioned on everything else, i.e. when $N, S, \mu, g, \mathcal{A}, \mathcal{B}, H_{-i}, O_{-i}$ are fixed.

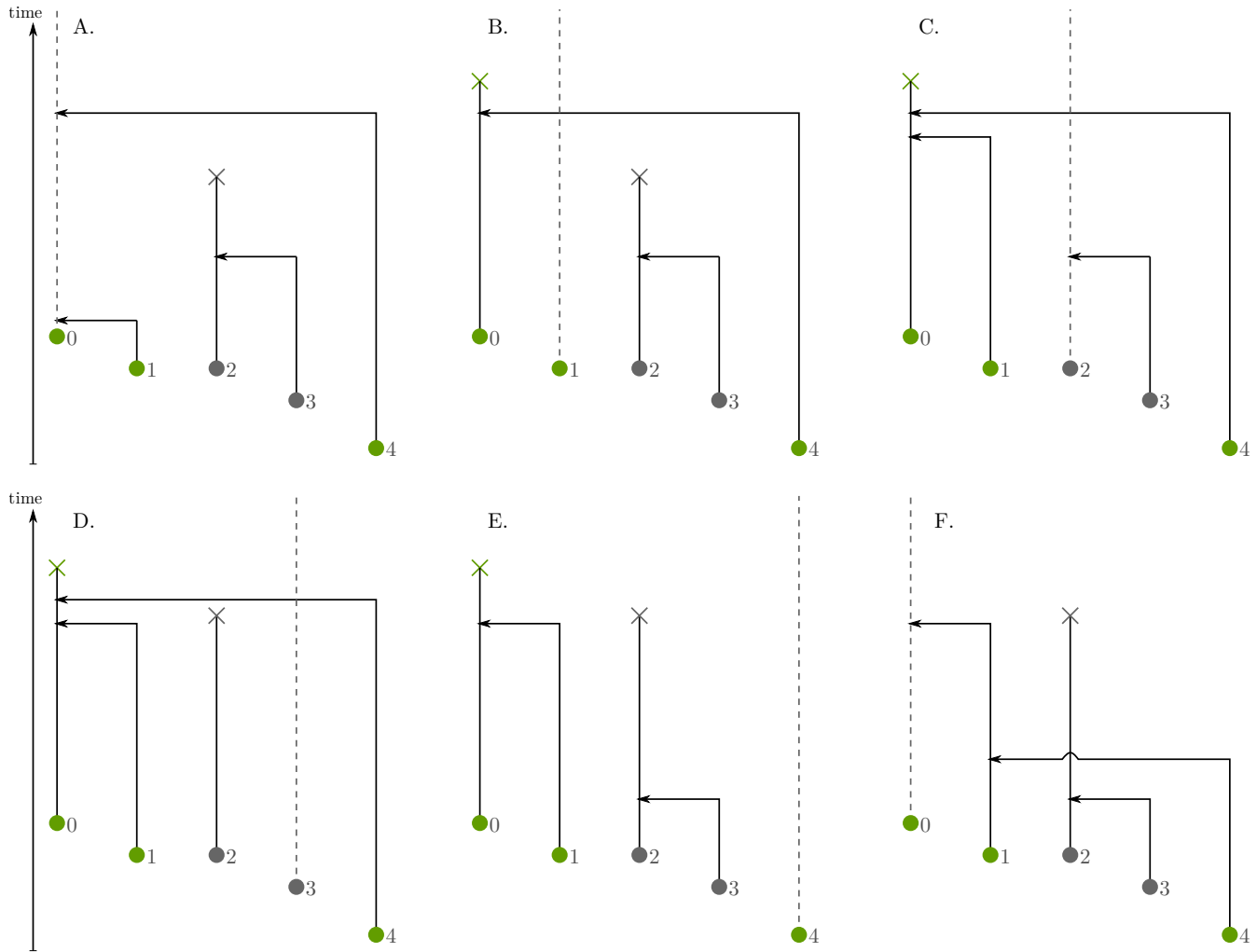


Figure 2: Gibbs sampling approach for simulating the past history of a sample given the allele partition. A-F, Each leaf is considered in turn, and its time of extinction is sampled given the rest of the coalescent history is fixed.

In a standard coalescent process, one can draw (H_i, O_i) from left to right: if a focal lineage i sees k_t other lineages already drawn to the left, at time t , it coalesces with one of them at rate $k_t(N_t g)^{-1}$, or finds a mutation at rate μ . Yet, when imposing our conditioning, only a fraction of these events leads to the known allele partition $\mathcal{A}$ and is compatible with the known coalescent history (H_{-i}, O_{-i}) . In particular, the allele partition and past coalescent history excluding i reveal that (i) lineage i dies through a coalescent event if and only if it can coalesce with an other lineage to the left, and (ii) lineage i cannot die before being sampled, nor before reaching the very last coalescence of other lineages with itself, i.e. $H_i \geq m_i := \max(\{b_i\} \cup \{H_j, j > i \text{ such that } O_j = i\})$.

A first strategy to draw (H_i, O_i) conditioned on everything else would thus consist in drawing (H_i, O_i) without conditioning, while subsequently rejecting simulations which outcome is incompatible with $\mathcal{A}, \mathcal{O}_{-i}, \mathcal{H}_{-i}$. I take here

the following alternative approach to avoid rejecting too many simulations. On all intervals $\Delta_l = (t_l, t_{l+1})$ where the total number of lineages k_l remains constant and where $t_l \geq m_i$, the probability that H_i falls within the interval conditioned on everything else is computed,

$$\begin{aligned}
 \mathbb{P}(H_i \in \Delta_l \mid \mathcal{A}, \mathcal{B}, H_{-i}, O_{-i}) &\propto \mathbb{P}(H_i \in \Delta_l, \mathcal{A} \mid \mathcal{B}, H_{-i}, O_{-i}) \\
 &= \mathbb{P}(H_i \in \Delta_l \mid \mathcal{B}, H_{-i}, O_{-i}) \mathbb{P}(\mathcal{A} \mid \mathcal{B}, H, O_{-i}) \\
 &= \mathbb{P}(H_i > t_l, H_i < t_{l+1} \mid \mathcal{B}, H_{-i}, O_{-i}) \sum_{O_i} \mathbb{P}(O_i, \mathcal{A} \mid \mathcal{B}, H, O_{-i}) \\
 &= \mathbb{P}(H_i > t_l \mid \mathcal{B}, H_{-i}, O_{-i}) \mathbb{P}(H_i < t_{l+1} \mid \mathcal{B}, H_{-i}, O_{-i}, H_i > t_l) \frac{Ng\mu \mathbb{1}_{o_i=i} + k_a^{<i} \mathbb{1}_{o_i \neq i}}{Ng\mu + k_l} \\
 &= \mathbb{P}(H_i > t_l \mid \mathcal{B}, H_{-i}, O_{-i}) \left(1 - e^{-(\mu + k_l(Ng)^{-1})(t_{l+1} - t_l)}\right) \frac{Ng\mu \mathbb{1}_{o_i=i} + k_a^{<i} \mathbb{1}_{o_i \neq i}}{Ng\mu + k_l} \quad (3.9) \\
 &=: w_l,
 \end{aligned}$$

where $k_a^{<i}$ denotes the number of living lineages to the left of i belonging to the same allele a as i .

The above formula is used to recursively compute from bottom to top the weights w_l associated to all intervals Δ_l above m_i . Once these have been computed, we have access to, and can sample from, $\mathbb{P}(H_i \in \Delta_l \mid \mathcal{A}, \mathcal{B}, H_{-i}, O_{-i}) = w_l / \sum_k w_k$. Note in addition that, if lineage i satisfies $o_i \neq i$, then only intervals from time m_i up to time $M_i := \max H_{-i}$ matter, since it must coalesce before the mutation is found. If lineage i dies through a mutation, i.e. $o_i = i$, then intervals from time $m_i = \max H_{-i}$ up to ∞ must be weighted, since the lineage cannot die before everybody else has coalesced into itself.

Once the interval on which the death event happens has been drawn, it remains to draw from $\mathbb{P}(H_i \in dt \mid H_i \in \Delta_l)$, which corresponds to an exponential distribution with rate $(\mu + k_l(Ng)^{-1})$ conditioned on happening on Δ_l . Further, $O_i = i$ if the lineage must die through a mutation, or O_i is a uniformly chosen lineage $j < i$, in the same allele as lineage i , living on interval Δ_l . The procedure for drawing (H_i, O_i) is summarized in Algorithm 1 and illustrated in Figure 2.

Algorithm 1 Drawing a realization of $\mathbb{P}(H_i, O_i \mid \mathcal{A}, \mathcal{B}, H_{-i}, O_{-i}, N, S, \mu, g)$

Input:

- Observed allele partition and sampling history $(\mathcal{A}, \mathcal{B})$,
- Focal lineage number i and fixed coalescent history for all other lineages (H_{-i}, O_{-i}) ,
- Parameters N, S through time and μ, g fixed.

Output: A realization of (H_i, O_i) conditioned on everything else.

1. Compute

$$\begin{aligned}
 m_i &= \max(\{b_i\} \cup \{H_j, j > i \text{ such that } O_j = i\}) \\
 \text{and } M_i &= (\max H_{-i}) \mathbb{1}_{o_i \neq i} + \infty \mathbb{1}_{o_i = i}
 \end{aligned}$$

2. Explore intervals, from time m_i up until M_i and for each interval Δ_l :

- (a) record the count of k_l , the total number of lineages alive on the interval,
- (b) record the list $L_a^{<i}$ of all lineages $j < i$ from the same allele a as lineage i alive in the interval,
- (c) record the weight w_l using Equation (3.9).

3. Draw the interval in which the event occurs, and then the specifics of the event:

- (a) Draw the interval Δ_l according to the weights computed at the previous step,
 - (b) Draw H_i , from an exponential distribution with rate $\mu + k_l(Ng)^{-1}$ conditioned on happening on Δ_l ,
 - (c) Draw O_i , a uniformly chosen lineage in the list $L_a^{<i}$.
-

3.4 Summary of the Gibbs sampler

The final Gibbs sampler is a simple MCMC that is initialized using the priors of N, S, μ, g , before relying on repeated updates of the four variables $N, S, \mu, g, \mathcal{H}$, using their conditional probabilities. Algorithm 2 summarizes these steps.

Algorithm 2 Gibbs sampling of the target distribution $\mathbb{P}(N, S, \mu, g | \mathcal{A}, \mathcal{B})$

Input:

- Observed allele partition and sampling history $(\mathcal{A}, \mathcal{B})$,
- Number of steps n of the MCMC,
- Prior hyperparameters (λ, χ, ψ) for N , (α_S, β_S) for S , (α_μ, β_μ) for μ , (α_g, β_g) for g .

Output: A posterior sample $(N^{(l)}, S^{(l)}, \mu^{(l)}, g^{(l)})_{l=1}^n$.

1. Initialization:

- (a) Fix $\forall i \in \{0, 1, \dots, B-1\}$, $H_i^{(0)} = b_i$ and $O_i^{(0)} = \min\{j \in a_i\}$.
- (b) Draw $\forall j \in \{0, 1, \dots, p-1\}$, $N_j^{(0)} \sim \mathcal{GIG}(\lambda, \chi, \psi)$,
- (c) Draw $\forall j \in \{0, 1, \dots, p'-1\}$, $S_j^{(0)} \sim \Gamma(\alpha_S, \beta_S)$,
- (d) Draw $\mu^{(0)} \sim \Gamma(\alpha_\mu, \beta_\mu)$,
- (e) Draw $g^{(0)} \sim \Gamma^{-1}(\alpha_g, \beta_g)$.

2. Chain: for l going from 1 to n ,

- (a) Use Algorithm 1 to update, $\forall i \in \{0, 1, \dots, B-1\}$, $(H_i^{(l)}, O_i^{(l)})$ using $N^{(l-1)}, S^{(l-1)}, \mu^{(l-1)}, g^{(l-1)}$,
 - (b) Use Equation 3.5 to update N , i.e. draw $\forall j \in \{0, 1, \dots, p-1\}$, $N_j^{(l)}$ using $\mathcal{H}^{(l)}, S^{(l-1)}, g^{(l-1)}$,
 - (c) Use Equation 3.6 to update S , i.e. draw $\forall j \in \{0, 1, \dots, p'-1\}$, $S_j^{(l)}$ using $\mathcal{H}^{(l)}, N^{(l)}$,
 - (d) Use Equation 3.7 to update μ , i.e. draw $\mu^{(l)}$ using $\mathcal{H}^{(l)}$,
 - (e) Use Equation 3.8 to update g , i.e. draw $g^{(l)}$ using $\mathcal{H}^{(l)}, N^{(l)}$,
 - (f) Record $(N^{(l)}, S^{(l)}, \mu^{(l)}, g^{(l)})$.
-

In the next Section, I validate the behaviour of this MCMC on simulated datasets before applying it to empirical datasets in Section 5.

4 Numerical validation of the method

4.1 Past coalescent history

I first aim to validate the procedure described in Section 3.3 and the implementation of Algorithm 1. To do so, I wrapped Algorithm 1 in a minimalist Gibbs sampler aiming at sampling from $\mathbb{P}(\mathcal{H} | \mathcal{A}, \mathcal{B}, N, S, \mu, g)$. I fix $\mathcal{B}, \mathcal{A}$ as well as all parameters of the model N, S, μ, g . I then use a simplified version of the MCMC described as Algorithm 2, where all updates concerning N, S, μ, g are skipped. To draw one observation of $\mathcal{H}$, I performed $n = 50$ complete cycles of leaf updates, and kept only the last state reached by the MCMC.

I compare the distribution obtained using this procedure with the distribution of $\mathcal{H}$ obtained by a naive rejection algorithm, consisting in simulating the coalescent process backwards in time, while rejecting outcomes that do not satisfy $\mathcal{A}$. The distributions are compared based on summary statistics computed on 10^4 samples drawn in both distributions: (i) the proportion of samples having a mutation in successive death events, as well as (ii) the distribution of death times. Note that the dataset must be small, for the rejection algorithm very quickly becomes computationally too intensive to be used. Figure 3 illustrates the perfect agreement between both distributions,

on a toy dataset with $N = 10$, $g = 0.1$, $\mu = 1.5$, and two alleles respectively joining individuals sampled at times $(0, 0.2, 0.5)$ and $(0.3, 0.7)$.

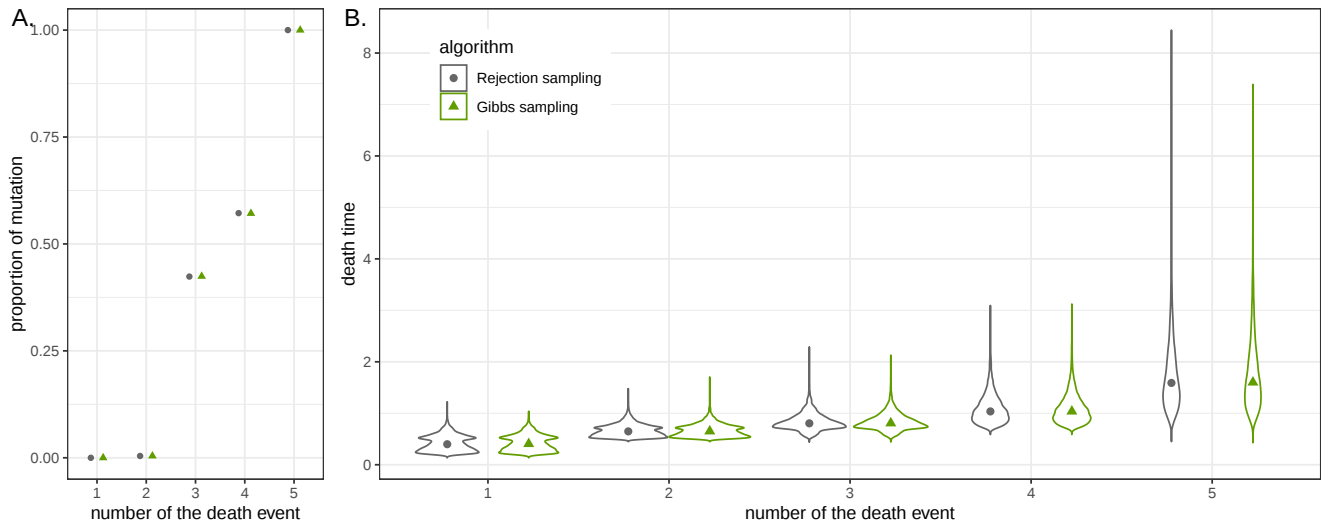


Figure 3: Comparison of the distribution of $\mathcal{H}$ conditioned on $\mathcal{A}$ obtained using a naive rejection algorithm or a custom Gibbs sampler relying on Algorithm 1. The number of the death event in x-axis refers to an order by increasing death time. A. Proportions of mutations in each death event. B. Distributions of death times.

4.2 Simulation-based calibration

The MCMC implementation of Algorithm 2 is further validated against simulated data using the Simulation-Based Calibration (SBC) method described by Talts et al. (2018) and summarized hereafter.

First, priors are fixed as follows, with hyperparameter values ensuring that the number of samples remains relatively small. The effective population size is piecewise-constant over $p = 2$ intervals, with $N_0, N_1 \sim \mathcal{GIG}(\lambda = 4, \chi = 0, \psi = 0.08)$ respectively over intervals $(0, 20)$ and $(20, +\infty)$. The sampling intensity is piecewise-constant over $p' = 3$ intervals, with S_0, S_1 having a $\Gamma(4, 1000)$ prior respectively over intervals $(0, 10)$ and $(10, 40)$ and $S_3 = 0$ on $(40, +\infty)$. The mutation rate and generation time are respectively assigned a prior $\mu \sim \Gamma(4, 400)$ and $g \sim \Gamma^{-1}(10, 10)$.

Second, 10^4 parameter sets are sampled from these distributions and for each parameter set, the sampling history $\mathcal{B}$ as well as the allele partition $\mathcal{A}$ are sampled according to the model.

Third, for each simulated dataset, the posterior distribution of N, S, μ, g conditioned on $\mathcal{A}, \mathcal{B}$ is sampled using the Gibbs sampler described as Algorithm 2, while using the same priors that were used for the simulation. I ran the MCMC for a total of 10^4 steps, discarded a burn-in of 10^3 steps at the beginning and recorded one state every 100 steps over the remaining steps.

Finally, Figure 4A shows the proportion of datasets p_α for which a credible interval with level α of the posterior distribution contains the true simulated data, for 9 values of α evenly spaced on $(0, 1)$. The good match between p_α and α indicates that the MCMC correctly samples the posterior distribution. This is further confirmed in Figure 4B, showing the histogram of the rank statistic associated with the 10^4 experiments. Here, the rank statistic associated to one experiment refers to the number of samples from the posterior being less than the true value. Under the null hypothesis that we are sampling the true posterior distribution, the histogram of rank statistics should be uniform, as illustrated in Figure 4B (Talts et al. 2018).

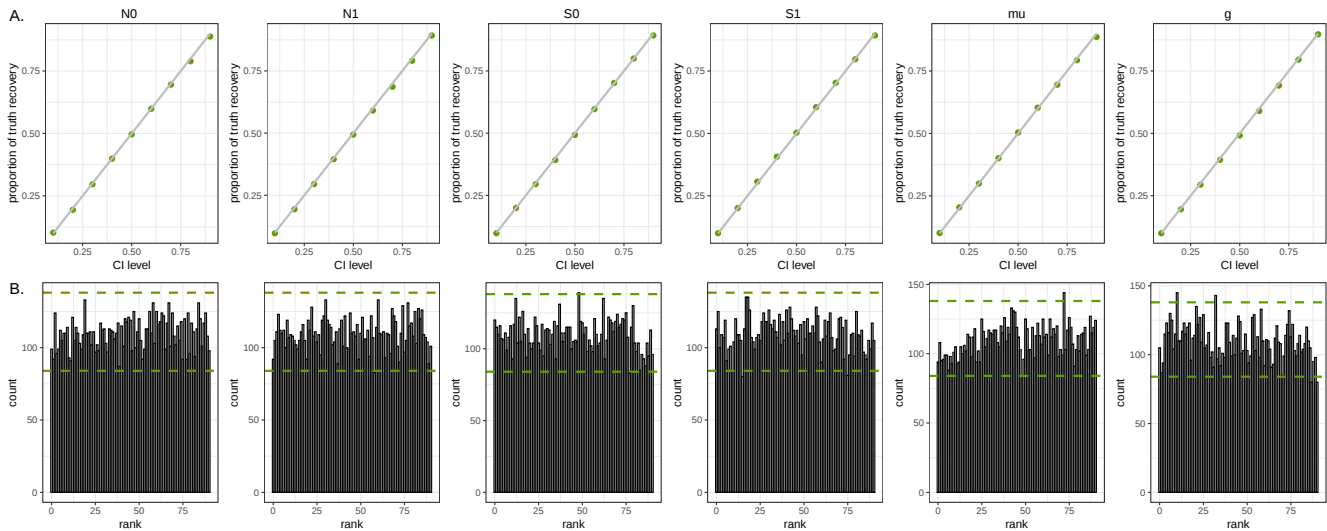


Figure 4: Results of the SBC analysis described in the main text, validating the Gibbs sampler. A. Proportion of datasets which $100\alpha\%$ posterior credible interval recovers the true parameter, for different values of α . B. Histogram of rank statistics. Horizontal dashed lines indicate the 99% CI of the bar heights if the histogram is uniform.

4.3 Running time assessment

I now turn to an assessment of the running time of the method on realistic datasets. I simulated datasets using a timeline cut into $p = p' = 5$ intervals with varying N and S values, while fixing the same hyperparameters on all intervals, so as to get datasets with total sample size B regularly spaced on a log scale between 10 and 2500. On each of these, I ran 10^4 steps of the Gibbs sampler, discarded the first 10^3 steps, and recorded the running time and posterior samples.

Let us focus first on the running time of each of the different updates. Since for each of B sequences, the update of the death event requires to compute the weights associated to a number of intervals of the order of B , the update of the coalescent history is expected to scale in $O(B^2)$ and to be the bottleneck of the MCMC. Figure 5A presents estimates of the running time depending on B , using the code released along this article on a laptop. It confirms that the update of the coalescent history – and so, a step in the MCMC – scales in $O(B^2)$.

Running a MCMC moreover requires to perform these updates repeatedly during a certain number of steps, in order to (i) escape the burn-in phase of the MCMC; and (ii) collect enough samples from the posterior to characterize it. When the samples collected through time are highly correlated, it is said that the chain is *mixing poorly*, and more steps are typically required. In order to provide a rough idea of the expected mixing behaviour on simulated datasets, I computed estimates of the effective sample size of $(N_j)_{j=0}^{p-1}$, $(S_j)_{j=0}^{p'-1}$, μ , g . The results are shown in Figure 5B. Combined with the running time assessment, it conveys the idea that the current implementation, without further approximation or numerical optimization will likely not be useful to process more than $\sim 10^4$ sequences.

Having in mind the rough behaviour of the method, I illustrate its use in the next Section on empirical datasets encompassing $\sim 10^3$ sequences.

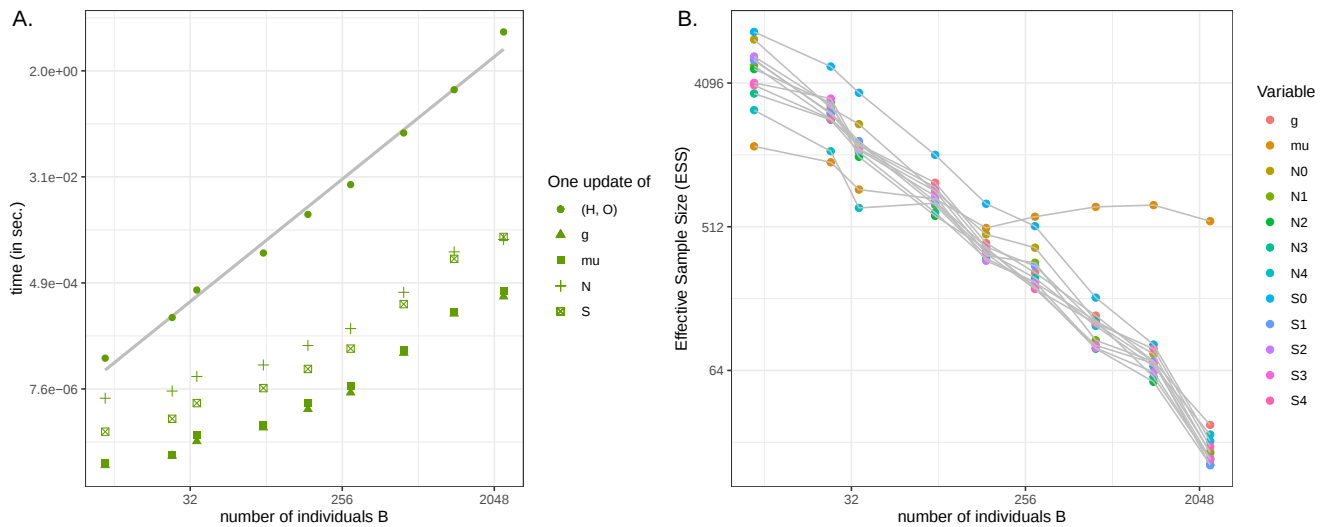


Figure 5: Estimating the running time of the method on simulated datasets. A. The running time of one update of each of the four variables shows that the update of the coalescent history is the bottleneck, that scales in $O(B^2)$. B. The ESS of μ, g and each of the piecewise-constant values of S and N as a function of the dataset size suggests that reasonable (i.e. > 100) ESS values for datasets up to $B \sim 10^3$ can be obtained using $\sim 10^4$ MCMC steps.

5 Empirical application

5.1 Data collection and preprocessing

Sequences collected in Switzerland (CH), Germany (DE), France (FR) and Italy (IT) between December 1st 2019 and June 1st 2020 have been downloaded on the GISAID website on the 7th of June 2021, while requiring the three options of (i) *complete* sequences, (ii) *high coverage* sequences, and (iii) complete collection date. I additionally downloaded GISAID reference genome *Wuhan/WIV04/2019* (accession id EPI_ISL_402124) for use in the data preprocessing steps. All people involved in sequence data collection are acknowledged in Supp. Mat. D.

Additional removal of sequences was performed on the basis of either one of these two criteria being fulfilled, (i) sequences were not extending from position 250 to 29700 of the reference genome, (ii) the proportion of ambiguously resolved bases was higher than 10%. The remaining 1284 sequences from CH (1673 in DE, 1919 in FR, 1314 in IT) were further classified into 627 alleles (886 in DE, 1166 in FR, 750 in IT) using a custom pipeline available as part of the provided code and detailed in Supp. Mat. A.

5.2 MCMC specifications

The timeline of the analysis is fixed for N and S . It extends from the 1st of June 2020 to the 13th of January 2020, cut into successive intervals of 4 weeks each. I assume that μ and g are known from other studies and are not the focus of the inference. The mutation rate μ is fixed to 0.065 mutations per genome per day, corresponding to 8×10^{-4} mutations per nucleotide per year, and the generation time g is fixed to 5 days.

Finally, hyperparameters values for N and S are chosen so as to not be too informative, using a quick back-of-the-envelope reasoning around Equations (3.5) and (3.6). We imagine what could happen over a time period with few data, as happens in the beginning of the dataset. If the order of magnitude of N is approximately 10^4 , and we roughly believe that one out of 5×10^3 individuals is sequenced in reality, because each individual

lives for 5 days in the model, it corresponds to sequencing one out of 2.5×10^4 individuals, i.e. $S \sim 4 \times 10^{-5}$. If we now imagine observing this situation over a time period $\Delta \sim 10$ days, we would observe on expectation 4 births. Using Equation (3.5) helps fix the prior for $(N_j)_{j=0}^{p-1}$ values, which are $\mathcal{GIG}$ distributed with hyperparameters $(\lambda, \chi, \psi) = (4, 0, 8 \times 10^{-4})$. Then, using Equation (3.6) helps fix the prior for $(S_j)_{j=0}^{p'-1}$ values, which are Gamma distributed with hyperparameters $(\alpha_S, \beta_S) = (4, 10^5)$.

I ran the Gibbs sampler for 10^4 steps, discarded the first 10^3 steps as burn-in and used the remaining 9×10^3 steps for posterior inference. The code provided along with this article generates the traces and auto-correlation functions of all parameters. These are inspected visually and the ESS values of all parameters are higher than 100.

5.3 Results

The output of the Gibbs sampler on each country is a posterior sample of $(N_j)_{j=0}^{p-1}$ and $(S_j)_{j=0}^{p'-1}$ values through time over the fixed timeline. Figure 6 illustrates the input data (to the left) together with the output posteriors of N and S (to the right). In particular, the trajectories of N and S tell a similar story in the four countries. The outbreak slowly started in early 2020 and reached its peak around March-April 2020, before quickly decreasing in May 2020. France appear on this Figure to have experienced the longest outbreak. In all four countries, the sampling intensity increased prior to the peak of the epidemic and slowly decreased thereafter.

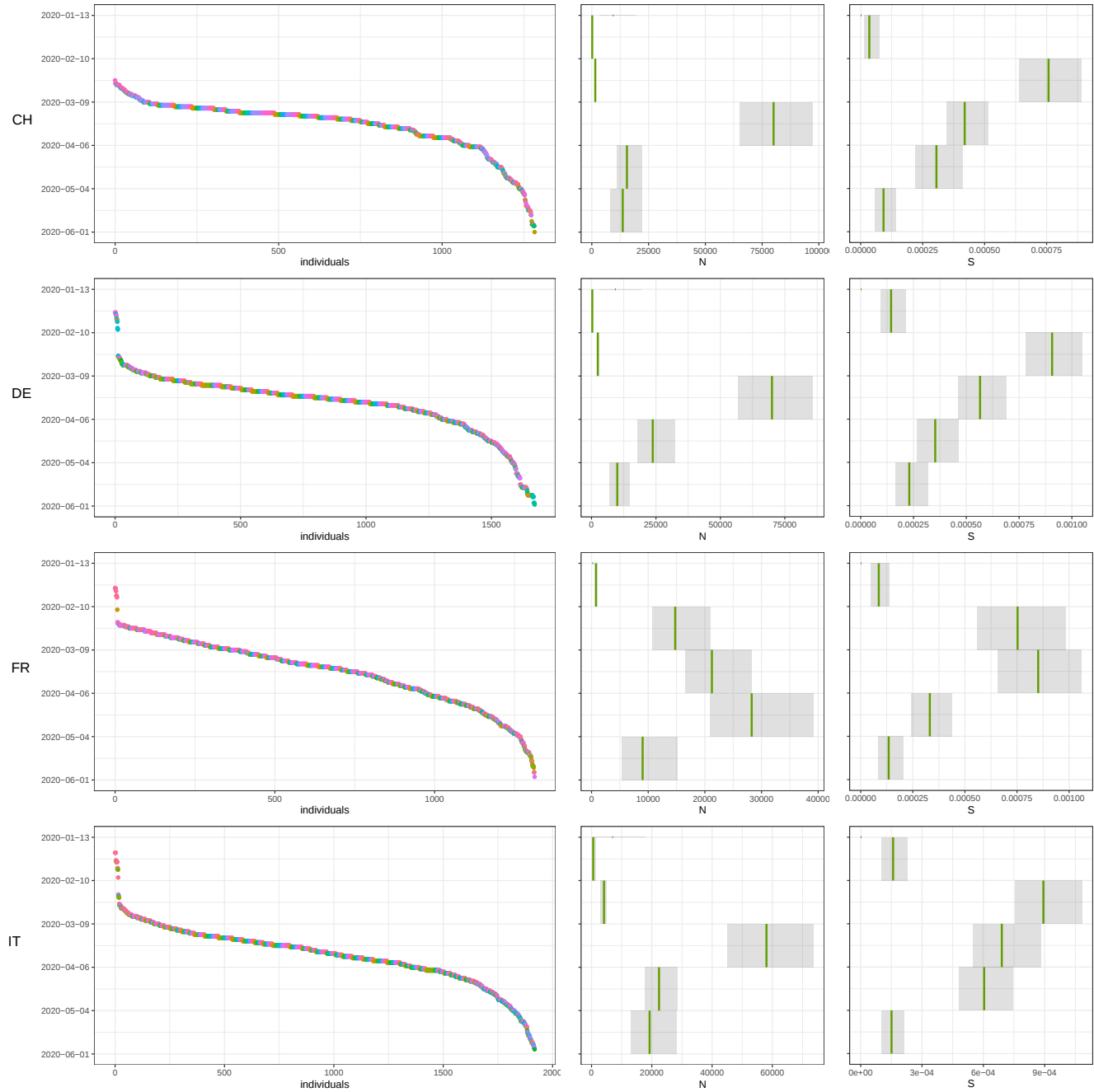


Figure 6: Results of the inference on SARS-CoV-2 data in four European countries during the first wave of the epidemic. CH: Switzerland, DE: Germany, FR: France, IT: Italy. First panel to the left, the raw data consists in an allele partition of sequences sampled through time, where different colors correspond to different alleles. Second and third panels, the posterior sample of N, S , with the median shown in green and a 95% posterior interval shown in gray.

6 Discussion

In this manuscript, I have presented a new Bayesian inference method relying on a Gibbs sampler to sample the posterior distributions of effective population sizes and sampling intensities through time, from the knowledge of an allele partition of sampled-through-time sequences. It relies on a coalescent framework under the infinite alleles model from population genetics, with constant mutation rate, constant generation time, and piecewise-constant effective population sizes and sampling intensities through time. Applying the method to SARS-CoV-2 sequences sampled throughout the first wave of the outbreak in Europe allows us to obtain estimates of effective population sizes, sampling intensities and mutation rate from genetic data only.

Inferred dynamics on empirical data In studies relying on a coalescent model, the usage is to focus on the inferred patterns of change through time rather than on the parameter values per se. The rationale explaining this is that values might be affected in complicated ways by various model misspecifications, among which, for example, having particular distributions of offspring numbers at reproduction, having population structure not taken into account, having a different generation time or mutation rate, or having different priors on N and S . Yet, as long as these model misspecifications do not change through time, one can trust the dynamics of the *effective* population size N_t to reflect the dynamics of the true population size. Although I have followed this convention so far throughout the manuscript, one can notice here that the orders of magnitude of inferred *effective* values seem nevertheless to roughly match what is known from the case count record only (shown in Supp. Mat. B).

In terms of dynamics as well, the patterns of effective population sizes appear compatible with what is known about the first wave of the outbreak in these countries. The number of infected individuals starts increasing exponentially early in 2020, reached a peak in March-April, before decreasing in response to policy measures taken – different versions of a lockdown have been implemented in the four countries around this time. Interestingly, the sampling intensity, on the other hand, starts increasing earlier during the epidemic, when the research effort started growing around SARS-CoV-2 genetics but the case counts were not so high yet. It then decreased again following the peak of the outbreak.

Opening future modeling opportunities with allele data Overall, the results on empirical data illustrates the use and applicability of the method on large real-world datasets. Yet, the current model formulation still lacks a few realistic ingredients before it can be used to learn new aspects of an epidemic.

First and foremost, it does not take into account population structure, a feature that is likely to be present in the empirical dataset and violates the model assumptions. Further work is needed to properly incorporate different demes characterized by different population sizes and sampling intensities, exchanging sequences through migrations among demes. This will likely be the subject of future work aiming to infer population structure and population dynamics using the allele partition. Integrating over the hidden coalescent history will be complicated a bit by migrations between demes, but could be envisioned within a closely related inference framework.

Second, it could be interesting to use smoothing priors for N and S to ensure that these two functions of time do not show huge steps from a time period to the next. This will as well be the focus of future developments of the method, that could build on related work in phylodynamics (Karcher et al. 2020; Parag et al. 2021). It would seem especially interesting for N to root smoothing priors on mechanistic assumptions of population dynamics, such as considered e.g. in other epidemiological models (Cori et al. 2013).

Last, the boundaries of the intervals on which N and S remain constant could be unknown, with or without

prior distribution. This would allow the timeline to be informed by the data, and could lead as well, in case it is stochastic and averaged over the posterior, to smoother N and S trajectories. This could build on related work in a phylodynamic context under a birth-death model (Stadler 2011).

Further theoretical work is also required before this kind of model can be applied to larger – already available – datasets. Indeed, while the initial hope of bringing back into fashion the infinite allele model was to be able to process very large genetic datasets, it is in the end not realistic to use the current implementation of the method with more than $\sim 10^4$ sequences. At least four directions can be envisioned to improve on this objective in the future: (i) trying to optimize the sampling step of the coalescent history, which is the current bottleneck of the computation, so that it scales closer to $O(B)$ than $O(B^2)$, possibly using well designed approximations; (ii) turning to a maximum likelihood framework, possibly relying on an expectation-maximization algorithm to either completely bypass the need for posterior sampling through MCMC, or at least use it to drastically speed-up the burn-in of the MCMC; (iii) turning to a variational Bayes method properly designed to sample the posterior in our model; and (iv) optimizing the implementation of Algorithms 1 and 2, where the most straightforward idea would be to parallelize MCMC chains for example.

When is the use of a simplified mutation process pertinent ? A natural question arises when thinking about the difference between this method and currently used coalescent-based method in phylodynamics, namely *How do these compare in terms of statistical power ?* Or to rephrase it in more technical terms: *what signal do we loose by forgetting about the coalescent history above the first mutation ?*

The answer will likely depend on the mutation rate and on the temporal scale that one is interested in studying. In the limit of very high mutation rate compared to the temporal scale under study, only singletons are observed, bearing no useful signal, while in the limit of very low mutation rate, only one allele is observed, again bearing no useful signal to infer N and S .

In between, there is a setting with an intermediate mutation rate, such that alleles extend for some time across the focal time-frame, providing signal to reconstruct N and S . However, even in this optimal setting for the method, data is being discarded so that all signal on the internal branches linking different alleles is lost as compared to coalescent-based methods integrating over the full unknown tree. When does the trade-off between computation time and precision turn in favor of using a simpler infinite alleles model ? Quantifying this more precisely on simulations would be a valuable contribution.

Moreover, when one is not interested in estimating μ , the allele partition could be chosen so as to tend to an optimal setting as described above. In principle, the allele partition of the set of sequences could be obtained by applying any another equivalence relation, e.g. *being similar only on a given subsequence*, or *having a similar amino-acid sequence*. These could be used to decrease the number of alleles in the dataset.

In between the two above-mentioned extremes of (i) using an infinite alleles model or (ii) using a finite site model with a substitution model, lies also the opportunity to revive another assumption from population genetics, namely the *infinite sites model*. Under this model, each mutation hits a new site along the sequence, and thus a more precise phylogenetic history between sequences can be reconstructed. An *Importance Sampler* algorithm has been proposed by Stephens and Donnelly (2000) for simulating the past history under a coalescent with an infinite sites model. A more thorough comparison of this inference framework against another inference method relying on the infinite sites model could as well be a relevant contribution to the field.

Finally, this manuscript also opens the way to develop better approximations aiming at taking into accounts more sequences in scenarios with high numbers of duplicates (Boskova and Stadler 2020). This line of research could benefit from the joint use of different mutation models clearly distinguished in distinct parts of the evolutionary

tree of sequences, while still relying on a unique underlying population dynamics model, such as e.g. a coalescent model with discrete population size shifts.

Conclusion Bringing back into fashion old population genetics simplifications of the mutation process and incorporating them into modern statistical frameworks could play a key role in better surveying and understanding population demographics and structure from molecular data. I hope that this work will participate in a current trend towards adapting computer-intensive phylodynamics methods for use with datasets characterized by low genetic diversity such as the current SARS-CoV-2 outbreak.

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A Details on the numerical method

Pipeline for creating the allele partition

Creating the allele partition is a central step in the method, for this will be the raw data taken as input by the Gibbs sampler. To build it, I relied on the following pipeline:

1. cut the master reference sequence from position 250 to 29700, and put this one as the first element of a list of reference sequences.
2. initialize an empty list of alleles.
3. Then iterate, for each other sequence, the following steps,
 - (a) look for a pattern close to the 30 first nucleotides of the master reference into the first 500 nucleotides of each sequence, to get the beginning of the window, and discard the very few sequences where the beginning could not be found.
 - (b) keep as the focal sequence the 29450 nucleotides following the beginning of the window.
 - (c) record the collection of snps differing in the focal sequence as compared to the reference sequence.
 - if it is smaller than 100 snps long, we consider it to be the *compressed representation of the sequence* against this reference.
 - if not, compare to the next reference sequence in the list.
 - (d) if no reference sequence is less than 100 snps different than the sequence, it is likely to have a feature of its own (typically, a gap). Add this sequence to the list of reference sequences.
 - (e) Look for the same compressed representation of the sequence in the list of alleles and add the sampling date of this sequence to the list of sampling dates of the allele.

This pipeline is implemented in the script `raw_to_datasets.ml`, available as part of the code associated to this article.

MCMC output analysis

MCMC samples output by the *Ocaml* code are then analyzed using scripts written in the *R* programming language. Post-processing steps rely in particular on the following packages to work,

- the very versatile *ggplot2* and *cowplot* to produce figures,
- *LaplacesDemon* to compute ESS values using traces of scalar values,
- *forecast* to compute ACF or PACF using traces of scalar values,

The R post-processing scripts are also available as part of the code released along this article.

Generation of random variables

Random variables distributed according to a *GIG* distribution are sampled using a personal implementation of Hörmann and Leydold (2014)'s algorithm in the programming language *Ocaml*. It is naive translation of the very handy R package *GIGrv* by the same authors.

B Case count data in the four countries

Case count numbers in the four countries of interest have been downloaded from the WHO website on the 16th of June 2021. I plot here the number of samples, number of sequences, and sampling fraction through time over the time frame of the first wave of the outbreak, for comparison with the order of magnitudes of N and S presented in the main text.

Note here that the *sequencing fraction* plotted below corresponds to the number of sequences divided by the sum of the number of sequences and number of samples. Indeed, the number of sequences in the early time period is sometimes higher than the number of samples, and I thus considered that the sequences were not included in the case count.

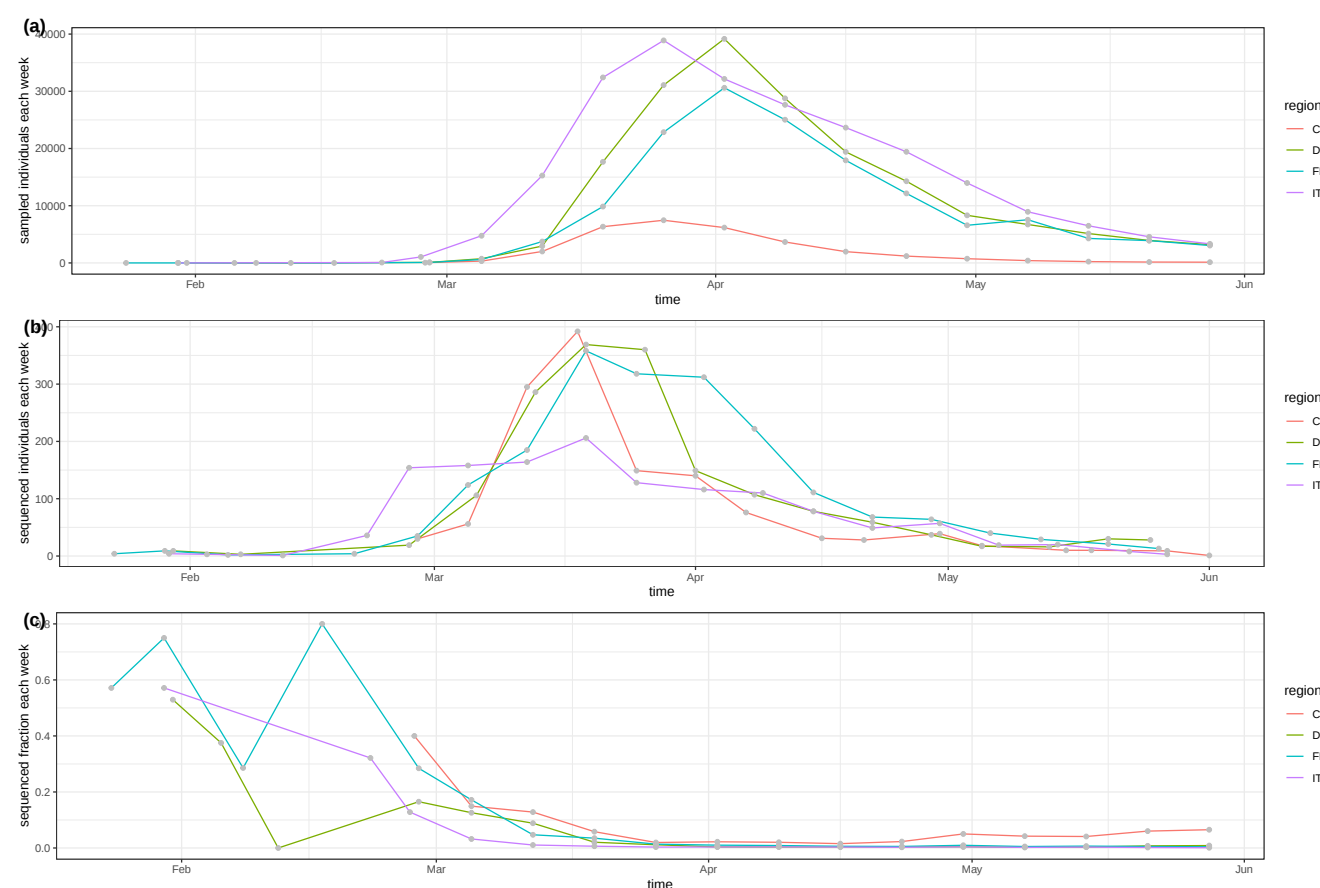


Figure 7: Information on the number of infected, and the number of sequences, sampled through time in CH, DE, FR, and IT.

C Gibbs sampler code documentation

This Section aims at making the code released along this article more easily comprehensible, by shortly presenting in plain text the strategy to store different data, together with key functions to manipulate the data.

Format of key quantities

By default, all lists are ordered in time ascending order (that is, first element on top of the list at present time 0).

listS or listN list of ordered (t_j, S_j) , where S_j is valid on $[t_j, t_{j+1})$.

an allele or a lineage an ordered list of either (b_i) belonging to the same allele/lineage, if the individuals are not numbered, or an ordered list of (n_i) if the individuals have been numbered.

alleles or lineages a list of (ordered lists of (b_i)) or a list of (ordered lists of (n_i)) depending again on whether individuals are numbered or not.

array_individuals an array of information about individuals, with element number i referring to individual number i . Each element is a tuple (b_i, h_i, o_i, a_i) where b_i is the birth time, d_i is the death time, o_i is the number of the individual into which this individual coalesces (or $o_i = i$ if there is a mutation), and a_i is the ID number of the allele this individual belongs to.

array_alleles an array of information about alleles. Each element number a is the list of ID numbers of all individuals belonging to allele a .

samp_history an ordered list of (b_i, i) where i is the ID number of the newly born individual at time b_i .

coal_history an ordered list of (h_i, i, o_i) where i is the ID number of the individual dying at time h_i by coalescence into lineage o_i (or by a mutation if $o_i = i$).

all_events a list of all events ordered in time ascending order, with lots of other interesting quantities attached to the interval between this event and the following, such as : the number of lineages alive, the current values of N , the current value of S , the total rate at which an event happens on this interval for a given individual, etc...

intervals the ordered in DESCENDING order list of $(t_s, t_e, k, k_a^{<i}, \tau, w)$ where t_s is the time of start, t_e is the end time, k is the total number of lineages alive on the interval, $k_a^{<i}$ is the number of individuals from allele a , to the left of individual i , being alive on the interval, τ is the total rate at which death happens and w is the weight of the interval, i.e. the probability that the death event of the focal individual falls in this interval, conditioned on $\mathcal{A}$. Note that the reason it is in descending order is that it is built by reading the list of **all_events** in ascending order, and the next steps consisting in drawing the interval does not require any specific order.

Roles of some key functions

Here is now an overview of some of the key operations we need to perform for Gibbs sampling steps.

simulation if needed to get **samp_history** first using **sim_sampling_events**.

And then to get **alleles** using **sim_coal**.

pre-processing we build the `array_individuals` and `array_alleles` from the `alleles` and `samp_history`.

Gibbs sampling We need to consider in turn the following operations,

- Updating the death time of individual number i using `update_past_coal`:
requires to first build the weighted intervals with `get_intervals`,
before drawing an interval with `find_back_interval`,
simulating the death time within the interval and finally erasing the old time and inserting the new at a correct place in `all_events` using `replace_coal`.
- Updating the (N_j) values using `update_listN`, which explores the list of `all_events`, and modifies in place the N_j values.
- Updating the (S_j) values using `update_listS`, working similarly as above.
- Updating μ using `update_mu`.

D Acknowledgements for data collection

I am grateful to the following list of authors, who have contributed to the collection of SARS-CoV-2 sequences that I downloaded on GISAID. In the four tables below, you will find the authors that took part in the collection effort in, respectively, Switzerland, Germany, France and Italy over the time period I have been interested in.

We gratefully acknowledge the following Authors from the Originating laboratories responsible for obtaining the specimens, as well as the Submitting laboratories where the genome data were generated and shared via GISAID, on which this research is based.

All Submitters of data may be contacted directly via www.gisaid.org

Authors are sorted alphabetically.

Accession ID	Originating Laboratory	Submitting Laboratory	Authors
EPI_ISL_1129372, EPI_ISL_1129434, EPI_ISL_1129601, EPI_ISL_1129613, EPI_ISL_1130072, EPI_ISL_1130073, EPI_ISL_1130088, EPI_ISL_1130090, EPI_ISL_1130230, EPI_ISL_1130396, EPI_ISL_1130587, EPI_ISL_1130591, EPI_ISL_1130632			
see above	Viollier AG	Department of Biosystems Science and Engineering, ETH Zürich	Christian Beisel, Sarah Nadeau, Chaoran Chen, Ivan Topolsky, Philipp Jablonski, Lara Fuhrmann, David Dreifuss, Katharina Jahn, Rebecca Denes, Mirjam Feldkamp, Ina Nissen, Natascha Santacroce, Elodie Burcklen, Christiane Beckmann, Maurice Redondo, Olivier Kobel, Christoph Noppen, Sophie Seidel, Noemie Santamaria de Souza, Niko Beerenwinkel, Tanja Stadler
EPI_ISL_1130784	Department of Dermatology	Switzerland	Department of Biosystems Science and Engineering, ETH Zürich
EPI_ISL_1130824, EPI_ISL_1130961	Viollier AG	Department of Biosystems Science and Engineering, ETH Zürich	Christian Beisel, Sarah Nadeau, Chaoran Chen, Ivan Topolsky, Philipp Jablonski, Lara Fuhrmann, David Dreifuss, Katharina Jahn, Rebecca Denes, Mirjam Feldkamp, Ina Nissen, Natascha Santacroce, Elodie Burcklen, Christiane Beckmann, Maurice Redondo, Olivier Kobel, Christoph Noppen, Sophie Seidel, Noemie Santamaria de Souza, Niko Beerenwinkel, Tanja Stadler
EPI_ISL_1388748, EPI_ISL_1388750, EPI_ISL_1388751, EPI_ISL_1388753, EPI_ISL_1388755	University Hospital Basel, Clinical Virology	University Hospital Basel, Clinical Bacteriology	Tim Roloff, Madlen Stange, Helena MB Seth-Smith, Alfredo Mari, Karoline Leuzinger, Julia Bielicki, Manuel Battegay, Hans Hirsch, Adrian Egli
EPI_ISL_2270090	Synlab Suisse SA	Clinical Bacteriology	Tim Roloff, Madlen Stange, Helena MB Seth-Smith, Alfredo Mari, Karoline Leuzinger, Julia Bielicki, Manuel Battegay, Hans Hirsch, Adrian Egli
EPI_ISL_2367311	PSVJ	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367353, EPI_ISL_2367356, EPI_ISL_2367357, EPI_ISL_2367358, EPI_ISL_2367359, EPI_ISL_2367360, EPI_ISL_2367361, EPI_ISL_2367362, EPI_ISL_2367363, EPI_ISL_2367364, EPI_ISL_2367365, EPI_ISL_2367366, EPI_ISL_2367367, EPI_ISL_2367368	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
see above	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367369	EMS LE FOYER	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367371	ADMED	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367372	GHOL	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367375, EPI_ISL_2367376	LA SOURCE	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367377, EPI_ISL_2367378, EPI_ISL_2367379	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367381	VIDYMED EPALINGES	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367384, EPI_ISL_2367385	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367386, EPI_ISL_2367387	PSVJ	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367388, EPI_ISL_2367389	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367390	Polyanalytic SA	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367391, EPI_ISL_2367392	SYNLAB	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367393	Polyanalytic SA	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367394	GHOL	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367395	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367396, EPI_ISL_2367397	Polyanalytic SA	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367398	SYNLAB	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367399	GHOL	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367400	VIOLLIER MORGES SA	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367401, EPI_ISL_2367402	EHNV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367403	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367404	PSVJ	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367405	EHC MORGES	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367406	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367407	LA SOURCE	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367408, EPI_ISL_2367409, EPI_ISL_2367410	EHC MORGES	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367411, EPI_ISL_2367412	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367413	Polyanalytic SA	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367414	GHOL	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367416, EPI_ISL_2367417, EPI_ISL_2367418, EPI_ISL_2367419	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367420	VIDYMED EPALINGES	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367426	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367427, EPI_ISL_2367428, EPI_ISL_2367430, EPI_ISL_2367431, EPI_ISL_2367432, EPI_ISL_2367433	Polyanalytic SA	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367434, EPI_ISL_2367435, EPI_ISL_2367436, EPI_ISL_2367437, EPI_ISL_2367438	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli

EPI_ISL_2367439	Polyanalytic SA	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367440	EMS LE FOYER	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
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EPI_ISL_2367442	EHNV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367443	PSVJ	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
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EPI_ISL_2367447, EPI_ISL_2367448	PSVJ	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367449	VIDYMED EPALINGES	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367451, EPI_ISL_2367452	LA SOURCE	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367453, EPI_ISL_2367454	Polyanalytic SA	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367455	GHOL	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367456, EPI_ISL_2367457, EPI_ISL_2367458, EPI_ISL_2367459, EPI_ISL_2367460	CHUV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367461	LA SOURCE	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367462, EPI_ISL_2367463	VIDYMED EPALINGES	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
EPI_ISL_2367464	EHNV	Laboratory of genomics and metagenomics	Trestan Pillonel, Damien Jacot, Sébastien Aebly, Gilbert Greub, Claire Bertelli
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EPI_ISL_413021	Klinik Hirslanden Zurich	Institute of Medical Virology, University of Zurich	Stefan Schmutz, Maryam Zaheri, Verena Kufner, Patrick Redli, Fiona Steiner, Jon Huder, Riccarda Capaul, Andrea Zbinden, Jürg Böni, Michael Huber, Christian Ruef, Alexandra Trkola
EPI_ISL_413022, EPI_ISL_413023, EPI_ISL_413024	Division of Infectious Diseases, University Hospital Zurich	Institute of Medical Virology, University of Zurich	Stefan Schmutz, Maryam Zaheri, Verena Kufner, Gabriela Zillener, Patrick Redli, Fiona Steiner, Jon Huder, Riccarda Capaul, Andrea Zbinden, Jürg Böni, Michael Huber, Christian Ruef, Alexandra Trkola
EPI_ISL_413996, EPI_ISL_413997, EPI_ISL_413999, EPI_ISL_414019, EPI_ISL_414020, EPI_ISL_414021, EPI_ISL_414022, EPI_ISL_414023	Laboratoire de Virologie, HUG	Swiss National Reference Centre for Influenza	LAUBSCHER Florian et al.
EPI_ISL_415454, EPI_ISL_415455, EPI_ISL_415456, EPI_ISL_415457, EPI_ISL_415458, EPI_ISL_415459, EPI_ISL_415698, EPI_ISL_415699, EPI_ISL_415700, EPI_ISL_415701, EPI_ISL_415702, EPI_ISL_415703, EPI_ISL_415704, EPI_ISL_415705, EPI_ISL_415706, EPI_ISL_415707, EPI_ISL_415708	University Hospitals of Geneva Laboratory of Virology	University Hospitals of Geneva Laboratory of Virology	Laubscher F.
see above	University Hospital Basel, Clinical Virology	University Hospital Basel, Clinical Bacteriology	Hirsch, H., Leuzinger, K., Seth-Smith, H., Mari, A., Roloff, T., Egli, A.
EPI_ISL_418271	University Hospital Basel, Clinical Virology	University Hospital Basel, Clinical Bacteriology	Hirsch, H., Leuzinger, K., Seth-Smith, H., Mari, A., Roloff, T., Egli, A.
EPI_ISL_418277, EPI_ISL_418279, EPI_ISL_418280, EPI_ISL_418282, EPI_ISL_418433, EPI_ISL_418434, EPI_ISL_418438	University Hospital Basel, Clinical Virology	University Hospital Basel, Clinical Bacteriology	Hirsch, H., Leuzinger, K., Seth-Smith, H., Mari, A., Roloff, T., Egli, A.
EPI_ISL_429196, EPI_ISL_429197, EPI_ISL_429199, EPI_ISL_429200, EPI_ISL_429201, EPI_ISL_429203, EPI_ISL_429204, EPI_ISL_429206, EPI_ISL_429207, EPI_ISL_429208, EPI_ISL_429209, EPI_ISL_429210, EPI_ISL_429211, EPI_ISL_429212, EPI_ISL_429213, EPI_ISL_429214, EPI_ISL_429215, EPI_ISL_429217, EPI_ISL_429218, EPI_ISL_429219, EPI_ISL_429220, EPI_ISL_429221, EPI_ISL_429222, EPI_ISL_429223	University Hospitals of Geneva Laboratory of Virology	University Hospitals of Geneva Laboratory of Virology	Laubscher F.
see above	University Hospital Basel, Clinical Virology	University Hospital Basel, Clinical Bacteriology	Hirsch, H., Leuzinger, K., Seth-Smith, H., Mari, A., Roloff, T., Egli, A.
EPI_ISL_451668, EPI_ISL_451669, EPI_ISL_451670, EPI_ISL_451672, EPI_ISL_451673, EPI_ISL_451674, EPI_ISL_451675, EPI_ISL_451676, EPI_ISL_451677, EPI_ISL_451678, EPI_ISL_451680, EPI_ISL_451681, EPI_ISL_451682, EPI_ISL_451683, EPI_ISL_451684, EPI_ISL_451685, EPI_ISL_451688, EPI_ISL_451689, EPI_ISL_451690, EPI_ISL_451691, EPI_ISL_451692, EPI_ISL_451693, EPI_ISL_451694, EPI_ISL_451695, EPI_ISL_451696, EPI_ISL_451697, EPI_ISL_451698, EPI_ISL_451699, EPI_ISL_451701, EPI_ISL_451702, EPI_ISL_451703, EPI_ISL_451704, EPI_ISL_451705, EPI_ISL_451706, EPI_ISL_451707, EPI_ISL_451708, EPI_ISL_451709, EPI_ISL_451711, EPI_ISL_451712, EPI_ISL_451713, EPI_ISL_451714, EPI_ISL_451716, EPI_ISL_451717, EPI_ISL_451718, EPI_ISL_451719, EPI_ISL_451720, EPI_ISL_451721, EPI_ISL_451722, EPI_ISL_451723, EPI_ISL_451724, EPI_ISL_451725, EPI_ISL_451727, EPI_ISL_451728, EPI_ISL_451730, EPI_ISL_451731, EPI_ISL_451732, EPI_ISL_451734, EPI_ISL_451736, EPI_ISL_451738, EPI_ISL_451740, EPI_ISL_451741, EPI_ISL_451742, 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Maurice Redondo, Olivier Kobel, Christoph Noppen, Sophie Seidel, Noemie Santamaria de Souza, Niko Beerenwinkel, Tanja Stadler
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see above	University Hospital Zurich	Department of Biosystems Science and Engineering, ETH Zurich	Christian Beisel, Sarah Nadeau, Ivan Topolsky, Pedro Ferreira, Philipp Jablonski, Susana Posada-Céspedes, Tobias Schär, Ina Nissen, Natascha Santacrose, Elodie Burcklen, Christiane Beckmann, Maurice Redondo, Olivier Kobel, Christoph Noppen, Sophie Seidel, Noemie Santamaria de Souza, Niko Beerenwinkel, Tanja Stadler

see above	Viollier AG	Department of Biosystems Science and Engineering, ETH Zurich	Christian Beisel, Sarah Nadeau, Ivan Topolsky, Pedro Ferreira, Philipp Jablonski, Susana Posada-Céspedes, Tobias Schär, Ina Nissen, Natascha Santacroce, Elodie Burcklen, Christiane Beckmann, Maurice Redondo, Olivier Kobel, Christoph Noppen, Sophie Seidel, Noemie Santamaria de Souza, Niko Beerenwinkel, Tanja Stadler
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see above	Institute of Medical Virology, University of Zurich	Institute of Medical Virology, University of Zurich	Marie O. Pohl, Idolia Busnadiego, Verena Kufner, Stefan Schmutz, Maryam Zaheri, Irene Abela, Alexandra Trkola, Michael Huber, Silke Stertz, Benjamin G. Hale
EPI_ISL_722208	Triemli Hospital Zurich	Institute of Medical Virology, University of Zurich	Stefan Schmutz, Verena Kufner, Maryam Zaheri, Gabriela Ziltener, Gerhard Eich, Daniel Rössli, Jürg Böni, Michael Huber, Alexandra Trkola
EPI_ISL_738085	University Hospitals of Geneva, Laboratory of Virology	University Hospitals of Geneva, Laboratory of Virology	Cordey Samuel and Laubscher Florian
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Accession ID	Originating Laboratory	Submitting Laboratory	Authors
EPI_ISL_1143986, EPI_ISL_1143989, EPI_ISL_1143990, EPI_ISL_1143991, EPI_ISL_1143992, EPI_ISL_1143994, EPI_ISL_1143996, EPI_ISL_1144003, EPI_ISL_1144006, EPI_ISL_1144015, EPI_ISL_1144017, EPI_ISL_1144115, EPI_ISL_1144118			
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see above	see above	see above	see above
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EPI_ISL_602518, EPI_ISL_602519, EPI_ISL_602520, EPI_ISL_602522, EPI_ISL_602523, EPI_ISL_602524, EPI_ISL_602527, EPI_ISL_602529, EPI_ISL_602530, EPI_ISL_602611, EPI_ISL_602612, EPI_ISL_602621, EPI_ISL_6026216, EPI_ISL_6026217, EPI_ISL_6026219, EPI_ISL_6026220, EPI_ISL_6026221, EPI_ISL_6026222	Institute for Virology, University Hospital Essen	Center of Medical Microbiology, Virology, and Hospital Hygiene, University of Duesseldorf	Olympia E. Anastasiou, Ulf Dittmer, Maximilian Damagnez, Alexander Diltthey, Torsten Houwaart, Lisanna Hülse, Malte Kohns Vasconcelos, Nadine Lübke, Jessica Nicolai, Klaus Pfeffer, Daniel Strelow, Jörg Timm, Andreas Walker, Tobias Wienemann
see above	see above	see above	see above
EPI_ISL_631300, EPI_ISL_631301, EPI_ISL_631302, EPI_ISL_632311	MVZ DIAMEDIS Diagnostische Medizin Sennestadt GmbH	Bielefeld University	David Brandt, Tobias Busche, Markus Haak, Jörn Kalinowski, Levin-Joe Klages, Christiane Scherer, Alexander Sczyrba, Marina Simunovic, Svenja Vinke
EPI_ISL_640219, EPI_ISL_640220, EPI_ISL_640221, EPI_ISL_640222, EPI_ISL_640223, EPI_ISL_640224, EPI_ISL_640225, EPI_ISL_640226, EPI_ISL_640227, EPI_ISL_640228, EPI_ISL_640229, EPI_ISL_640231, EPI_ISL_640232, EPI_ISL_640233, EPI_ISL_640235, EPI_ISL_640236, EPI_ISL_640238, EPI_ISL_640239, EPI_ISL_640240, EPI_ISL_640241, EPI_ISL_640242, EPI_ISL_640243, EPI_ISL_640244, EPI_ISL_640245, EPI_ISL_640246, EPI_ISL_640247, EPI_ISL_640248, EPI_ISL_640251, EPI_ISL_640252, EPI_ISL_640253, EPI_ISL_640254, EPI_ISL_640255, EPI_ISL_640256, EPI_ISL_640257, EPI_ISL_640258, EPI_ISL_640259, EPI_ISL_640260, EPI_ISL_640261, EPI_ISL_640262, EPI_ISL_640263, EPI_ISL_640264, EPI_ISL_640268, EPI_ISL_640271, EPI_ISL_640272	MVZ Laborärzte Singen	MVZ Laborärzte Singen	Jonas Schmidt, Frithjof Blessing, Sandro Berghaus, Folker Wenzel
see above	see above	see above	see above
EPI_ISL_707943, EPI_ISL_707947, EPI_ISL_707948, EPI_ISL_707949, EPI_ISL_707950, EPI_ISL_707951, EPI_ISL_707954, EPI_ISL_707956, EPI_ISL_707959, EPI_ISL_707964, EPI_ISL_707966, EPI_ISL_707968, EPI_ISL_708003			

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EPI_ISL_806526, EPI_ISL_806527, EPI_ISL_806528, EPI_ISL_806529, EPI_ISL_806530, EPI_ISL_806531, EPI_ISL_806533, EPI_ISL_806534, EPI_ISL_806535, EPI_ISL_806537, EPI_ISL_806539, EPI_ISL_806539, EPI_ISL_806540	see above	Charité Universitätsmedizin Berlin, Institut für Virologie/Labor Berlin	Charité Universitätsmedizin Berlin, Institut für Virologie	Victor M Cornman, Jörn Behne-Schwarzbach, Barbara Mühlemann, Julia Schneider, Talitha Veith, Cornelia Schlee, Tomasz Zemojtel, Terry Jones, Christian Drosten
EPI_ISL_852659, EPI_ISL_852660, EPI_ISL_852661, EPI_ISL_852662, EPI_ISL_852663, EPI_ISL_852664, EPI_ISL_852665, EPI_ISL_852666, EPI_ISL_852667, EPI_ISL_852668, EPI_ISL_852669, EPI_ISL_852670, EPI_ISL_852671, EPI_ISL_852672, EPI_ISL_852673, EPI_ISL_852674, EPI_ISL_852675, EPI_ISL_852676, EPI_ISL_852677, EPI_ISL_852678, EPI_ISL_852679, EPI_ISL_852680, EPI_ISL_852681, EPI_ISL_852682, EPI_ISL_852683, EPI_ISL_852684, EPI_ISL_852685, EPI_ISL_852686, EPI_ISL_852687, EPI_ISL_852688, EPI_ISL_852689, EPI_ISL_852690, EPI_ISL_852691, EPI_ISL_852692, EPI_ISL_852693, EPI_ISL_852694, EPI_ISL_852695, EPI_ISL_852696, EPI_ISL_852697, EPI_ISL_852698, EPI_ISL_852699, EPI_ISL_852700, EPI_ISL_852701, EPI_ISL_852702, EPI_ISL_852703, EPI_ISL_852704, EPI_ISL_852705, EPI_ISL_852706, EPI_ISL_852707, EPI_ISL_852708, EPI_ISL_852709, EPI_ISL_852710, EPI_ISL_852711, EPI_ISL_852712, EPI_ISL_852713, EPI_ISL_852714, EPI_ISL_852715, EPI_ISL_852716, EPI_ISL_852717, EPI_ISL_852718, EPI_ISL_852719, EPI_ISL_852720, EPI_ISL_852721, EPI_ISL_852722, EPI_ISL_852723, EPI_ISL_852724, EPI_ISL_852725, EPI_ISL_852726, EPI_ISL_852727, EPI_ISL_852728, EPI_ISL_852729, EPI_ISL_852730, EPI_ISL_852731, EPI_ISL_852732, EPI_ISL_852733, EPI_ISL_852734, EPI_ISL_852735, EPI_ISL_852736, EPI_ISL_852737, EPI_ISL_852738, EPI_ISL_852739, EPI_ISL_852740, EPI_ISL_852741, EPI_ISL_852742, EPI_ISL_852743, EPI_ISL_852744, EPI_ISL_852745, EPI_ISL_852746, EPI_ISL_852747, EPI_ISL_852748, EPI_ISL_852749, EPI_ISL_852750, EPI_ISL_852751, EPI_ISL_852752, EPI_ISL_852753, EPI_ISL_852754, EPI_ISL_852755, EPI_ISL_852756, EPI_ISL_852757, EPI_ISL_852758, EPI_ISL_852759, EPI_ISL_852760, EPI_ISL_852761, EPI_ISL_852762, EPI_ISL_852763, EPI_ISL_852764, EPI_ISL_852765, EPI_ISL_852766, EPI_ISL_852767, EPI_ISL_852768, EPI_ISL_852769, EPI_ISL_852770, EPI_ISL_852771, EPI_ISL_852772, EPI_ISL_852773, EPI_ISL_852774, EPI_ISL_852775, EPI_ISL_852776, EPI_ISL_852777, EPI_ISL_852778, EPI_ISL_852779, EPI_ISL_852780, EPI_ISL_852781, EPI_ISL_852782, EPI_ISL_852783, EPI_ISL_852784, EPI_ISL_852785, EPI_ISL_852786, EPI_ISL_852787, EPI_ISL_852788, EPI_ISL_852789, EPI_ISL_852790, EPI_ISL_852791, EPI_ISL_852792, EPI_ISL_852793, EPI_ISL_852794, EPI_ISL_852795, EPI_ISL_852796, EPI_ISL_852797, EPI_ISL_852798, EPI_ISL_852799, EPI_ISL_852800, EPI_ISL_852801, EPI_ISL_852802	see above	Institute of Virology, Medical Center, University of Freiburg, Freiburg, Germany	Institute of Virology, Clinical Virus Genomics, Medical Center, University of Freiburg, Freiburg, Germany	Jonas Fuchs, Lisa Kern, Sandra Reuter, Hajo Grundmann, Marcus Panning
EPI_ISL_883156	UK Tübingen, Medical Microbiology	Hannover Medical School, Institute of Virology	Lars Steinbrück, Jasper Göting	
EPI_ISL_883158, EPI_ISL_883159, EPI_ISL_883160, EPI_ISL_883161, EPI_ISL_883162, EPI_ISL_883163, EPI_ISL_883164, EPI_ISL_883165, EPI_ISL_883166, EPI_ISL_883167, EPI_ISL_883168, EPI_ISL_883169, EPI_ISL_883170, EPI_ISL_883171	see above	Hannover Medical School, Institute of Virology	Lars Steinbrück, Jasper Göting	
EPI_ISL_883176, EPI_ISL_883177, EPI_ISL_883178, EPI_ISL_883179, EPI_ISL_883180, EPI_ISL_883181, EPI_ISL_883182, EPI_ISL_883183, EPI_ISL_883184, EPI_ISL_883185, EPI_ISL_883186, EPI_ISL_883187, EPI_ISL_883188, EPI_ISL_883189, EPI_ISL_883192	see above	UK Tübingen, Medical Microbiology	Hannover Medical School, Institute of Virology	Lars Steinbrück, Jasper Göting
EPI_ISL_886157, EPI_ISL_887106, EPI_ISL_887107, EPI_ISL_887108, EPI_ISL_887111	Institute of Medical Microbiology and Virology, University Hospital Carl Gustav Carius, TU Dresden	DRESDEN-concept Genome Center, CMCB, TU Dresden	Beil J., Brown T., Büttner L., Gscheidel N., Hochauf-Stange K., Klemroth S., Lindemann D., Mehner G., Petzold A., Reinhardt S., Rost F., Sameith K., Winkler S.	
EPI_ISL_887327, EPI_ISL_887328, EPI_ISL_887329, EPI_ISL_887330, EPI_ISL_887331, EPI_ISL_887332, EPI_ISL_887333, EPI_ISL_887334, EPI_ISL_887335, EPI_ISL_887336, EPI_ISL_887337, EPI_ISL_887338, EPI_ISL_887339, EPI_ISL_887340, EPI_ISL_887341, EPI_ISL_887342, EPI_ISL_887343, EPI_ISL_887344, EPI_ISL_887345, EPI_ISL_887346, EPI_ISL_887347, EPI_ISL_887348, EPI_ISL_887349, EPI_ISL_887350, EPI_ISL_887351, EPI_ISL_887352, EPI_ISL_887353, EPI_ISL_887354, EPI_ISL_887355, EPI_ISL_887356, EPI_ISL_887357, EPI_ISL_887358, EPI_ISL_887359, EPI_ISL_887360, EPI_ISL_887361, EPI_ISL_887362, EPI_ISL_887363, EPI_ISL_887364, EPI_ISL_887365, EPI_ISL_887366, EPI_ISL_887367, EPI_ISL_887368, EPI_ISL_887369, EPI_ISL_887370, EPI_ISL_887371, EPI_ISL_887372, EPI_ISL_887373, EPI_ISL_887374, EPI_ISL_887375, EPI_ISL_887376, EPI_ISL_887377, EPI_ISL_887378, EPI_ISL_887379, EPI_ISL_887380, EPI_ISL_887381, EPI_ISL_887382, EPI_ISL_887383, EPI_ISL_887384, EPI_ISL_887385, EPI_ISL_887386, EPI_ISL_887387, EPI_ISL_887388, EPI_ISL_887389, EPI_ISL_887390, EPI_ISL_887391, EPI_ISL_887392, EPI_ISL_887393, EPI_ISL_887394, EPI_ISL_887395, EPI_ISL_887396, EPI_ISL_887397, EPI_ISL_887398, EPI_ISL_887399, EPI_ISL_887400, EPI_ISL_887401, EPI_ISL_887402, EPI_ISL_887403, EPI_ISL_887404, EPI_ISL_887405, EPI_ISL_887406, EPI_ISL_887407, EPI_ISL_887408, EPI_ISL_887409, EPI_ISL_887410, EPI_ISL_887411, EPI_ISL_887412, EPI_ISL_887413, EPI_ISL_887414, EPI_ISL_887415, EPI_ISL_887416, EPI_ISL_887417, EPI_ISL_887418	see above	Protzler Lab	Protzler Lab, Gagneur Lab, Robert Koch Institut	Ulrike Protzer, Dieter Hoffmann, Eva Schulte, Andrea Theumer, Oliver Drechsel, Max von Kleist, Aleksandar Radonic, Stephan Fuchs, Alexander Karolius, Julien Gagneur
EPI_ISL_964878, EPI_ISL_964879	Institute of Virology Ulm University Medical Center Prof. Dr. Thomas Stammering	Münch Lab / Ulm University Medical Center Kirchhoff Lab / Ulm University Medical Center Spanner Lab / Ulm University Medical Center Blum Lab / LMU Munich	Thomas Stammering, Helmut Blum, Stefan Krebs, Alexander Graf, Rüdiger Gross, Janis Müller, Carina Conzelmann, Jan Münch, Frank Kirchhoff, Konstantin Spanner	
EPI_ISL_983563, EPI_ISL_983564, EPI_ISL_983565, EPI_ISL_983566, EPI_ISL_983567, EPI_ISL_983568, EPI_ISL_983569, EPI_ISL_983570, EPI_ISL_983571, EPI_ISL_983572, EPI_ISL_983573, EPI_ISL_983574, EPI_ISL_983575, EPI_ISL_983576, EPI_ISL_983577, EPI_ISL_983578, EPI_ISL_983579, EPI_ISL_983580, EPI_ISL_983581, EPI_ISL_983582, EPI_ISL_983583, EPI_ISL_983584, EPI_ISL_983585, EPI_ISL_983586, EPI_ISL_983587	see above	Institute of Virology, University Hospital, University of Bonn and German Center for Infection Research (DZIF), Bonn-Cologne, Bonn, Germany	Institute of Virology, University Hospital, University of Bonn and German Center for Infection Research (DZIF), Bonn-Cologne, Bonn, Germany	Marek Korenecak et al

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EPI_ISL_416564	Centre Hospitalier Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia
EPI_ISL_416493	CH Jean de Navarre Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_416494	Centre Hospitalier Universitaire de Rouen Laboratoire de Virologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Jean-Christophe Plantier
EPI_ISL_416495, EPI_ISL_416496, EPI_ISL_416497	Centre Hospitalier Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia
EPI_ISL_416498	Institut Médico légal- Hop R. Poincaré	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_416499, EPI_ISL_416500	LABM GH nord Essonne	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_416501	Hopital franco britannique - Service des Urgences	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_416502, EPI_ISL_416503, EPI_ISL_416504, EPI_ISL_416505, EPI_ISL_416506, EPI_ISL_416507, EPI_ISL_416508, EPI_ISL_416509, EPI_ISL_416510, EPI_ISL_416511, EPI_ISL_416512, EPI_ISL_416513	CHRU Pontchaillou - Laboratoire de Virologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Gisèle Lagathu
EPI_ISL_416745, EPI_ISL_416746	CNR Virus des Infections Respiratoires - France SUD	CNR Virus des Infections Respiratoires - France SUD	Bal, Antonin; Destras, Gregory; Gaymard, Alexandre; Bouscambert-Duchamp, Maude; Cheynet, Valérie; Brengel-Pesce, Karen; Morfin-Sherpa, Florence; Valette, Martine; Jossel, Laurence; Lina, Bruno.
EPI_ISL_416747, EPI_ISL_416748	Institut des Agents Infectieux (IA) Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Bal, Antonin; Destras, Gregory; Gaymard, Alexandre; Bouscambert-Duchamp, Maude; Cheynet, Valérie; Brengel-Pesce, Karen; Morfin-Sherpa, Florence; Valette, Martine; Jossel, Laurence; Lina, Bruno.
EPI_ISL_416749	Centre Hospitalier de Valence	CNR Virus des Infections Respiratoires - France SUD	Bal, Antonin; Destras, Gregory; Gaymard, Alexandre; Bouscambert-Duchamp, Maude; Cheynet, Valérie; Brengel-Pesce, Karen; Morfin-Sherpa, Florence; Valette, Martine; Jossel, Laurence; Lina, Bruno.
EPI_ISL_416750	Institut des Agents Infectieux (IA) Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Bal, Antonin; Destras, Gregory; Gaymard, Alexandre; Bouscambert-Duchamp, Maude; Cheynet, Valérie; Brengel-Pesce, Karen; Morfin-Sherpa, Florence; Valette, Martine; Jossel, Laurence; Lina, Bruno.
EPI_ISL_416751, EPI_ISL_416752	CHU Gabriel Montpied	CNR Virus des Infections Respiratoires - France SUD	Bal, Antonin; Destras, Gregory; Gaymard, Alexandre; Bouscambert-Duchamp, Maude; Cheynet, Valérie; Brengel-Pesce, Karen; Morfin-Sherpa, Florence; Valette, Martine; Jossel, Laurence; Lina, Bruno.
EPI_ISL_416753, EPI_ISL_416754, EPI_ISL_416756	Institut des Agents Infectieux (IA) Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Bal, Antonin; Destras, Gregory; Gaymard, Alexandre; Bouscambert-Duchamp, Maude; Cheynet, Valérie; Brengel-Pesce, Karen; Morfin-Sherpa, Florence; Valette, Martine; Jossel, Laurence; Lina, Bruno.
EPI_ISL_416757	Centre Hospitalier de Bourg en Bresse	CNR Virus des Infections Respiratoires - France SUD	Bal, Antonin; Destras, Gregory; Gaymard, Alexandre; Bouscambert-Duchamp, Maude; Cheynet, Valérie; Brengel-Pesce, Karen; Morfin-Sherpa, Florence; Valette, Martine; Jossel, Laurence; Lina, Bruno.
EPI_ISL_416758	Institut des Agents Infectieux (IA) Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Bal, Antonin; Destras, Gregory; Gaymard, Alexandre; Bouscambert-Duchamp, Maude; Cheynet, Valérie; Brengel-Pesce, Karen; Morfin-Sherpa, Florence; Valette, Martine; Jossel, Laurence; Lina, Bruno.
EPI_ISL_417333, EPI_ISL_417334, EPI_ISL_417335, EPI_ISL_417336, EPI_ISL_417337	Institut des Agents Infectieux (IA), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Laurence Jossel, Bruno Lina
EPI_ISL_417338	Centre Hospitalier de Macon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Laurence Jossel, Bruno Lina
EPI_ISL_417339	Institut des Agents Infectieux (IA), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Laurence Jossel, Bruno Lina
EPI_ISL_417340	Centre Hospitalier de Bourg en Bresse	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Laurence Jossel, Bruno Lina
EPI_ISL_418218	Centre Hospitalier Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Fabiana Gambaro, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia
EPI_ISL_418219	CHU - Hôpital Cavale Blanche - Labo. de Virologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Fabiana Gambaro, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Léa Pilorge
EPI_ISL_418220, EPI_ISL_418221	Centre Hospitalier Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Fabiana Gambaro, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia
EPI_ISL_418222	CHRU Bretonneau - Serv. Bactério-Virol.	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Fabiana Gambaro, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Julien Marlet
EPI_ISL_418223, EPI_ISL_418224, EPI_ISL_418225	Centre Hospitalier Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Fabiana Gambaro, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia
EPI_ISL_418226	EHPAD - Résidences les Cèdres	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_418227, EPI_ISL_418228	Centre Hospitalier Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia
EPI_ISL_418229	Hopital franco britannique - Laboratoire	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Marianne Asso Bonnet
EPI_ISL_418230	Clinique AVERAY LA BROUSTE, Med. Polyvalente	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Elsa Ngwem
EPI_ISL_418231	Centre Hospitalier Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia
EPI_ISL_418232, EPI_ISL_418233	Service des Urgences	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Boukeur
EPI_ISL_418234	LABM GH nord Essonne	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Christine Lambert
EPI_ISL_418235	Cabinet médical	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_418236, EPI_ISL_418237, EPI_ISL_418238, EPI_ISL_418239	Centre Hospitalier Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia

EPI_ISL_418240	LABM GH nord Essonne	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Christine Lambert
EPI_ISL_418412	Centre Hospitalier des Vals d'Ardeche	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_418413	Centre Hospitalier de Macon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_418414	Centre Hospitalier de Valence	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_418416	GH Les Portes du Sud	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_418417	Centre Hospitalier de Valence	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_418418, EPI_ISL_418419	Centre Hospitalier Saint Joseph Saint Luc	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_418420, EPI_ISL_418421, EPI_ISL_418422, EPI_ISL_418423, EPI_ISL_418424, EPI_ISL_418425	Institut des Agents Infectieux (IAI), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_418426	Centre Hospitalier de Bourg en Bresse	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_418427	Hopital Privé de l'Est Lyonnais	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_418428	Centre Hospitalier Lucien Husseil	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_418429, EPI_ISL_418430, EPI_ISL_418431, EPI_ISL_418432	Institut des Agents Infectieux (IAI), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_419168	Centre Hospitalier de Valence	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_419169, EPI_ISL_419170, EPI_ISL_419171, EPI_ISL_419172, EPI_ISL_419173	Institut des Agents Infectieux (IAI), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_419174, EPI_ISL_419175, EPI_ISL_419176	Centre Hospitalier de Macon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_419177, EPI_ISL_419178, EPI_ISL_419179, EPI_ISL_419180, EPI_ISL_419181, EPI_ISL_419182	Institut des Agents Infectieux (IAI), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_419183	Centre Hospitalier de Bourg en Bresse	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_419184	Institut des Agents Infectieux (IAI), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_419185, EPI_ISL_419186	Centre Hospitalier de Bourg en Bresse	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_419187, EPI_ISL_419188	Centre Hospitalier de Macon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_420038	Sentinelles network	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_420039, EPI_ISL_420040	L'Air du Temps	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_420041	CH Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia
EPI_ISL_420042	Service de Biologie clinique	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_420043	CMIP	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_420044	CH Jean de Navarre Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_420045	Sentinelles network	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_420046, EPI_ISL_420047	Résidence Villa Caroline	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_420048	Service de Biologie Médicale - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Christine Lambert
EPI_ISL_420049, EPI_ISL_420050	CH Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia
EPI_ISL_420051	Résidence Eleusis	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_420052	Résidence les Marines	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_420053	CH Jean de Navarre Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_420055	Sentinelles network	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf

EPI_ISL_420056, EPI_ISL_420057	CH Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia
EPI_ISL_420058, EPI_ISL_420059, EPI_ISL_420060	Service de Biologie Médicale - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Christine Lambert
EPI_ISL_420061	CMIP	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_420063	Labo BM - Site de Juvisy - Hopital Général	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_420064	Service de Biologie Médicale - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Christine Lambert
EPI_ISL_420604, EPI_ISL_420605, EPI_ISL_420606, EPI_ISL_420607, EPI_ISL_420608, EPI_ISL_420609, EPI_ISL_420610, EPI_ISL_420611	Institut des Agents Infectieux (IAI), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_420613, EPI_ISL_420614	Centre Hospitalier de Macon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_420615, EPI_ISL_420616	Institut des Agents Infectieux (IAI), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_420617	Centre Hospitalier Saint Joseph Saint Luc	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_420618, EPI_ISL_420619	Institut des Agents Infectieux (IAI), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_420620	Centre Hospitalier de Bourg en Bresse	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_420621, EPI_ISL_420622, EPI_ISL_420623, EPI_ISL_420624, EPI_ISL_420625	Institut des Agents Infectieux (IAI), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_421500	CH Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Christine Lambert
EPI_ISL_421501	Service de Biologie Médicale - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Christine Lambert
EPI_ISL_421502, EPI_ISL_421503	Parc des Dames	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_421504, EPI_ISL_421505, EPI_ISL_421506	Service de Biologie Médicale - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Christine Lambert
EPI_ISL_421507, EPI_ISL_421508	Le Château de Seine-Port	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_421509, EPI_ISL_421510, EPI_ISL_421511	CH Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia
EPI_ISL_421512	Service de Biologie Médicale - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Christine Lambert
EPI_ISL_421513	Service de Biologie clinique	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Christine Lambert
EPI_ISL_421514	Sentinelles network	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428347	Service de Biologie Médicale - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428348	Maison de Santé du Val d'Ormois	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428349	Service de Biologie Médicale - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428350	CH Jean de Navarre Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428351, EPI_ISL_428352	GH Nord Essonne Service de Biologie clinique	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428353	CH Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428354	LABM GH nord Essonne de Longjumeau - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428355, EPI_ISL_428356, EPI_ISL_428357	Institut Médico légal- Hop R. Poincaré	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428358	CH Jeanne de Navarre Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428359, EPI_ISL_428360	CH Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428361	LABM GH nord Essonne de Longjumeau - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428363	GH Nord Essonne Service de Biologie clinique	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428365	LABM GH nord Essonne de Longjumeau - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf

EPI_ISL_428366	CH Jeanne de Navarre Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_428367	Cabinet Médical	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_429968	Centre Hospitalier Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Fabiana Gambaro, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Raulin Olivia
EPI_ISL_434626, EPI_ISL_434627, EPI_ISL_434628, EPI_ISL_434629, EPI_ISL_434630, EPI_ISL_434631, EPI_ISL_434632, EPI_ISL_434633, EPI_ISL_434634, EPI_ISL_434635	CHU Purpan - Laboratoire de Virologie - Institut Fédératif de Biologie	Laboratoire de virologie - École Nationale Vétérinaire de Toulouse	Guillaume Crouille, Jean-Luc Guérin, Jacques Izopet
EPI_ISL_437689	Laboratory for Urgent Response to Biological Threats	Institut Pasteur CIBU / ERI	V. Caro, A. Kwasiborski, V. Hourdel, C. Balière, J. Vanhomwegen, C. Batéjat, JC. Manuguerra
EPI_ISL_437690	Laboratory for Urgent Response to Biological Threats	Institut Pasteur CIBU/ERI	V. Caro, A. Kwasiborski, H. Hourdel, C. Balière, J. Vanhomwegen, C. Batéjat, JC. Manuguerra
EPI_ISL_443258, EPI_ISL_443259	Résidence Ormano	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443260	LABM GH nord Essonne de Longjumeau - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443261, EPI_ISL_443262, EPI_ISL_443263, EPI_ISL_443264	CHU de Dijon - Laboratoire de Virologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Jean-Baptiste Bour
EPI_ISL_443265, EPI_ISL_443266, EPI_ISL_443267, EPI_ISL_443268, EPI_ISL_443269, EPI_ISL_443270, EPI_ISL_443271, EPI_ISL_443272, EPI_ISL_443273, EPI_ISL_443274, EPI_ISL_443275, EPI_ISL_443276, EPI_ISL_443277, EPI_ISL_443278, EPI_ISL_443279, EPI_ISL_443281, EPI_ISL_443282, EPI_ISL_443283	see above	CHU - Hôpital Cavale Blanche - Labo. de Virologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris
EPI_ISL_443284, EPI_ISL_443285, EPI_ISL_443286, EPI_ISL_443287, EPI_ISL_443288	Laboratoire de Microbiologie - Bât A - CH René Dubois	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Pascale Martres
EPI_ISL_443289, EPI_ISL_443290, EPI_ISL_443291, EPI_ISL_443292, EPI_ISL_443293, EPI_ISL_443294	CHRU Pontchaillou - Laboratoire de Virologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Gisèle Lagathu
EPI_ISL_443295, EPI_ISL_443296, EPI_ISL_443298, EPI_ISL_443299	Hôpital Necker - Enfants - Malades Laboratoire de Virologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Marianne Lereux-Ville
EPI_ISL_443300, EPI_ISL_443301, EPI_ISL_443302	Cabinet Médical	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443303	Résidence Les Marines	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443305	LABM GH nord Essonne de Longjumeau - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443306	Cabinet Médical	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443307	La Villa Papyri	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443308	Plaisance	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443309	CH Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443310	Centre de santé Filiéris	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443311, EPI_ISL_443312, EPI_ISL_443313	Cabinet Médical	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443314	LABM GH nord Essonne de Longjumeau - BP 125	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443315	Château de la Source	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443316	CH Compiègne Laboratoire de Biologie	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_443317	Cabinet Médical	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Mélanie Albert, Marion Barbet, Sylvie Behillil, Méline Bizard, Angela Brisebarre, Flora Donati, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf
EPI_ISL_469282	Service de Virologie Hôpital Saint-Louis	Laboratory of Cell Biology of viral infection, Unit INSERM-U944	Laurent Meertens, Lucie Bonnet-Madin, Constance Delaquerre, Ali Amara
EPI_ISL_469283, EPI_ISL_469284, EPI_ISL_505003	Service de Virologie Hôpital Saint-Louis Biology Dpt	Laboratory Cell Biology of Viral Infection-INSERM unit 944 Microbiology and Infections Diseases	Laurent Meertens, Lucie Bonnet-Madin, Séverine Mercier-Delaurie, Maud SALMONA, Constance Delaquerre, Ali Amara Emmanuelle Billon-Denis, Audrey Ferrier-Rembert, Annabelle Garnier, Laurence Cheutin, Clarisse Vigne, Emilie Tessier, Jessica Denis, Olivier Gorgé, Flora Nolent, Isabelle Drouet, Noémie Verguet, Olivier Ferraris, Jean-Nicolas Tournier
EPI_ISL_508871, EPI_ISL_508872, EPI_ISL_508873, EPI_ISL_508874, EPI_ISL_508875, EPI_ISL_508876	Institut des Agents Infectieux (IAI), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burlin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaynard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Bruno Lina, Laurence Josset
EPI_ISL_508877	Centre Hospitalier de Macon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burlin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaynard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_508878	Institut des Agents Infectieux (IAI), Hospices Civils de Lyon	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burlin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaynard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_508879	GH Les Portes du Sud	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burlin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaynard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_508879, EPI_ISL_508880	Centre Hospitalier Saint Joseph Saint Luc	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burlin, Solenne Brun, Carine Moustaud, Raphaëlle Lamy, Alexandre Gaynard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset

				Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset			
EPI_ISL_614281	CHRU Pontchaillou - Laboratoire de Virologie 2, rue Henri Le Guilloux	National Reference Center for Viruses of Respiratory Infections, Institut Pasteur, Paris	Marion Barbet, Sylvie Behillill, Méline Bizard, Angela Brisebarre, Camille Capel, Etienne Simon-Lorière, Vincent Enouf, Maud Vanpeene, Sylvie van der Werf, Gisèle Lagathu				
EPI_ISL_629081, EPI_ISL_629082, EPI_ISL_629083, EPI_ISL_629084, EPI_ISL_629085, EPI_ISL_629086, EPI_ISL_629088, EPI_ISL_629089, EPI_ISL_629090, EPI_ISL_629091, EPI_ISL_629092, EPI_ISL_629093, EPI_ISL_629094, EPI_ISL_629095, EPI_ISL_629096, EPI_ISL_629097, EPI_ISL_629098, EPI_ISL_629099, EPI_ISL_629101, EPI_ISL_629102, EPI_ISL_629103, EPI_ISL_629104, EPI_ISL_629105, EPI_ISL_629106, EPI_ISL_629107, EPI_ISL_629108							
see above	Laboratoire du Centre Hospitalier Annecy Genevois	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Héléne Pettitrez, Bruno Chanzy, Laurence Josset				
EPI_ISL_634817	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 9	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634818	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 10	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634819	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 11	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634820	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 12	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634821	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 13	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634822	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 14	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634823	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 15	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634824	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 16	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634825	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 17	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634826	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 18	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634827	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 19	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634828	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 20	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634829	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 21	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634830	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 22	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634831	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 23	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634832	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 24	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634833	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 25	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634834	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 26	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634835	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 27	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634836	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 28	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_634837	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 29	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Lartrat, Laurence Josset				
EPI_ISL_636476, EPI_ISL_636477	CNR Virus des Infections Respiratoires - France SUD	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset				
EPI_ISL_636478	Centre Hospitalier Pierre Oudot	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset				
EPI_ISL_636479	CNR Virus des Infections Respiratoires - France SUD	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset				
EPI_ISL_636480	Centre Hospitalier Pierre Oudot	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset				
EPI_ISL_636481	Centre Hospitalier de Bourg en Bresse	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset				
EPI_ISL_636482, EPI_ISL_636483	Centre Hospitalier Pierre Oudot	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset				
EPI_ISL_636484, EPI_ISL_636485	CNR Virus des Infections Respiratoires - France SUD	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset				
EPI_ISL_636486	Centre Hospitalier Pierre Oudot	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset				
EPI_ISL_636487	CNR Virus des Infections Respiratoires - France SUD	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Alexandre Gaymard, Maude Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset				
EPI_ISL_641520	CHU de Nice - Hôpital Archet 2	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gouffier, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset				
EPI_ISL_641521	CHU de Nice - Hôpital Archet 8	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gouffier, Gregory Destras, Gwendolyne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie				

EPI_ISL_641522	CHU de Nice - Hôpital Archet 3	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641523	CHU de Nice - Hôpital Archet 4	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641524	CHU de Nice - Hôpital Archet 5	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641525	CHU de Nice - Hôpital Archet 6	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641526	CHU de Nice - Hôpital Archet 7	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641527	CHU de Nice - Hôpital Archet 9	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641528	CHU de Nice - Hôpital Archet 10	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641529	CHU de Nice - Hôpital Archet 11	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641530	CHU de Nice - Hôpital Archet 12	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641531	CHU de Nice - Hôpital Archet 13	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641532	CHU de Nice - Hôpital Archet 14	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641533	CHU de Nice - Hôpital Archet 15	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641534	CHU de Nice - Hôpital Archet 16	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_641535, EPI_ISL_641536, EPI_ISL_641537, EPI_ISL_641538, EPI_ISL_641539, EPI_ISL_641540, EPI_ISL_641541, EPI_ISL_641542, EPI_ISL_641543, EPI_ISL_641544, EPI_ISL_641545	see above	CHU de Saint-Étienne Hôpital Nord	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Issam Bechri, Manon Vogrig, Marine Delorme, Bruno Pozzetto, Thomas Bourlet, Sylvie Gonzalo, Sylvie Pillet, Laurence Josset
EPI_ISL_641546, EPI_ISL_641547, EPI_ISL_641548, EPI_ISL_641549, EPI_ISL_641550	CHU Clermont-Ferrand	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Christine Archimbaud, Amélie Brebion, Hélène Chabrolles, Martine Chambon, Audrey Mirand, Christel Regagnon, Maxime Bisseux, Patricia Combes, Cécile Henquell, Laurence Josset	
EPI_ISL_641551, EPI_ISL_641552, EPI_ISL_641553, EPI_ISL_641554, EPI_ISL_641555	CHU Toulouse	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Jean Michel Mansuy, Laurence Josset	
EPI_ISL_641556	CHU Montpellier	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Michel Segondy, Vincent Foulongne, Laurence Josset	
EPI_ISL_644403, EPI_ISL_644404, EPI_ISL_644405, EPI_ISL_644406, EPI_ISL_644407, EPI_ISL_644408, EPI_ISL_644409, EPI_ISL_644410	MEPHI, Aix Marseille University	MEPHI, Aix Marseille University	Anthony LEVASSEUR	
EPI_ISL_644673, EPI_ISL_644674, EPI_ISL_644675, EPI_ISL_644676, EPI_ISL_644677, EPI_ISL_644678, EPI_ISL_644679, EPI_ISL_644680	CHU de Limoges	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Rogez, Laurence Josset	
EPI_ISL_644681, EPI_ISL_644682, EPI_ISL_644683, EPI_ISL_644684, EPI_ISL_644685, EPI_ISL_644686, EPI_ISL_644687, EPI_ISL_644688, EPI_ISL_644689, EPI_ISL_644690, EPI_ISL_644691, EPI_ISL_644692, EPI_ISL_644693, EPI_ISL_644694, EPI_ISL_644695, EPI_ISL_644696	see above	CHU Montpellier	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Michel Segondy, Vincent Foulongne, Laurence Josset
EPI_ISL_644697, EPI_ISL_644698, EPI_ISL_644699, EPI_ISL_644700, EPI_ISL_644701, EPI_ISL_644702	CHU Nîmes	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Jean-Philippe Lavigne, Stephan Robin, Maxence Lotellier, Marie-Josée Carles, Laurence Josset	
EPI_ISL_644703, EPI_ISL_644704, EPI_ISL_644705, EPI_ISL_644706, EPI_ISL_644707, EPI_ISL_644708, EPI_ISL_644709, EPI_ISL_644710, EPI_ISL_644711, EPI_ISL_644712, EPI_ISL_644713, EPI_ISL_644714	see above	Unité des Virus Émergents	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Laetitia Ninove, Léa Luciani, Antoine Nougarié, Laurence Josset
EPI_ISL_645169, EPI_ISL_645170, EPI_ISL_645171, EPI_ISL_645172	CHU Bordeaux	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Pantbox Bellecave, Camille Ciconne, Isabelle Garrigue, Marie-Edith Lafon, Pascale Trimoulet, Laurence Josset	
EPI_ISL_645173	CHU de Nice	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Gonfrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset	
EPI_ISL_645174, EPI_ISL_645175, EPI_ISL_645176, EPI_ISL_645177, EPI_ISL_645178, EPI_ISL_645179, EPI_ISL_645180, EPI_ISL_645181, EPI_ISL_645182, EPI_ISL_645183	CHU de Limoges	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Rogez, Laurence Josset	
EPI_ISL_645184, EPI_ISL_645185, EPI_ISL_645186, EPI_ISL_645187	CHU de Saint-Étienne Hôpital Nord	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Issam Bechri, Manon Vogrig, Marine Delorme, Bruno Pozzetto, Thomas Bourlet, Sylvie Gonzalo, Sylvie Pillet, Laurence Josset	
EPI_ISL_645188, EPI_ISL_645189, EPI_ISL_645190, EPI_ISL_645191, EPI_ISL_645192, EPI_ISL_645193, EPI_ISL_645194, EPI_ISL_645195, EPI_ISL_645196	CHU Clermont-Ferrand	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Christine Archimbaud, Amélie Brebion, Hélène Chabrolles, Martine Chambon, Audrey Mirand, Christel Regagnon, Maxime Bisseux, Patricia Combes, Cécile Henquell, Laurence Josset	
EPI_ISL_645197, EPI_ISL_645198, EPI_ISL_645199, EPI_ISL_645200, EPI_ISL_645201, EPI_ISL_645202, EPI_ISL_645203, EPI_ISL_645204, EPI_ISL_645205, EPI_ISL_645206, EPI_ISL_645207, EPI_ISL_645208, EPI_ISL_645209				

see above	CHU Nîmes	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Jean-Philippe Lavigne, Stephan Robin, Maxence Lotellier, Marie-Josée Carles, Laurence Josset
EPI_ISL_645212, EPI_ISL_645213, EPI_ISL_645214	Unité des Virus Émergents	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Laetitia Ninove, Léa Luciani, Antoine Nougairède, Laurence Josset
EPI_ISL_645216	CHU Poitiers	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Agnès Beby-Defaux, Magali Garcia, Clément Jousselin, Nicolas Lévêque, Laurence Josset
EPI_ISL_645217, EPI_ISL_645218, EPI_ISL_649173, EPI_ISL_649174, EPI_ISL_649175, EPI_ISL_649176, EPI_ISL_649177, EPI_ISL_649178, EPI_ISL_649179, EPI_ISL_649180, EPI_ISL_649181, EPI_ISL_649182, EPI_ISL_649183, EPI_ISL_649184, EPI_ISL_649185, EPI_ISL_649186, EPI_ISL_649187	CHU Nantes	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Louise Castain, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Celine Bressollette, Laurence Josset
see above	Unité des Virus Émergents	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Laetitia Ninove, Léa Luciani, Antoine Nougairède, Laurence Josset
EPI_ISL_649942, EPI_ISL_649943, EPI_ISL_649944, EPI_ISL_649945, EPI_ISL_649946, EPI_ISL_649947, EPI_ISL_649948, EPI_ISL_649949, EPI_ISL_649950, EPI_ISL_649951, EPI_ISL_649952, EPI_ISL_649953	CHU de Saint-Étienne Hôpital Nord	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Issam Bechri, Manon Vogrig, Marine Delorme, Bruno Pozzetto, Thomas Bourlet, Sylvie Gonzalo, Sylvie Pillet, Laurence Josset
see above	CHU Bordeaux	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Pantbika Bellecave, Camille Ciccone, Isabelle Garrigue, Marie-Edith Lafon, Pascale Trimoulet, Laurence Josset
EPI_ISL_660326, EPI_ISL_660327, EPI_ISL_660328, EPI_ISL_660329, EPI_ISL_660330, EPI_ISL_660331, EPI_ISL_660332, EPI_ISL_660333, EPI_ISL_660334, EPI_ISL_660335, EPI_ISL_660336, EPI_ISL_660337, EPI_ISL_660338, EPI_ISL_660339, EPI_ISL_660340, EPI_ISL_660341, EPI_ISL_660342, EPI_ISL_660343, EPI_ISL_660344, EPI_ISL_660345, EPI_ISL_660346, EPI_ISL_660347, EPI_ISL_660348, EPI_ISL_660349, EPI_ISL_660350, EPI_ISL_660351, EPI_ISL_660352	CHU de Saint-Étienne Hôpital Nord	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Issam Bechri, Manon Vogrig, Marine Delorme, Bruno Pozzetto, Thomas Bourlet, Sylvie Gonzalo, Sylvie Pillet, Laurence Josset
see above	CHU Clermont-Ferrand	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Christine Archimbaud, Amélie Brebion, Hélène Chabrolles, Martine Chambon, Audrey Mirand, Christel Regagnon, Maxime Bisseux, Patricia Combes, Cécile Henquell, Laurence Josset
EPI_ISL_660372	CHU Bordeaux	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Pantbika Bellecave, Camille Ciccone, Isabelle Garrigue, Marie-Edith Lafon, Pascale Trimoulet, Laurence Josset
EPI_ISL_660373, EPI_ISL_660374, EPI_ISL_660375, EPI_ISL_660376, EPI_ISL_660377	CHU Toulouse	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Jean Michel Mansuy, Laurence Josset
EPI_ISL_660432	CHU de Saint-Étienne Hôpital Nord	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Issam Bechri, Manon Vogrig, Marine Delorme, Bruno Pozzetto, Thomas Bourlet, Sylvie Gonzalo, Sylvie Pillet, Laurence Josset
EPI_ISL_660655, EPI_ISL_660656, EPI_ISL_660657, EPI_ISL_660658, EPI_ISL_660659, EPI_ISL_660660, EPI_ISL_660661, EPI_ISL_660662, EPI_ISL_660663, EPI_ISL_660664, EPI_ISL_660665, EPI_ISL_660666, EPI_ISL_660667, EPI_ISL_660668, EPI_ISL_660669, EPI_ISL_660670, EPI_ISL_660671, EPI_ISL_660672, EPI_ISL_660673, EPI_ISL_660674, EPI_ISL_660675, EPI_ISL_660676, EPI_ISL_660677, EPI_ISL_660678, EPI_ISL_660679, EPI_ISL_660680, EPI_ISL_660681, EPI_ISL_660682, EPI_ISL_660683, EPI_ISL_660684, EPI_ISL_660685, EPI_ISL_660686, EPI_ISL_660687, EPI_ISL_660688, EPI_ISL_660689, EPI_ISL_660690, EPI_ISL_660691, EPI_ISL_660692, EPI_ISL_660693, EPI_ISL_660694, EPI_ISL_660695, EPI_ISL_660696, EPI_ISL_660697, EPI_ISL_660698, EPI_ISL_660699, EPI_ISL_660700, EPI_ISL_660701, EPI_ISL_660702, EPI_ISL_660703, EPI_ISL_660704, EPI_ISL_660705, EPI_ISL_660706, EPI_ISL_660707, EPI_ISL_660708, EPI_ISL_660709	CHU Montpellier	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Michel Segondy, Vincent Foulongne, Laurence Josset
see above	CHU Nîmes	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Jean-Philippe Lavigne, Stephan Robin, Maxence Lotellier, Marie-Josée Carles, Laurence Josset
EPI_ISL_660710, EPI_ISL_660711, EPI_ISL_660712, EPI_ISL_660713, EPI_ISL_660714, EPI_ISL_660715, EPI_ISL_660716, EPI_ISL_660717, EPI_ISL_660718, EPI_ISL_660719, EPI_ISL_660720, EPI_ISL_660721, EPI_ISL_660722, EPI_ISL_660723, EPI_ISL_660724, EPI_ISL_660725, EPI_ISL_660726, EPI_ISL_660727, EPI_ISL_660728, EPI_ISL_660729, EPI_ISL_660730, EPI_ISL_660731	Unité des Virus Émergents	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Laetitia Ninove, Léa Luciani, Antoine Nougairède, Laurence Josset
EPI_ISL_660732, EPI_ISL_660733, EPI_ISL_660734, EPI_ISL_660735, EPI_ISL_660736, EPI_ISL_660737, EPI_ISL_660738, EPI_ISL_660739, EPI_ISL_660740, EPI_ISL_660741	CHU de Limoges	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Rogez, Laurence Josset
EPI_ISL_663206, EPI_ISL_663207, EPI_ISL_663208, EPI_ISL_663209, EPI_ISL_663210, EPI_ISL_663211, EPI_ISL_663212, EPI_ISL_663213, EPI_ISL_663214, EPI_ISL_663215, EPI_ISL_663216, EPI_ISL_663217, EPI_ISL_663218, EPI_ISL_663219, EPI_ISL_663220, EPI_ISL_663221, EPI_ISL_663222, EPI_ISL_663223, EPI_ISL_663224, EPI_ISL_663225, EPI_ISL_663226	CHU Poitiers	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Agnès Beby-Defaux, Magali Garcia, Clément Jousselin, Nicolas Lévêque, Laurence Josset
see above	CHU Nîmes	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Jean-Philippe Lavigne, Stephan Robin, Maxence Lotellier, Marie-Josée Carles, Laurence Josset
EPI_ISL_663227, EPI_ISL_663228, EPI_ISL_663229, EPI_ISL_663230, EPI_ISL_663231, EPI_ISL_663232, EPI_ISL_663233, EPI_ISL_663234, EPI_ISL_663235, EPI_ISL_663236, EPI_ISL_663237, EPI_ISL_663238, EPI_ISL_663239, EPI_ISL_663240, EPI_ISL_663241, EPI_ISL_663242, EPI_ISL_663243, EPI_ISL_663244, EPI_ISL_663245, EPI_ISL_663246, EPI_ISL_663247, EPI_ISL_663248	CHU Nantes	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Louise Castain, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Virginie Ferré, Celine Bressollette, Laurence Josset
EPI_ISL_663249, EPI_ISL_663250, EPI_ISL_663251, EPI_ISL_663252, EPI_ISL_663253, EPI_ISL_663254, EPI_ISL_663255, EPI_ISL_663256, EPI_ISL_663257, EPI_ISL_663258, EPI_ISL_663259, EPI_ISL_663260, EPI_ISL_663261, EPI_ISL_663262, EPI_ISL_663263, EPI_ISL_663264, EPI_ISL_663265, EPI_ISL_663266, EPI_ISL_663267, EPI_ISL_663268, EPI_ISL_663269, EPI_ISL_663270, EPI_ISL_663271, EPI_ISL_663272, EPI_ISL_663273, EPI_ISL_663274, EPI_ISL_663275, EPI_ISL_663276, EPI_ISL_663277, EPI_ISL_663278, EPI_ISL_663279, EPI_ISL_663280, EPI_ISL_663281, EPI_ISL_663282, EPI_ISL_663283, EPI_ISL_663284	Laboratoire du Centre Hospitalier Annecy Genevois	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Hélène Pettitprez, Bruno Chanzy, Laurence Josset
see above	Centre hospitalier Métropole Savoie	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Carine Dumollard, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Jérôme Grosjean, Laurence Josset
EPI_ISL_666654, EPI_ISL_666655, EPI_ISL_666656, EPI_ISL_666657, EPI_ISL_666658, EPI_ISL_666659, EPI_ISL_666660, EPI_ISL_666661, EPI_ISL_666662, EPI_ISL_666663, EPI_ISL_666664, EPI_ISL_666665, EPI_ISL_666666, EPI_ISL_666667, EPI_ISL_666668, EPI_ISL_666669, EPI_ISL_666670, EPI_ISL_666671, EPI_ISL_666672, EPI_ISL_666673, EPI_ISL_666674, EPI_ISL_666675, EPI_ISL_666676, EPI_ISL_666677, EPI_ISL_666678, EPI_ISL_666679, EPI_ISL_666680, EPI_ISL_666681	CHU de Limoges	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Rogez, Laurence Josset
see above			
EPI_ISL_666683, EPI_ISL_666684, EPI_ISL_666685, EPI_ISL_666686			
EPI_ISL_666711, EPI_ISL_666712, EPI_ISL_666713, EPI_ISL_666714			

EPI_ISL_666715, EPI_ISL_666716, EPI_ISL_666717, EPI_ISL_666718, EPI_ISL_666719, EPI_ISL_666720 EPI_ISL_666721, EPI_ISL_666722, EPI_ISL_666723, EPI_ISL_666724	CHU Nantes	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Louise Castain, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Virginie Ferré, Celine Bressollette, Laurence Josset
EPI_ISL_666870 EPI_ISL_671976	Laboratoire de Virologie, CHU de Caen, Normandie, France. CHU Purpan - Laboratoire de Virologie - Institut Fédératif de Biologie	GRAM2.0, Université de Caen Normandie CHU Purpan - Laboratoire de Virologie - Institut Fédératif de Biologie	Meriadeg LE GOUIL, Januel VOUTEAU, Juliette ECHE, Estelle LEPERCHOIS, Astrid VABRET Latour J., Ranger N., Dubois M., Carcenac R., Harter A., Boyer P., Tremeaux P., Izopet J.
EPI_ISL_676542, EPI_ISL_676543, EPI_ISL_676544, EPI_ISL_676545, EPI_ISL_676546, EPI_ISL_676547, EPI_ISL_676548, EPI_ISL_676550, EPI_ISL_676551, EPI_ISL_676552, EPI_ISL_676553, EPI_ISL_676554, EPI_ISL_676555, EPI_ISL_676556, EPI_ISL_676561, EPI_ISL_676562, EPI_ISL_676563, EPI_ISL_676564, EPI_ISL_676565, EPI_ISL_676566, EPI_ISL_676567, EPI_ISL_676568, EPI_ISL_676569, EPI_ISL_676570, EPI_ISL_676571, EPI_ISL_676572, EPI_ISL_676573	CNR Virus des Infections Respiratoires - France SUD	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Alexandre Brun, Alexandre Gaynard, Maudé Bouscambert-Duchamp, Florence Morfin-Sherpa, Martine Valette, Bruno Lina, Laurence Josset
see above	CNR Virus des Infections Respiratoires - France SUD	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_678494, EPI_ISL_678495, EPI_ISL_678496, EPI_ISL_678497, EPI_ISL_678498, EPI_ISL_678499, EPI_ISL_678500, EPI_ISL_678501, EPI_ISL_678502, EPI_ISL_678503, EPI_ISL_678504, EPI_ISL_678505, EPI_ISL_678506, EPI_ISL_678507, EPI_ISL_678508, EPI_ISL_678534, EPI_ISL_678535, EPI_ISL_678536, EPI_ISL_678537, EPI_ISL_678538, EPI_ISL_678539, EPI_ISL_678540, EPI_ISL_678541, EPI_ISL_678542, EPI_ISL_678543, EPI_ISL_678544, EPI_ISL_678545, EPI_ISL_678546, EPI_ISL_678547, EPI_ISL_681261, EPI_ISL_681262, EPI_ISL_681263	CNR Virus des Infections Respiratoires - France SUD	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Solenne Brun, Martine Valette, Bruno Lina, Laurence Josset
see above	CNR Virus des Infections Respiratoires - France SUD	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Hélène Pettiprez, Bruno Chanzy, Laurence Josset
EPI_ISL_683331, EPI_ISL_683332	Laboratoire du Centre Hospitalier Annecy Genevois	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_683352, EPI_ISL_683353, EPI_ISL_683355, EPI_ISL_683356, EPI_ISL_683357, EPI_ISL_683358, EPI_ISL_683359, EPI_ISL_683362, EPI_ISL_684107	CNR Virus des Infections Respiratoires - France SUD	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Quentin Semanas, Martine Valette, Bruno Lina, Laurence Josset
EPI_ISL_693387, EPI_ISL_693388, EPI_ISL_693389, EPI_ISL_693390 EPI_ISL_693391	CHU de Nice - Hôpital Archet 2 Centre hospitalier Métropole Savoie	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Géraldine Confrier, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Valérie Giordanengo, Laurence Josset
EPI_ISL_700348	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 9	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700349	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 10	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700350	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 11	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700351	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 12	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700352	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 13	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700353	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 14	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700354	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 15	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700355	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 16	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700356	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 17	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700357	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 18	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700358	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 19	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700359	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 20	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700360	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 21	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700361	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 22	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700362	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 23	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700363	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 24	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700364	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 25	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700365	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 26	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700366	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 27	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700367	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 28	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700368	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 29	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700369	Laboratoire de virologie, CHU de Grenoble - CS 10217 - 38043 Grenoble cedex 30	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset
EPI_ISL_700370	Laboratoire de virologie, CHU de Grenoble - CS 10217 -	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Sylvie Larraz, Laurence Josset

38043 Grenoble cedex 31			
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EPI_ISL_700372, EPI_ISL_700373, EPI_ISL_700374, EPI_ISL_700375, EPI_ISL_700376, EPI_ISL_700377, EPI_ISL_700378, EPI_ISL_700379, EPI_ISL_700380, EPI_ISL_700381, EPI_ISL_700382, EPI_ISL_700383, EPI_ISL_700384, EPI_ISL_700385, EPI_ISL_700386, EPI_ISL_700387, EPI_ISL_700388, EPI_ISL_700389, EPI_ISL_700390, EPI_ISL_700391, EPI_ISL_700394, EPI_ISL_700395, EPI_ISL_700396, EPI_ISL_700397, EPI_ISL_700398, EPI_ISL_700399, EPI_ISL_700401, EPI_ISL_700402, EPI_ISL_700403, EPI_ISL_700404, EPI_ISL_700405, EPI_ISL_700406, EPI_ISL_700407, EPI_ISL_700408, EPI_ISL_700409, EPI_ISL_700410			
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EPI_ISL_707781, EPI_ISL_707782	CHU Poitiers	CNR Virus des Infections Respiratoires - France SUD	Antonin Bal, Gregory Destras, Gwendolynne Burfin, Hadrien Règue, Quentin Semanas, Martine Valette, Bruno Lina, Agnès Beby-Defaux, Magali Garcia, Clément Jousselin, Nicolas Lévêque, Laurence Josset
EPI_ISL_735241, EPI_ISL_735242, EPI_ISL_735243, EPI_ISL_735244, EPI_ISL_735245, EPI_ISL_735246, EPI_ISL_738241, EPI_ISL_738242	UZ Leuven, National Reference Laboratory for Coronaviruses, Laboratory Medicine, Leuven, Belgium	KU Leuven, Rega Institute, Clinical and Epidemiological Virology	Tony Wawina-Bokallanga, Joan Marti-Carerras, Bert Vanmechelen, Piet Maes
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All Submitters of data may be contacted directly via www.gisaid.org

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EPI_ISL_1133159, EPI_ISL_1133160, EPI_ISL_1133161, EPI_ISL_1133162, EPI_ISL_1133163, EPI_ISL_1133164, EPI_ISL_1133165, EPI_ISL_1133166, EPI_ISL_1133167, EPI_ISL_1133168, EPI_ISL_1133169, EPI_ISL_1133170, EPI_ISL_1133171, EPI_ISL_1133172, EPI_ISL_1133173, EPI_ISL_1133174, EPI_ISL_1133175, EPI_ISL_1133176, EPI_ISL_1133177, EPI_ISL_1133178, EPI_ISL_1133179, EPI_ISL_1133180, EPI_ISL_1133181, EPI_ISL_1133182, EPI_ISL_1133183, EPI_ISL_1133184, EPI_ISL_1133185, EPI_ISL_1133186, EPI_ISL_1133187, EPI_ISL_1133188, EPI_ISL_1133189, EPI_ISL_1133190, EPI_ISL_1133191, EPI_ISL_1133192, EPI_ISL_1133193, EPI_ISL_1133194, EPI_ISL_1133195, EPI_ISL_1133196, EPI_ISL_1133197	Microbiology and Virology Unit, Azienda Ospedale Padova, Padova, Italy	Department of Molecular Medicine, Computational Medicine Group, University of Padova, Padova, Italy	Elisa Franchin, Claudia Del Vecchio, Francesco Onelia, Stefano Toppo, Enrico Lavezzo, Laura Manuto, Federico Bianca , Marco Grazioli, Andrea Crisanti
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EPI_ISL_1499594	Laboratorio di Microbiologia e Virologia, Università Vita-Salute San Raffaele, Milano	Laboratorio di Microbiologia e Virologia, Università Vita-Salute San Raffaele, Milano	Nicola Clementi, Matteo Castelli, Elena Criscuolo, Roberta Antonia Diotti, Roberto Ferrarese, Nicasio Mancini, Massimo Clementi, on behalf of SARS-CoV-2 ITALIAN RESEARCH ENTERPRISE(SCIRE) Collaborative Group
EPI_ISL_1692721, EPI_ISL_1692723, EPI_ISL_1692728, EPI_ISL_1692737, EPI_ISL_1692768, EPI_ISL_1692805, EPI_ISL_1692814, EPI_ISL_1692816	Università Federico II - Dipartimento di scienze mediche traslazionali - Napoli	Telethon Institute of Genetics and Medicine (TIGEM)	Antonio Grimaldi Patrizia Annunziata Francesco Panariello Teresa Giuliano Michele Cennamo Valentina Bouche Chiara Colantuono Lucio Di Filippo Mariano Fiorenza Anna Manfredi Marcello Salvi Giuseppe Portella Andrea Ballabio Davide Cacchiarelli
EPI_ISL_1854981, EPI_ISL_1854982, EPI_ISL_1854983, EPI_ISL_1854984	Virology Laboratory, Scientific Department, Army Medical Center	Virology Laboratory, Scientific Department, Army Medical Center	Silvia Fillo, Riccardo De Sanctis, Antonella Fortunato, Anella Monte, Anna Anselmo, Vanessa Vera Fain, Francesco Giordani, Giandomenico Cerreto, Filippo Molinari, Giancarlo Petralito, Florio Lisa
EPI_ISL_2138923	Laboratorio HUB -Azienda Ospedaliero Universitaria - AOU - Cagliari	Laboratorio SPOKE Biologia Molecolare -Azienda Ospedaliero Universitaria - AOU - Cagliari	Germano Orrù, Alessandra Scano, Sara Fais, Valentina Medda, Miriam Loddò, Riccardo Cappai, Ferdinando Coghe
EPI_ISL_2138924	Laboratorio HUB -Azienda Ospedaliero Universitaria - AOU - Cagliari	Laboratorio SPOKE Biologia Molecolare -Azienda Ospedaliero Universitaria - AOU - Cagliari	Alessandra Scano, Germano Orrù, Sara Fais, Valentina Medda, Miriam Loddò, Riccardo Cappai, Ferdinando Coghe
EPI_ISL_2282167	Istituto Zooprofilattico Sperimentale del Mezzogiorno	TIGEM	Antonio Grimaldi Patrizia Annunziata Francesco Panariello Biancamaria Pierri Claudia Tiberio Teresa Giuliano Valentina Bouche Chiara Colantuono Maria Concetta Cuomo Denise Di Concilio Lucio Di Filippo Anna Manfredi Marcello Salvi Antonio Limone Luigi Atripaldi Pellegrino Cerino Andrea Ballabio Davide Cacchiarelli
EPI_ISL_2450729, EPI_ISL_2450730, EPI_ISL_2450731, EPI_ISL_2450732, EPI_ISL_2450733, EPI_ISL_2450734, EPI_ISL_2450735, EPI_ISL_2450736, EPI_ISL_2450737	Virology Laboratory, Department of Biomedical Sciences and Public Health, University Politecnica delle Marche	Virology and Legal Medicine Laboratories, Department of Biomedical Sciences and Public Health, University Politecnica delle Marche	Sara Caucci, Patrizia Bagnarelli, Stefano Menzo, Federica Alessandrini, Valerio Onofri, Chiara Turchi, Filomena Melchionda, Adriano Tagliabracchi

EPI_ISL_2484209, EPI_ISL_2484210, EPI_ISL_2484211, EPI_ISL_2484212, EPI_ISL_2484213, EPI_ISL_2484214, EPI_ISL_2484215, EPI_ISL_2484216	University of Brescia - Dept. of Molecular and Translational Medicine	Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna (IZSLER), Risk Analysis and Genomic Epidemiology Unit	Caruso Arnaldo, Fiorentini Simona, Caccuri Francesca, Messali Serena, Zani Alberto, Marina Morganti, Erika Scaltrini, Stefano Pongolini
EPI_ISL_410545	INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Maria R. Capobianchi, Cesare E. M. Gruber, Martina Rueca, Barbara Bartolini, Francesco Messina, Emanuela Giombini, Francesca Colavita, Concetta Castilletti, Eleonora Lalle, Fabrizio Carletti, Emanuele Nicastri, Giuseppe Ippolito.
EPI_ISL_410546	INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Maria R. Capobianchi, Cesare E. M. Gruber, Martina Rueca, Barbara Bartolini, Francesco Messina, Emanuela Giombini, Francesca Colavita, Concetta Castilletti, Eleonora Lalle, Emanuele Nicastri, Giuseppe Ippolito.
EPI_ISL_412973	Department of Infectious Diseases, Istituto Superiore di Sanità, Rome, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Stefano Fiore, Antonella Marchi, Eleonora Benedetti, Concetta Fabiani, Giovanni Faggioli, Antonella Fortunato, Riccardo De Santis, Silvia Fillo, Anna Anselmo, Andrea Ciannarucci, Stefano Palomba, Florio Lista
EPI_ISL_412974	Department of Infectious Diseases, Istituto Superiore di Sanità, Rome, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Stefano Fiore, Antonella Marchi, Eleonora Benedetti, Concetta Fabiani, Giovanni Faggioli, Antonella Fortunato, Silvia Fillo, Riccardo De Santis, Andrea Ciannarucci, Giancarlo Petralito, Filippo Molinari, Florio Lista
EPI_ISL_413489	Laboratorio di Microbiologia e Virologia, Università Vita-Salute San Raffaele, Milano	Laboratorio di Microbiologia e Virologia, Università Vita-Salute San Raffaele, Milano	R.A. Diotti, E. Crisculo, M. Castelli, V. Caputo, R. Ferrarese, M. Sampaolo, E. Boeri, I. Negri, V. Amato, G. Lo Raso, C. Di Resta, R. Burioni, M. Clementi, N. Mancini & N. Clementi
EPI_ISL_417418	Laboratory of Molecular Virology International Center for Genetic Engineering and Biotechnology (ICGEB)	ARGO Open Lab Platform for Genome sequencing	Licastro D, Rajasekharan S, Dal Monego S, Segat L, D'Agaro P, Marcello A
EPI_ISL_417419, EPI_ISL_417421	Laboratory of Molecular Virology International Center for Genetic Engineering and Biotechnology (ICGEB)	ARGO Open Lab Platform for Genome sequencing	Licastro D, Rajasekharan S, Dal Monego S, Segat L, D'Agaro P, Marcello A
EPI_ISL_417423	Laboratory of Molecular Virology International Center for Genetic Engineering and Biotechnology (ICGEB)	ARGO Open Lab Platform for Genome sequencing	Licastro D, Rajasekharan, Dal Monego S, Segat L, D'Agaro P, Marcello A
EPI_ISL_417445, EPI_ISL_417447	Laboratory of Infectious Diseases, Department of Biomedical and Clinical Sciences L. Sacco, University of Milan	Laboratory of Infectious Diseases, Department of Biomedical and Clinical Sciences L. Sacco, University of Milan	Gianguglielmo Zehender, Alessia Lai, Annalisa Bergha, Luca Meroni, Agostino Riva, Claudia Balotta, Maciej Tarkowski, Arianna Gabrieli, Dario Bernachia, Stefano Rusconi, Giuliano Rizzardi, Spriello Antinori, Massimo Galli
EPI_ISL_417491	Virology Laboratory, Department of Biomedical Sciences and Public Health, University Politecnica delle Marche	Virology and Legal Medicine Laboratories, Department of Biomedical Sciences and Public Health, University Politecnica delle Marche	Bagnarelli P., Caucci S., Di Santile L., Menzo S., Alessandrini F., Onofri V., Turchi C., Tagliabracchi A.
EPI_ISL_417921	INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Martina Rueca, Barbara Bartolini, Francesco Messina, Cesare E. M. Gruber, Emanuela Giombini, Maria R. Capobianchi, Fabrizio Carletti, Francesca Colavita, Concetta Castilletti, Eleonora Lalle, Daniele Lapa, Giuseppe Ippolito.
EPI_ISL_417922	INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Cesare E. M. Gruber, Martina Rueca, Barbara Bartolini, Francesco Messina, Emanuela Giombini, Maria R. Capobianchi, Fabrizio Carletti, Francesca Colavita, Concetta Castilletti, Eleonora Lalle, Daniele Lapa, Giuseppe Ippolito.
EPI_ISL_417923	INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Francesco Messina, Barbara Bartolini, Martina Rueca, Cesare E. M. Gruber, Emanuela Giombini, Maria R. Capobianchi, Fabrizio Carletti, Francesca Colavita, Concetta Castilletti, Eleonora Lalle, Daniele Lapa, Giuseppe Ippolito.
EPI_ISL_418255	Presidio Ospedaliero "S. Spirito" - PESCARA	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Maracci M, Cammà C, Monaco F, Puglia I, Di Pasquale A, Rinaldi A, Mangone I, Savini G
EPI_ISL_418256	Ospedale "San Liberatore" di Atri	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Maracci M, Di Domenico M, Puglia I, Curini V, Ancora M, Di Pasquale A, Rinaldi A, Mangone I, Cammà C, Savini G.
EPI_ISL_418257	Ospedale Civile Giuseppe Mazzini, Teramo	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Maracci M, Di Domenico M, Puglia I, Curini V, Ancora M, Di Pasquale A, Rinaldi A, Mangone I, Cammà C, Savini G.
EPI_ISL_418258, EPI_ISL_418259	Presidio ospedaliero "Santo Spirito"	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Maracci M, Di Domenico M, Puglia I, Curini V, Ancora M, Di Pasquale A, Rinaldi A, Mangone I, Cammà C, Savini G.
EPI_ISL_418260	Ospedale Civile Giuseppe Mazzini	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Maracci M, Di Domenico M, Puglia I, Curini V, Ancora M, Di Pasquale A, Rinaldi A, Mangone I, Cammà C, Savini G.
EPI_ISL_419254	INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Barbara Bartolini, Martina Rueca, Francesco Messina, Cesare E. M. Gruber, Emanuela Giombini, Maria R. Capobianchi, Fabrizio Carletti, Francesca Colavita, Concetta Castilletti, Eleonora Lalle, Daniele Lapa, Giuseppe Ippolito.
EPI_ISL_419255	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Antonino Di Caro, Cesare E. M. Gruber, Martina Rueca, Barbara Bartolini, Francesco Messina, Emanuela Giombini, Maria R. Capobianchi, Fabrizio Carletti, Francesca Colavita, Concetta Castilletti, Eleonora Lalle, Daniele Lapa, Giuseppe Ippolito.
EPI_ISL_420563	Ospedale Civile Giuseppe Mazzini	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Maracci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_420564	Ospedale Civile Castel Di Sangro	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Maracci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_420565	Ospedale Civile Giuseppe Mazzini	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Maracci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_420566, EPI_ISL_420567	Ospedale Regionale San Salvatore	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Maracci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_420568, EPI_ISL_420569, EPI_ISL_420583	Ospedale Civile Giuseppe Mazzini	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Maracci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_422437, EPI_ISL_422438	ULSS9 Distretto di Bussolengo	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvato, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Teregino, Antonia Ricci
EPI_ISL_424342	INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Concetta Castilletti, Barbara Bartolini, Martina Rueca, Cesare Ernesto Maria Gruber, Francesco Messina, Fabrizio Carletti, Eleonora Lalle, Licia Bordini, Giulia Matusali, Francesca Colavita, Maria Rosaria Capobianchi, Francesco Vairo, Giuseppe Ippolito, Antonino Di Caro
EPI_ISL_424343	INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Fabrizio Carletti, Barbara Bartolini, Martina Rueca, Cesare Ernesto Maria Gruber, Francesco Messina, Eleonora Lalle, Licia Bordini, Giulia Matusali, Francesca Colavita, Maria Rosaria Capobianchi, Concetta Castilletti, Francesco Vairo, Giuseppe Ippolito, Antonino Di Caro
EPI_ISL_424344	INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Eleonora Lalle, Barbara Bartolini, Martina Rueca, Cesare Ernesto Maria Gruber, Francesco Messina, Fabrizio Carletti, Licia Bordini, Giulia Matusali, Francesca Colavita, Maria Rosaria Capobianchi, Concetta Castilletti, Francesco Vairo, Giuseppe Ippolito, Antonino Di Caro
EPI_ISL_428853	Laboratory of Molecular Virology International Center for Genetic Engineering and Biotechnology (ICGEB)	ARGO Open Lab Platform for Genome Sequencing	Licastro D, Rajasekharan S, Dal Monego S, Segat L, D'Agaro P, Marcello A
EPI_ISL_428854	Laboratory of Molecular Virology International Center for Genetic Engineering and Biotechnology (ICGEB)	ARGO Open Lab Platform for Genome sequencing	Licastro D, Rajasekharan S, Dal Monego S, Segat L, D'Agaro P, Marcello A
EPI_ISL_429226, EPI_ISL_429227	Presidio Ospedaliero Santo Spirito	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Maracci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_429228, EPI_ISL_429231, EPI_ISL_429232, EPI_ISL_429235	Ospedale Civile Giuseppe Mazzini	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Maracci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G

EPI_ISL_429236	Ospedale Civile S. Liberatore di Atri	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_435145	Ospedale Civile Giuseppe Mazzini	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_435146, EPI_ISL_435147	Villa Serena del Dr. Leonardo Petruzzi	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_435148	Ospedale SS Annunziata	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_435149	SERVIZIO DI IGIENE E SANITÀ PUBBLICA ASL Teramo	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_435150, EPI_ISL_435151	Ospedale SS Annunziata	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_435152	Servizio di Igiene, Epidemiologia e Sanità Pubblica (SIESP)	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_435153, EPI_ISL_435154, EPI_ISL_435155	SERVIZIO DI IGIENE E SANITÀ PUBBLICA ASL Teramo	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_436718	Ospedale Regionale San Salvatore	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_436719, EPI_ISL_436720, EPI_ISL_436721, EPI_ISL_436722	Ospedale Civile S. Liberatore di Atri	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_436723	Ospedale Civile Giuseppe Mazzini	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_436724	Ospedale Civile S. Liberatore di Atri	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_436725	RSARP Villa San Giovanni - Gruppo Edos	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_436726, EPI_ISL_436727, EPI_ISL_436729	SERVIZIO DI IGIENE E SANITÀ PUBBLICA ASL Teramo	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_436730	Servizio di igiene epidemiologia e sanità pubblica (Siesp) Chieti	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_436731, EPI_ISL_436732	Ospedale Civile S. Liberatore di Atri	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Ancora M, Curini V, Mangone I, Rinaldi A, Di Pasquale A, Cammà C, Puglia I, Savini G
EPI_ISL_451298	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Cesare E.M. Gruber, Martina Rueca, Barbara Bartolini, Francesco Messina, Antonino Di Caro, Maria R. Capobianchi, Giuseppe Ippolito
EPI_ISL_451299	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Martina Rueca, Cesare E.M. Gruber, Barbara Bartolini, Francesco Messina, Antonino Di Caro, Maria R. Capobianchi, Giuseppe Ippolito
EPI_ISL_451300	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Cesare E.M. Gruber, Martina Rueca, Barbara Bartolini, Francesco Messina, Antonino Di Caro, Maria R. Capobianchi, Giuseppe Ippolito
EPI_ISL_451301	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Martina Rueca, Cesare E.M. Gruber, Barbara Bartolini, Francesco Messina, Antonino Di Caro, Maria R. Capobianchi, Giuseppe Ippolito
EPI_ISL_451302	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Cesare E.M. Gruber, Martina Rueca, Barbara Bartolini, Francesco Messina, Antonino Di Caro, Maria R. Capobianchi, Giuseppe Ippolito
EPI_ISL_451303	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Martina Rueca, Cesare E.M. Gruber, Barbara Bartolini, Francesco Messina, Antonino Di Caro, Maria R. Capobianchi, Giuseppe Ippolito
EPI_ISL_451304	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Cesare E.M. Gruber, Martina Rueca, Barbara Bartolini, Francesco Messina, Antonino Di Caro, Maria R. Capobianchi, Giuseppe Ippolito
EPI_ISL_451306	Molecular Virology Unit, Fondazione IRCCS Policlinico San Matteo , Pavia	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Antonio Piralla, Fausto Baldanti, Martina Rueca, Antonino Di Caro, Maria R. Capobianchi, Cesare E.M. Gruber, Barbara Bartolini
EPI_ISL_451307	Molecular Virology Unit, Fondazione IRCCS Policlinico San Matteo , Pavia	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Fausto Baldanti, Antonio Piralla, Antonino Di Caro, Cesare E.M. Gruber, Martina Rueca, Barbara Bartolini, Maria R. Capobianchi
EPI_ISL_451308	Molecular Virology Unit, Fondazione IRCCS Policlinico San Matteo , Pavia	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Antonio Piralla, Fausto Baldanti, Maria R. Capobianchi, Cesare E.M. Gruber, Martina Rueca, Barbara Bartolini, Antonino Di Caro
EPI_ISL_451309	Molecular Virology Unit, Fondazione IRCCS Policlinico San Matteo , Pavia	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Fausto Baldanti, Antonio Piralla, Cesare E.M. Gruber, Maria R. Capobianchi, Antonino Di Caro, Martina Rueca, Barbara Bartolini
EPI_ISL_451961	Istituto Zooprofilattico Sperimentale Puglia e Basilicata; Dipartimento di Bioscienze, Biotecnologie e Biofarmaceutica dell'Università degli Studi di Bari "A.Moro"; Istituto di Biomembrane, Bioenergetica e Biotecnologie Molecolari del Consiglio Nazionale delle Ricerche di Bari	Beaonlab (Bioinformatics Evolution and Comparative Genomics lab), Dept of Biosciences, University of Milan	Parisi A.,Pesole G., Manzari C., Chiara M.
EPI_ISL_451962	Istituto Zooprofilattico Sperimentale Puglia e Basilicata; Dipartimento di Bioscienze, Biotecnologie e Biofarmaceutica dell'Università degli Studi di Bari "A.Moro"; Istituto di Biomembrane, Bioenergetica e Biotecnologie Molecolari del Consiglio Nazionale delle Ricerche di Bari	Beaonlab (Bioinformatics, Evolution and Comparative Genomics lab), Dept of Biosciences, University of Milan	Parisi A.,Pesole G., Manzari C., Chiara M.
EPI_ISL_452181, EPI_ISL_452182, EPI_ISL_452183, EPI_ISL_452184, EPI_ISL_452185, EPI_ISL_452186, EPI_ISL_452187, EPI_ISL_452188, EPI_ISL_452189	ULSS9 Distretto di Bussolengo	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvato, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Terregino, Antonia Ricci
EPI_ISL_452190, EPI_ISL_452191	ULSS9 Distretto di San Bonifacio	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvato, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Terregino, Antonia Ricci
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EPI_ISL_457699, EPI_ISL_457700	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma , Italy	Army Medical and Veterinary Research Center	Paola Stefanelli, Alessandra Lo Presti, Stefano Fiore, Antonella Marchi, Eleonora Benedetti, Concetta Fabiani Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fairn, Nino D'Amore, Florio Lista
EPI_ISL_457721, EPI_ISL_457724, EPI_ISL_457728, EPI_ISL_457732, EPI_ISL_457736, EPI_ISL_457749	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma , Italy	Army Medical and Veterinary Research Center	Paola Stefanelli, Alessandra Lo Presti, Stefano Fiore, Antonella Marchi, Eleonora Benedetti, Concetta Fabiani Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fairn, Nino D'Amore, Florio Lista

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EPI_ISL_457826	Army Medical Center - Scientific Department	Army Medical and Veterinary Research Center	Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florio Lista
EPI_ISL_458084	Laboratorio Biologia Molecolare Sars Cov2 - UOC Laboratorio Analisi - Servizio Medicina di Laboratorio, Ospedale "San Francesco" - ATS-ASSL Nuoro	Laboratorio specialistico UOC Ematologia - Ospedale "San Francesco" - ATS-ASSL Nuoro	Piras Giovanna, Fancello Tatiana, Asproni Rosanna, Fiamma Maura, Monne Maria Itria, Toja Alessandro, Sanna Filomena, Floris Anna Rita, Sulis Vincenzo, Palmas Angelo Domenico, Casu Gavino, Lo Maglio Iana, Mamei Giuseppe.
EPI_ISL_458085	Laboratorio Biologia Molecolare Sars Cov2 - UOC Laboratorio Analisi - Servizio Medicina di Laboratorio, Ospedale "San Francesco" - ATS-ASSL Nuoro	Laboratorio specialistico UOC Ematologia - Ospedale "San Francesco" - ATS-ASSL Nuoro	Piras Giovanna, Fancello Tatiana, Asproni Rosanna, Fiamma Maura, Monne Maria Itria, Toja Alessandro, Sanna Filomena, Floris Anna Rita, Sulis Vincenzo, Palmas Angelo Domenico, Casu Gavino, Lo Maglio Iana, Mamei Giuseppe.
EPI_ISL_460079	Molecular Virology Unit, Fondazione IRCCS Policlinico San Matteo, Pavia	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Barbara Bartolini, Cesare E.M. Gruber, Maria R. Capobianchi, Martina Rueca, Antonio Piralla, Fausto Baldanti, Antonino Di Caro
EPI_ISL_460080	Molecular Virology Unit, Fondazione IRCCS Policlinico San Matteo, Pavia	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Antonio Piralla, Barbara Bartolini, Fausto Baldanti, Martina Rueca, Antonino Di Caro, Cesare E.M. Gruber, Maria R. Capobianchi
EPI_ISL_460081	Molecular Virology Unit, Fondazione IRCCS Policlinico San Matteo, Pavia	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Fausto Baldanti, Martina Rueca, Antonio Piralla, Antonino Di Caro, Maria R. Capobianchi, Cesare E.M. Gruber, Barbara Bartolini
EPI_ISL_460082	Molecular Virology Unit, Fondazione IRCCS Policlinico San Matteo, Pavia	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Martina Rueca, Cesare E.M. Gruber, Antonio Piralla, Antonino Di Caro, Barbara Bartolini, Maria R. Capobianchi, Fausto Baldanti
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EPI_ISL_460084	Molecular Virology Unit, Fondazione IRCCS Policlinico San Matteo, Pavia	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Fausto Baldanti, Antonio Piralla, Martina Rueca, Barbara Bartolini, Maria R. Capobianchi, Cesare E.M. Gruber, Antonino Di Caro
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EPI_ISL_460086	Molecular Virology Unit, Fondazione IRCCS Policlinico San Matteo, Pavia	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Maria R. Capobianchi, Fausto Baldanti, Antonio Piralla, Antonino Di Caro, Barbara Bartolini, Cesare E.M. Gruber, Martina Rueca
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EPI_ISL_460089	Molecular Virology Unit, Fondazione IRCCS Policlinico San Matteo, Pavia	Laboratory of Virology, INMI Lazzaro Spallanzani IRCCS	Antonino Di Caro, Barbara Bartolini, Martina Rueca, Cesare E.M. Gruber, Antonio Piralla, Fausto Baldanti, Maria R. Capobianchi
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EPI_ISL_468914, EPI_ISL_469016, EPI_ISL_469018, EPI_ISL_469019, EPI_ISL_469020, EPI_ISL_469021, EPI_ISL_469022	Istituto Zooprofilattico Sperimentale Puglia e Basilicata; Dipartimento di Bioscienze, Biotecnologie e Biofarmaceutica dell'Università degli Studi di Bari "A.Moro"; Istituto di Biomembrane, Bioenergetica e Biotecnologie Molecolari del Consiglio Nazionale delle Ricerche di Bari	Beaconlab (Bioinformatics, Evolution and Comparative Genomics lab), Dept of Biosciences, University on Milan	Parisi A., Pesole G., Manzari C., Chiara M.
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EPI_ISL_477193, EPI_ISL_477194	Istituto Zooprofilattico Sperimentale Puglia e Basilicata;	Beaconlab (Bioinformatics, Evolution and Comparative Genomics lab), Dept of Biosciences, University on Milan	Parisi A., Pesole G., Manzari C., Chiara M.
EPI_ISL_477195, EPI_ISL_477196, EPI_ISL_477197, EPI_ISL_477198, EPI_ISL_477199, EPI_ISL_477200, EPI_ISL_477201	Istituto Zooprofilattico Sperimentale Puglia e Basilicata;	Beaconlab (Bioinformatics, Evolution and Comparative Genomics lab), Dept of Biosciences, University on Milan	Parisi A., Pesole G., Manzari C., Chiara M.
EPI_ISL_477202, EPI_ISL_477203	Istituto Zooprofilattico Sperimentale Puglia e Basilicata;	Beaconlab (Bioinformatics, Evolution and Comparative Genomics lab), Dept of Biosciences, University on Milan	Parisi A., Pesole G., Manzari C., Chiara M.
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EPI_ISL_479616, EPI_ISL_479617	Laboratory of Molecular Virology of the International Centre for Genetic Engineering and Biotechnology (ICGEB)	ARGO Open Lab Platform for Genome Sequencing	Licastro, D, Rajasekharan S, Dal Monego S, Segat L, D'Agaro P, Salton F, Confalonieri P, Confalonieri M Marcello A
EPI_ISL_479618, EPI_ISL_479619, EPI_ISL_479790, EPI_ISL_479791	Laboratory of Molecular Virology of the International Centre for Genetic Engineering and Biotechnology (ICGEB)	ARGO Open Lab Platform for Genome Sequencing	Licastro, D, Rajasekharan S, Dal Monego S, Segat L, D'Agaro P, Salton F, Confalonieri P, Confalonieri M Marcello A

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EPI_ISL_486646	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Mancon A, Comandatore F, Romeri F, Micheli V, Rimoldi SG
EPI_ISL_486650	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Romeri F, Comandatore F, Mancon A, Micheli V, Rimoldi SG
EPI_ISL_486651	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Mancon A, Comandatore F, Romeri F, Micheli V, Rimoldi SG
EPI_ISL_486652	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Micheli V, Comandatore F, Romeri F, Mancon A, Rimoldi SG
EPI_ISL_486653	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Rimoldi SG, Comandatore F, Romeri F, Mancon A, Micheli V
EPI_ISL_486655	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Mancon A, Comandatore F, Romeri F, Micheli V, Rimoldi SG
EPI_ISL_486657	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Rimoldi SG, Comandatore F, Romeri F, Mancon A, Micheli V
EPI_ISL_486658	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Romeri F, Comandatore F, Mancon A, Micheli V, Rimoldi SG
EPI_ISL_486659	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Micheli V, Comandatore F, Romeri F, Mancon A, Rimoldi SG
EPI_ISL_486660	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Rimoldi SG, Comandatore F, Romeri F, Mancon A, Micheli V
EPI_ISL_486662	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Mancon A, Comandatore F, Romeri F, Micheli V, Rimoldi SG
EPI_ISL_486663	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Micheli V, Comandatore F, Romeri F, Mancon A, Rimoldi SG
EPI_ISL_486664	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Rimoldi SG, Comandatore F, Romeri F, Mancon A, Micheli V
EPI_ISL_486665	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Microbiology, Virology and Biemergency Laboratory-ASST FBF Sacco	Micheli V, Rimoldi SG, Comandatore F, Mancon A, Romeri F
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EPI_ISL_492980, EPI_ISL_492981, EPI_ISL_492982, EPI_ISL_492983, EPI_ISL_492984, EPI_ISL_492985, EPI_ISL_492986, EPI_ISL_492987	IRCCS Sacro Cuore Don Calabria Hospital, Department of Infectious, Tropical Diseases & Microbiology	University of Verona, Department of Biotechnology	Antonio Mori, Michela Deiana, Elena Pomari, Chiara Piubelli; Giulia Lopatriello, Luca Marcolungo, Cristina Beltrami, Chiara Degli Esposti, Emanuela Cosentino, Massimo Delleddone
EPI_ISL_493328	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Martina Rueca, Cesare E.M. Gruber, Barbara Bartolini, Francesco Messina, Maria R. Capobianchi, Antonino Di Caro
EPI_ISL_493329	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Barbara Bartolini, Martina Rueca, Cesare E.M. Gruber, Francesco Messina, Antonino Di Caro, Maria R. Capobianchi
EPI_ISL_493330	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Cesare E.M. Gruber, Martina Rueca, Barbara Bartolini, Francesco Messina, Maria R. Capobianchi, Antonino Di Caro
EPI_ISL_493331	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Martina Rueca, Cesare E.M. Gruber, Barbara Bartolini, Francesco Messina, Maria R. Capobianchi, Antonino Di Caro
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EPI_ISL_493333	Istituto Zooprofilattico Sperimentale del Mezzogiorno	INMI Lazzaro Spallanzani IRCCS	Barbara Bartolini, Martina Rueca, Cesare E.M. Gruber, Francesco Messina, Antonino Di Caro, Giovanna Fusco, Maurizio Viscardi, Giorgia Borriello, Maria R. Capobianchi
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EPI_ISL_516079, EPI_ISL_516080, EPI_ISL_516081, EPI_ISL_516082, EPI_ISL_516083, EPI_ISL_516084, EPI_ISL_516085, EPI_ISL_516086, EPI_ISL_516087, EPI_ISL_516088	Biomedical Sciences and Public Health, Polytechnic University of Marche	Biomedical Sciences and Public Health, Polytechnic University of Marche	Bagnarelli.P., Caucci.S., Di Sante.L., Menzo.S., Alessandrini.F., Onofri.V., Turchi.C., Melchionda.F., Tagliabracci.A.
EPI_ISL_522855	ULSS9 Distretto di Bussolengo	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvati, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Terregino, Antonia Ricci
EPI_ISL_522856	ULSS9 Distretto di San Bonifacio	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvati, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Terregino, Antonia Ricci
EPI_ISL_522857	ULSS9 Scaligera	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvati, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Terregino, Antonia Ricci
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EPI_ISL_522860, EPI_ISL_522861, EPI_ISL_522862, EPI_ISL_522863, EPI_ISL_522864, EPI_ISL_522865, EPI_ISL_522866, EPI_ISL_522867, EPI_ISL_522868	ULSS9 Distretto di Bussolengo	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvati, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Terregino, Antonia Ricci
EPI_ISL_525553, EPI_ISL_525555, EPI_ISL_525556, EPI_ISL_525557, EPI_ISL_525558, EPI_ISL_525559, EPI_ISL_525560, EPI_ISL_525561, EPI_ISL_525562, EPI_ISL_525563, EPI_ISL_525564, EPI_ISL_525565, EPI_ISL_525566, EPI_ISL_525567, EPI_ISL_525568, EPI_ISL_525569, EPI_ISL_525570, EPI_ISL_525571,			

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see above	Istituto Zooprofilattico Sperimentale Puglia e Basilicata; Dipartimento di Bioscienze, Biotecnologie e Biofarmaceutica dell'Università degli Studi di Bari "A.Moro"; Istituto di Biomembrane, Bioenergetica e Biotecnologie Molecolari del Consiglio Nazionale delle Ricerche di Bari	Beaonclab (Bioinformatics, Evolution and Comparative Genomics lab), Dept of Biosciences, University on Milan	Parisi A., Pesole G., Manzari C., Chiara M	
EPI_ISL_528919	Ospedale Civile S. Liberatore-Atri	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_528920, EPI_ISL_528921	Presidio Ospedaliero "Santo Spirito"-Pescara	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_528922, EPI_ISL_528924	Ospedale "Giuseppe Mazzini"-Teramo	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_528925	Ospedale Regionale San Salvatore-L'Aquila	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_528926, EPI_ISL_528927, EPI_ISL_528928	Ospedale "Giuseppe Mazzini"-Teramo	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_528929	Ospedale Civile S. Liberatore-Atri	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_528934, EPI_ISL_528935, EPI_ISL_528936, EPI_ISL_528937, EPI_ISL_528938, EPI_ISL_528939, EPI_ISL_528940, EPI_ISL_528941, EPI_ISL_528943, EPI_ISL_528944, EPI_ISL_528945, EPI_ISL_528946, EPI_ISL_528947, EPI_ISL_528948, EPI_ISL_528949	Agenzia di Tutela della Salute di Bergamo	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
see above				
EPI_ISL_528990	Ospedale Civile Maria SS. dello Splendore	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_528991	Ospedale SS Annunziata-Sulmona	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_528993	Ospedale Civile S. Liberatore-Atri	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_528994, EPI_ISL_528995, EPI_ISL_528996, EPI_ISL_528997, EPI_ISL_528998, EPI_ISL_528999, EPI_ISL_529000, EPI_ISL_529001, EPI_ISL_529003, EPI_ISL_529004, EPI_ISL_529005	Servizio di igiene epidemiologia e sanità pubblica (SIESP)-Chieti	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
see above				
EPI_ISL_529009	Ospedale Civile S. Liberatore-Atri	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_529016	Ospedale SS Annunziata-Sulmona	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_529018	Ospedale "Giuseppe Mazzini"-Teramo	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_529019	RSARP Villa San Giovanni - Gruppo Edos	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_529020, EPI_ISL_529021	Ospedale Civile S. Liberatore-Atri	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_529022	Ospedale "Ss. Annunziata"	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_529026	Ospedale "Giuseppe Mazzini"-Teramo	Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale"	Lorusso A, Marcacci M, Di Domenico M, Curini V, Ancora M, Cammà C, Rinaldi A, Mangone I, Di Pasquale A, Puglia I, Savini G.	
EPI_ISL_542098, EPI_ISL_542099, EPI_ISL_542100, EPI_ISL_542101, EPI_ISL_542102, EPI_ISL_542103, EPI_ISL_542104, EPI_ISL_542105, EPI_ISL_542106, EPI_ISL_542107, EPI_ISL_542108, EPI_ISL_542109, EPI_ISL_542110, EPI_ISL_542111, EPI_ISL_542112, EPI_ISL_542113, EPI_ISL_542114, EPI_ISL_542115, EPI_ISL_542116, EPI_ISL_542117, EPI_ISL_542118, EPI_ISL_542119, EPI_ISL_542120, EPI_ISL_542121, EPI_ISL_542122, EPI_ISL_542123, EPI_ISL_542124, EPI_ISL_542125, EPI_ISL_542126, EPI_ISL_542127, EPI_ISL_542128, EPI_ISL_542129, EPI_ISL_542130, EPI_ISL_542131, EPI_ISL_542132, EPI_ISL_542133, EPI_ISL_542134, EPI_ISL_542135, EPI_ISL_542136, EPI_ISL_542137, EPI_ISL_542138, EPI_ISL_542139, EPI_ISL_542140, EPI_ISL_542141, EPI_ISL_542142, EPI_ISL_542143, EPI_ISL_542144, EPI_ISL_542145, EPI_ISL_542146, EPI_ISL_542147, EPI_ISL_542148, EPI_ISL_542149, EPI_ISL_542150, EPI_ISL_542151, EPI_ISL_542152, EPI_ISL_542153, EPI_ISL_542154, EPI_ISL_542155, EPI_ISL_542156, EPI_ISL_542157, EPI_ISL_542158, EPI_ISL_542159, EPI_ISL_542160, EPI_ISL_542161, EPI_ISL_542162, EPI_ISL_542163, EPI_ISL_542164, EPI_ISL_542165, EPI_ISL_542166, EPI_ISL_542167, EPI_ISL_542168, EPI_ISL_542169, EPI_ISL_542170, EPI_ISL_542171, EPI_ISL_542172, EPI_ISL_542173, EPI_ISL_542174, EPI_ISL_542175, EPI_ISL_542176, EPI_ISL_542177, EPI_ISL_542178, EPI_ISL_542179, EPI_ISL_542180, EPI_ISL_542181, EPI_ISL_542182, EPI_ISL_542183, EPI_ISL_542184, EPI_ISL_542185, EPI_ISL_542186, EPI_ISL_542187, EPI_ISL_542188, EPI_ISL_542189, EPI_ISL_542190, EPI_ISL_542191, EPI_ISL_542192, EPI_ISL_542193, EPI_ISL_542194, EPI_ISL_542195, EPI_ISL_542196, EPI_ISL_542197, EPI_ISL_542198, EPI_ISL_542199, EPI_ISL_542200, EPI_ISL_542201, EPI_ISL_542202, EPI_ISL_542203, EPI_ISL_542204, EPI_ISL_542205, EPI_ISL_542206, EPI_ISL_542207, EPI_ISL_542208, EPI_ISL_542209, EPI_ISL_542210, EPI_ISL_542211, EPI_ISL_542212, EPI_ISL_542213, EPI_ISL_542214, EPI_ISL_542215, EPI_ISL_542216, EPI_ISL_542217, EPI_ISL_542218, EPI_ISL_542219, EPI_ISL_542220, EPI_ISL_542221, EPI_ISL_542222, EPI_ISL_542223, EPI_ISL_542224, EPI_ISL_542225, EPI_ISL_542226, EPI_ISL_542228, EPI_ISL_542229, EPI_ISL_542230, EPI_ISL_542231, EPI_ISL_542232, EPI_ISL_542233, EPI_ISL_542234, EPI_ISL_542235, EPI_ISL_542236, EPI_ISL_542237, EPI_ISL_542238, EPI_ISL_542239, EPI_ISL_542240, EPI_ISL_542241, EPI_ISL_542242, EPI_ISL_542243, EPI_ISL_542244, EPI_ISL_542245, EPI_ISL_542246, EPI_ISL_542247, EPI_ISL_542248, EPI_ISL_542249, EPI_ISL_542250, EPI_ISL_542251, EPI_ISL_542252, EPI_ISL_542253, EPI_ISL_542254, EPI_ISL_542255, EPI_ISL_542256, EPI_ISL_542257, EPI_ISL_542258, EPI_ISL_542259, EPI_ISL_542260, EPI_ISL_542261, EPI_ISL_542262, EPI_ISL_542263, EPI_ISL_542264, EPI_ISL_542265, EPI_ISL_542266, EPI_ISL_542267, EPI_ISL_542268, EPI_ISL_542269, EPI_ISL_542270, EPI_ISL_542271, EPI_ISL_542272, EPI_ISL_542273, EPI_ISL_542274, EPI_ISL_542275, EPI_ISL_542276, EPI_ISL_542277	Dep. Of Oncology and Hemato-Oncology University of Milan	Claudia Alteri, Valeria Cento, Antonio Piralla, Valentino Costabile, Monica Tallarita, Luna Colagrossi, Silvia Renica, Federica Giardina, Federica Novazzi, Stefano Gaiarsa, Elisa Matarazzo, Maria Antonello, Chiara Vismara, Roberto Fumagalli, Oscar Massimiliano Epis, Massimo Puoti, Carlo Federico Perno, Fausto Baldanti		
see above	ASST GOM Niguarda	Dep. Of Oncology and Hemato-Oncology University of Milan	Claudia Alteri, Valeria Cento, Antonio Piralla, Valentino Costabile, Monica Tallarita, Luna Colagrossi, Silvia Renica, Federica Giardina, Federica Novazzi, Stefano Gaiarsa, Elisa Matarazzo, Maria Antonello, Chiara Vismara, Roberto Fumagalli, Oscar Massimiliano Epis, Massimo Puoti, Carlo Federico Perno, Fausto Baldanti	
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see above				
EPI_ISL_542400, EPI_ISL_542401, EPI_ISL_542402, EPI_ISL_542403, EPI_ISL_542404, EPI_ISL_542405, EPI_ISL_542406, EPI_ISL_542407, EPI_ISL_542408, EPI_ISL_542409, EPI_ISL_542410, EPI_ISL_542411, EPI_ISL_542412, EPI_ISL_542413, EPI_ISL_542414, EPI_ISL_542415, EPI_ISL_542416, EPI_ISL_542417, EPI_ISL_542418, EPI_ISL_542419, EPI_ISL_542420, EPI_ISL_542421, EPI_ISL_542422, EPI_ISL_542423, EPI_ISL_542424, EPI_ISL_542425, EPI_ISL_542426, EPI_ISL_542427, EPI_ISL_542428, EPI_ISL_542429, EPI_ISL_542430, EPI_ISL_542431, EPI_ISL_542432, EPI_ISL_542433, EPI_ISL_542434, EPI_ISL_542435, EPI_ISL_542436, EPI_ISL_542437, EPI_ISL_542438, EPI_ISL_542439, EPI_ISL_542440, EPI_ISL_542441, EPI_ISL_542442, EPI_ISL_542443	ASST GOM Niguarda	Dep. Of Oncology and Hemato-Oncology University of Milan	Claudia Alteri, Valeria Cento, Antonio Piralla, Valentino Costabile, Monica Tallarita, Luna Colagrossi, Silvia Renica, Federica Giardina, Federica Novazzi, Stefano Gaiarsa, Elisa Matarazzo, Maria Antonello, Chiara Vismara, Roberto Fumagalli, Oscar Massimiliano Epis, Massimo Puoti, Carlo Federico Perno, Fausto Baldanti	
see above				

EPI_ISL_560407	Istituto Zooprofilattico Sperimentale del Mezzogiorno	INMI Lazzaro Spallanzani IRCCS	Barbara Bartolini, Cesare E.M. Gruber, Martina Rueca, Francesco Messina, Antonino Di Caro, Giovanna Fusco, Maurizio Viscardi, Giorgia Borriello, Sergio Brandi, Maria R. Capobianchi
EPI_ISL_568579	Virus Molecular Laboratory of the Microbiology and Virology Department	INMI Lazzaro Spallanzani IRCCS	Cesare E.M. Gruber, Martina Rueca, Barbara Bartolini, Francesco Messina, Silvia Meschi, Francesca Colavita, Concetta Castilletti, Elena Percivalle, Irene Cassaniti, Edoardo Vecchio Nepita, Fausto Baldanti, Maria R. Capobianchi, Antonino Di Caro
EPI_ISL_569865, EPI_ISL_569866, EPI_ISL_569867, EPI_ISL_569868, EPI_ISL_569869, EPI_ISL_569870, EPI_ISL_569871, EPI_ISL_569872, EPI_ISL_569873, EPI_ISL_569874, EPI_ISL_569875, EPI_ISL_569876, EPI_ISL_569877, EPI_ISL_569878, EPI_ISL_569879, EPI_ISL_569880, EPI_ISL_569881, EPI_ISL_569882, EPI_ISL_569883, EPI_ISL_569884, EPI_ISL_569885, EPI_ISL_569886	see above	Crosetto lab, Karolinska Institutet, SciLifeLab	Michele Simonetti, Maria Grazia Mila, Luuk Harbers, Ning Zhang, Anna Sapino, Valeria Ghisetti, Nicola Crosetto
EPI_ISL_572324	IZSM	IZSM	Maurizio Viscardi, Lorena Cardillo, Giovanna Fusco
EPI_ISL_582123, EPI_ISL_583954, EPI_ISL_583955, EPI_ISL_583958, EPI_ISL_583959, EPI_ISL_583960, EPI_ISL_583961, EPI_ISL_583962	UOC Microbiologia e Virologia, Azienda Ospedaliera Universitaria Senese, Siena, Italy	Dipartimento di Biotechnologie Mediche	Maria Grazia Cusi, David Pinzauli, Claudia Gandolfo, Gabriele Anichini, Gianni Pozzi, Francesco Santoro
EPI_ISL_584048	Laboratory of Molecular Virology, Department of Biomedical, Surgical and Dental Sciences University of Milano	Laboratory of Molecular Virology, Department of Biomedical, Surgical and Dental Sciences University of Milano	Delbue,S., Modenese,A., Bianchi,M., Fattori,M., D'Alessandro,S., Pariani,E., Basilio,N., Galli,C. and Ferrante,P.
EPI_ISL_584049	Laboratory of Molecular Virology, Department of Biomedical, Surgical and Dental Sciences University of Milano	Laboratory of Molecular Virology, Department of Biomedical, Surgical and Dental Sciences University of Milano	Delbue,S., Modenese,A., Bianchi,M., Fattori,M., D'Alessandro,S.,Pariani,E., Basilio,N., Galli,C. and Ferrante,P.
EPI_ISL_584051	Laboratory of Molecular Virology, Department of Biomedical, Surgical and Dental Sciences University of Milano	Laboratory of Molecular Virology, Department of Biomedical, Surgical and Dental Sciences University of Milano	Delbue,S., Ferrante,P., Basilio,N., Parapini,S., Binda,S., D'Alessandro,S., Galli,C., Signorini,L., Primache,V., Anselmi,G. and Pariani,E
EPI_ISL_584052	Laboratory of Molecular Virology, Department of Biomedical, Surgical and Dental Sciences University of Milano	Laboratory of Molecular Virology, Department of Biomedical, Surgical and Dental Sciences University of Milano	Delbue,S., D'Alessandro,S., Modenese,A., Signorini,L., Parapini,S.,Dolci,M., Binda,S., Primache,V., Taramelli,D., Inconava,B. and Ferrante,P.
EPI_ISL_591327, EPI_ISL_591328, EPI_ISL_591331, EPI_ISL_591332, EPI_ISL_591333, EPI_ISL_591334, EPI_ISL_591335	Dipartimento di Biotechnologie Mediche, University of Siena	Dipartimento di Biotechnologie Mediche, University of Siena	Cusi,M.G., Pinzauli,D., Gandolfo,C., Anichini,G., Pozzi,G., Santoro,F.
EPI_ISL_603177	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Barbara Bartolini, Francesco Messina, Emanuela Giombini, Martina Rueca, Cesare E.M. Gruber, Simone Lanini, Maria R. Capobianchi, Antonino Di Caro
EPI_ISL_603178	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Martina Rueca, Francesco Messina, Cesare E.M. Gruber, Barbara Bartolini, Simone Lanini, Emanuela Giombini, Antonino Di Caro, Maria R. Capobianchi
EPI_ISL_603179	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Cesare E.M. Gruber, Barbara Bartolini, Francesco Messina, Martina Rueca, Emanuela Giombini, Simone Lanini, Antonino Di Caro, Maria R. Capobianchi
EPI_ISL_603180	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Barbara Bartolini, Cesare E.M. Gruber, Francesco Messina, Simone Lanini, Martina Rueca, Emanuela Giombini, Maria R. Capobianchi, Antonino Di Caro
EPI_ISL_603181	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Francesco Messina, Cesare E.M. Gruber, Barbara Bartolini, Martina Rueca, Simone Lanini, Emanuela Giombini, Maria R. Capobianchi, Antonino Di Caro
EPI_ISL_603182	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Martina Rueca, Barbara Bartolini, Cesare E.M. Gruber, Francesco Messina, Emanuela Giombini, Simone Lanini, Maria R. Capobianchi, Antonino Di Caro
EPI_ISL_603183	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Barbara Bartolini, Francesco Messina, Martina Rueca, Cesare E.M. Gruber, Emanuela Giombini, Simone Lanini, Maria R. Capobianchi, Antonino Di Caro
EPI_ISL_603184	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Martina Rueca, Barbara Bartolini, Francesco Messina, Cesare E.M. Gruber, Emanuela Giombini, Simone Lanini, Maria R. Capobianchi, Antonino Di Caro
EPI_ISL_603185	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Cesare E.M. Gruber, Martina Rueca, Barbara Bartolini, Francesco Messina, Simone Lanini, Emanuela Giombini, Maria R. Capobianchi, Antonino Di Caro
EPI_ISL_603186	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Francesco Messina, Martina Rueca, Barbara Bartolini, Cesare E.M. Gruber, Emanuela Giombini, Simone Lanini, Maria R. Capobianchi, Antonino Di Caro
EPI_ISL_603187	INMI Lazzaro Spallanzani IRCCS	INMI Lazzaro Spallanzani IRCCS	Cesare E.M. Gruber, Martina Rueca, Francesco Messina, Barbara Bartolini, Simone Lanini, Emanuela Giombini, Antonino Di Caro, Maria R. Capobianchi
EPI_ISL_613560	Laboratorio Biologia Molecolare Sars Cov2 - UOC Laboratorio Analisi - Servizio Medicina di Laboratorio, Ospedale "San Francesco" - ATS-ASSL Nuoro Via Mannironi 1, 08100 Nuoro	Laboratorio specialistico UOC Ematologia - Ospedale "San Francesco" - ATS-ASSL Nuoro Nuoro	Piras Giovanna, Fancello Tatiana, Asproni Rosanna, Fiamma Maura, Monne Maria Itria, Toja Alessandro, Sanna Filomena, Floris Anna Rita, Sulis Vincenzo, Palmas Angelo Domenico, Casu Gavino, Lo Maglio Iana, Mameli Giuseppe
EPI_ISL_613706, EPI_ISL_613953, EPI_ISL_613955, EPI_ISL_614396, EPI_ISL_614397, EPI_ISL_614398, EPI_ISL_614889	Laboratorio Biologia Molecolare Sars Cov2 - UOC Laboratorio Analisi - Servizio Medicina di Laboratorio, Ospedale "San Francesco" - ATS-ASSL Nuoro	Laboratorio specialistico UOC Ematologia - Ospedale "San Francesco" - ATS-ASSL Nuoro	Piras Giovanna, Fancello Tatiana, Asproni Rosanna, Fiamma Maura, Monne Maria Itria, Toja Alessandro, Sanna Filomena, Floris Anna Rita, Sulis Vincenzo, Palmas Angelo Domenico, Casu Gavino, Lo Maglio Iana, Mameli Giuseppe
EPI_ISL_636462, EPI_ISL_636463	ULSS6 Euganea	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvati, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Terregino, Antonia Ricci
EPI_ISL_636464	ULSS6 Piove di Sacco	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvati, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Terregino, Antonia Ricci
EPI_ISL_636467, EPI_ISL_636468, EPI_ISL_636469, EPI_ISL_636470	ULSS6 Distretto Padova Terme Colli	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvati, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Terregino, Antonia Ricci
EPI_ISL_636471, EPI_ISL_636472, EPI_ISL_636473	ULSS6 Piove di Sacco	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvati, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Terregino, Antonia Ricci
EPI_ISL_636474, EPI_ISL_636475	ULSS6 Distretto Padova Terme Colli	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvati, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Terregino, Antonia Ricci
EPI_ISL_636488	ULSS9 Scaligera	Istituto Zooprofilattico Sperimentale delle Venezie	Adelaide Milani, Alessia Schivo, Annalisa Salvati, Erika Giorgia Quaranta, Ambra Pastori, Bianca Zecchin, Alice Fusaro, Isabella Monne, Calogero Terregino, Antonia Ricci
EPI_ISL_637108, EPI_ISL_637109	Laboratorio Biologia Molecolare Sars Cov2 - UOC Laboratorio Analisi - Servizio Medicina di Laboratorio, Ospedale "San Francesco" - ATS-ASSL Nuoro	Laboratorio specialistico UOC Ematologia - Ospedale "San Francesco" - ATS-ASSL Nuoro	Piras Giovanna, Fancello Tatiana, Asproni Rosanna, Fiamma Maura, Monne Maria Itria, Toja Alessandro, Sanna Filomena, Floris Anna Rita, Sulis Vincenzo, Palmas Angelo Domenico, Casu Gavino, Lo Maglio Iana, Mameli Giuseppe
EPI_ISL_649189	Istituto Zooprofilattico Sperimentale della Puglia e della Basilicata	Istituto Zooprofilattico Sperimentale della Puglia e della Basilicata	Parisi A., Bianco A., Capozzi L., Del Sambre L., Manzulli V, Rondinone V., Pace L., Galante D., Cipolletta D.
EPI_ISL_653813	Istituto Zooprofilattico Sperimentale della Puglia e della Basilicata	Istituto Zooprofilattico Sperimentale della Puglia e della Basilicata	Parisi A., Bianco A., Capozzi L., Del Sambre L., Manzulli V, Rondinone V., Pace L., Cipolletta D., Galante D.
EPI_ISL_653814, EPI_ISL_653815, EPI_ISL_653816, EPI_ISL_653817, EPI_ISL_653818	I.R.C.C.S. "S. De Bellis" - Ente Ospedaliero	Istituto Zooprofilattico Sperimentale della Puglia e della Basilicata	Parisi A., Bianco A., Capozzi L., Del Sambre L., Lippolis A., Notarnicola M., Cipolletta D., Galante D.
EPI_ISL_738147, EPI_ISL_738194, EPI_ISL_738243	Microbiology and Virology Unit, Florence Careggi University Hospital	Microbiology and Virology Unit, Florence Careggi University Hospital	Vincenzo Di Pilato, Marco Coppi, Alberto Antonelli, Simona Pollini, Gian Maria Rossolini
EPI_ISL_751320, EPI_ISL_751321, EPI_ISL_751322, EPI_ISL_751333, EPI_ISL_751334, EPI_ISL_751336, EPI_ISL_751338, EPI_ISL_751347, EPI_ISL_751348, EPI_ISL_751349, EPI_ISL_751350, EPI_ISL_751351, EPI_ISL_751352, EPI_ISL_751353, EPI_ISL_751354, EPI_ISL_751355, EPI_ISL_751356, EPI_ISL_751357, EPI_ISL_751358, EPI_ISL_751359, EPI_ISL_751360, EPI_ISL_751361, EPI_ISL_751362, EPI_ISL_751363, EPI_ISL_751364, EPI_ISL_751365, EPI_ISL_751366, EPI_ISL_751367, EPI_ISL_751368, EPI_ISL_751369, EPI_ISL_751370, EPI_ISL_751371, EPI_ISL_751372, EPI_ISL_751373, EPI_ISL_751374, EPI_ISL_751375, EPI_ISL_751376, EPI_ISL_751377, EPI_ISL_751378, EPI_ISL_751379, EPI_ISL_751380, EPI_ISL_751381, EPI_ISL_751382, EPI_ISL_751383, EPI_ISL_751384, EPI_ISL_751385, EPI_ISL_751386, EPI_ISL_751387, EPI_ISL_751388, EPI_ISL_751389, EPI_ISL_751390, EPI_ISL_751391, EPI_ISL_751392, EPI_ISL_751393, EPI_ISL_751394, EPI_ISL_751395, EPI_ISL_751396, EPI_ISL_751397, EPI_ISL_751398, EPI_ISL_751399, EPI_ISL_751400, EPI_ISL_751401, EPI_ISL_751402, EPI_ISL_751403, EPI_ISL_751404, EPI_ISL_751405, EPI_ISL_751406, EPI_ISL_751407, EPI_ISL_751408, EPI_ISL_751409, EPI_ISL_751410, EPI_ISL_751411,			

EPI_ISL_751412, EPI_ISL_751413, EPI_ISL_751414, EPI_ISL_751415, EPI_ISL_751416, EPI_ISL_751417, EPI_ISL_751418, EPI_ISL_751419, EPI_ISL_751420, EPI_ISL_751421, EPI_ISL_751422, EPI_ISL_751423, EPI_ISL_751424, EPI_ISL_751425, EPI_ISL_751426, EPI_ISL_751427, EPI_ISL_751428, EPI_ISL_751429, EPI_ISL_751430, EPI_ISL_751431, EPI_ISL_751432, EPI_ISL_751433, EPI_ISL_751434, EPI_ISL_751435, EPI_ISL_751436, EPI_ISL_751437, EPI_ISL_751438, EPI_ISL_751439, EPI_ISL_751440, EPI_ISL_751441, EPI_ISL_751442, EPI_ISL_751443, EPI_ISL_751444, EPI_ISL_751445, EPI_ISL_751446, EPI_ISL_751447			
see above	IRCCS Sacro Cuore Don Calabria Hospital, Department of Infectious, Tropical Diseases & Microbiology	University of Verona, Department of Biotechnology	Antonio Mori, Michela Deiana, Elena Pomari, Chiara Piubelli; Giulia Lopatriello, Luca Marcolungo, Cristina Beltrami, Chiara Degli Esposti, Emanuela Cosentino, Massimo Delle Donne
EPI_ISL_767043	University of Bari Biomedical Sciences and Human Oncology	University of Bari Biomedical Sciences and Human Oncology	Maria Chironna, Anna Sallustio, Daniela Loconsole, Marisa Accogli
EPI_ISL_775259	INT Fondazione Pascale	INT Fondazione Pascale	INT Fondazione Pascale
EPI_ISL_778646, EPI_ISL_778647, EPI_ISL_778648, EPI_ISL_778649, EPI_ISL_778651, EPI_ISL_778652, EPI_ISL_778653, EPI_ISL_778654, EPI_ISL_778655, EPI_ISL_778656, EPI_ISL_778657, EPI_ISL_778658, EPI_ISL_778659, EPI_ISL_778660, EPI_ISL_778661, EPI_ISL_778662, EPI_ISL_778663, EPI_ISL_778664, EPI_ISL_778665, EPI_ISL_778666, EPI_ISL_778667, EPI_ISL_778668, EPI_ISL_778669, EPI_ISL_778670, EPI_ISL_778671, EPI_ISL_778673, EPI_ISL_778674, EPI_ISL_778676, EPI_ISL_778677, EPI_ISL_778678, EPI_ISL_778679, EPI_ISL_778680, EPI_ISL_778681, EPI_ISL_778682, EPI_ISL_778683, EPI_ISL_778684, EPI_ISL_778685, EPI_ISL_778686, EPI_ISL_778687, EPI_ISL_778689, EPI_ISL_778690, EPI_ISL_778696, EPI_ISL_778699, EPI_ISL_778700, EPI_ISL_778701, EPI_ISL_778702, EPI_ISL_778722, EPI_ISL_778723, EPI_ISL_778724, EPI_ISL_778725, EPI_ISL_778727, EPI_ISL_778728, EPI_ISL_778729, EPI_ISL_778730, EPI_ISL_778731, EPI_ISL_778732, EPI_ISL_778733, EPI_ISL_778734, EPI_ISL_778735, EPI_ISL_778736			
see above	Istituto Zooprofilattico Sperimentale del Mezzogiorno	TIGEM	Antonio Grimaldi, Patrizia Annunziata, Francesco Panariello, Biancamaria Pieri, Valentina Bouche, Chiara Colantuono, Maria Concetta Cuomo, Denise Di Concio, Lucio Di Filippo, Anna Manfredi, Marcello Salvi, Antonio Limone, Pellegrino Cerino, Andrea Ballabio, Davide Cacchiarelli
EPI_ISL_779704, EPI_ISL_779709, EPI_ISL_779712, EPI_ISL_779713, EPI_ISL_779714, EPI_ISL_780378, EPI_ISL_780381, EPI_ISL_780413	Laboratory of Infectious Diseases, Department of Biomedical and Clinical Sciences L. Sacco, University of Milan	Laboratory of Infectious Diseases, Department of Biomedical and Clinical Sciences L. Sacco, University of Milan	Alessia Lai, Annalisa Bergna, Carla Della Ventura, Claudia Balotta, Massimo Galli, Gianguglielmo Zehender on behalf of SARS-CoV-2 ITALIAN RESEARCH ENTERPRISE(SCIRE) Collaborative Group
EPI_ISL_788944, EPI_ISL_788945, EPI_ISL_788946, EPI_ISL_788947, EPI_ISL_788962, EPI_ISL_788963, EPI_ISL_788964, EPI_ISL_788965, EPI_ISL_788966, EPI_ISL_788967	Ospedale "Di Venere"	Beaconlab (Bioinformatics, Evolution and Comparative Genomics lab), Dept of Biosciences, University of Milan	Iacobellis M, d'Avenia M, Pilusio R, Parisi A, Chiara M, Manzari C, Pesole G
EPI_ISL_794745	Istituto Zooprofilattico Sperimentale della Puglia e della Basilicata	Istituto Zooprofilattico Sperimentale della Puglia e della Basilicata	Parisi A., Bianco A., Capozzi L., Del Sambro L., Manzulli V, Rondinone V., Pace L., Cipolletta D., Galante D.
EPI_ISL_803880, EPI_ISL_803881, EPI_ISL_803882, EPI_ISL_803883, EPI_ISL_803884, EPI_ISL_803885, EPI_ISL_803886, EPI_ISL_803887, EPI_ISL_803888, EPI_ISL_803891, EPI_ISL_803892, EPI_ISL_803893, EPI_ISL_803895	Department of Medical Biotechnologies, University of Siena	Department of Infectious Diseases, Department of Biomedical and Clinical Sciences L. Sacco, University of Milan	Ilaria Vicenti, Filippo Dragoni, Maurizio Zazzi, Maria Grazia Cusi, Alessia Lai, Annalisa Bergna, Carla Della Ventura, Claudia Balotta, Massimo Galli, Gianguglielmo Zehender on behalf of SARS-CoV-2 ITALIAN RESEARCH ENTERPRISE(SCIRE) Collaborative Group
EPI_ISL_812968	Department of Molecular Medicine, University of Padova	Department of Molecular Medicine, University of Padova	Lavezzo E., Franchin E., Barzon L., Del Vecchio C., Rossi L., Manganello R., Lorgian A., Abate D., Sotgiu M., De Candia E., Vanuzzo M.C., Besutti V., Saluzzo F., Onelia F., Pacenti M., Manuti L., Parisi S.G., Massi G., Trevisan M., Toppo S. and Crisanti A.
EPI_ISL_833535, EPI_ISL_833536, EPI_ISL_833537, EPI_ISL_833538, EPI_ISL_833539, EPI_ISL_833540, EPI_ISL_833541, EPI_ISL_833542, EPI_ISL_833543, EPI_ISL_833544, EPI_ISL_833545, EPI_ISL_833546, EPI_ISL_833547, EPI_ISL_833548, EPI_ISL_833549, EPI_ISL_833550, EPI_ISL_833551, EPI_ISL_833552, EPI_ISL_833553, EPI_ISL_833554, EPI_ISL_833555, EPI_ISL_833556, EPI_ISL_833557, EPI_ISL_833558, EPI_ISL_833559, EPI_ISL_833560, EPI_ISL_833561, EPI_ISL_833562, EPI_ISL_833563, EPI_ISL_833564, EPI_ISL_833565, EPI_ISL_833566, EPI_ISL_833567, EPI_ISL_833568, EPI_ISL_833569, EPI_ISL_833570	Istituto Zooprofilattico Sperimentale del Mezzogiorno	TIGEM	Antonio Grimaldi, Patrizia Annunziata, Francesco Panariello, Biancamaria Pieri, Valentina Bouche, Chiara Colantuono, Maria Concetta Cuomo, Denise Di Concio, Lucio Di Filippo, Anna Manfredi, Marcello Salvi, Antonio Limone, Pellegrino Cerino, Andrea Ballabio, Davide Cacchiarelli
EPI_ISL_855550	Department of Infectious Diseases, Istituto Superiore di Sanità, Rome, Italy	Istituto Superiore di Sanità (ISS)	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Gabriele Vaccari, Luca De Sabato, Ilaria Di Bartolo, Giovanni Ianiro, Manuela Marra, Maria Carollo, Marco Crescenzi
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EPI_ISL_855553	Department of Infectious Diseases, Istituto Superiore di Sanità, Rome, Italy	Istituto Superiore di Sanità (ISS)	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Gabriele Vaccari, Luca De Sabato, Ilaria Di Bartolo, Giovanni Ianiro, Manuela Marra, Maria Carollo, Marco Crescenzi
EPI_ISL_855554, EPI_ISL_855555	Department of Infectious Diseases, Istituto Superiore di Sanità, Rome, Italy; ASST G.O.M. Niguarda, Sezione Microbiologia e Virologia, Milano, Italy	Istituto Superiore di Sanità (ISS)	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Carlo Federico Perno, Gabriele Vaccari, Luca De Sabato, Ilaria Di Bartolo, Giovanni Ianiro, Manuela Marra, Maria Carollo, Marco Crescenzi
EPI_ISL_856712, EPI_ISL_856716, EPI_ISL_856721	Infectious Diseases Unit, Department of Internal Medicine, Azienda Ospedaliera-Universitaria di Padova	Laboratory of Infectious Diseases, Department of Biomedical and Clinical Sciences L. Sacco, University of Milan	Anna Maria Cattelan, Lolita Sasset, Davide Leoni, Alessia Lai, Annalisa Bergna, Carla Della Ventura, Claudia Balotta, Massimo Galli, Gianguglielmo Zehender on behalf of SARS-CoV-2 ITALIAN RESEARCH ENTERPRISE(SCIRE) Collaborative Group
EPI_ISL_856869	Virology Laboratory, Scientific Department, Army Medical Center	Virology Laboratory, Scientific Department, Army Medical Center	Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anella Monte, Anna Anselmo, Vanessa Vera Fain, Francesco Giordani, Nino D'Amore, Filippo Molinari, Giancarlo Petralito, Florio Lista
EPI_ISL_856870	Virology Laboratory, Scientific Department, Army Medical Center	Virology Laboratory, Scientific Department, Army Medical Center	Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anella Monte, Anna Anselmo, Vanessa Vera Fain, Francesco Giordani, Nino D'Amore, Filippo Molinari, Giancarlo Petralito, Florio Lista
EPI_ISL_856871	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; AORN dei Colli, UOC Microbiologia Virologia, Napoli, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Luigi Altigaldi, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florio Lista
EPI_ISL_856872, EPI_ISL_856873, EPI_ISL_856874, EPI_ISL_856875	Virology Laboratory, Scientific Department, Army Medical Center	Virology Laboratory, Scientific Department, Army Medical Center	Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anella Monte, Anna Anselmo, Vanessa Vera Fain, Francesco Giordani, Nino D'Amore, Filippo Molinari, Giancarlo Petralito, Florio Lista
EPI_ISL_856876	Virology Laboratory, Scientific Department, Army Medical Center	Virology Laboratory, Scientific Department, Army Medical Center	Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anella Monte, Anna Anselmo, Vanessa Vera Fain, Francesco Giordani, Nino D'Amore, Filippo Molinari, Giancarlo Petralito, Florio Lista
EPI_ISL_856877, EPI_ISL_856878	Virology Laboratory, Scientific Department, Army Medical Center	Virology Laboratory, Scientific Department, Army Medical Center	Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anella Monte, Anna Anselmo, Vanessa Vera Fain, Francesco Giordani, Nino D'Amore, Filippo Molinari, Giancarlo Petralito, Florio Lista
EPI_ISL_856879	Virology Laboratory, Scientific Department, Army Medical Center	Virology Laboratory, Scientific Department, Army Medical Center	Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anella Monte, Anna Anselmo, Vanessa Vera Fain, Francesco Giordani, Nino D'Amore, Filippo Molinari, Giancarlo Petralito, Florio Lista
EPI_ISL_856880	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; Ospedali Riuniti, Laboratorio Virologia, Ancona, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Patrizia Bagnarelli, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florio Lista
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EPI_ISL_856882	Virology Laboratory, Scientific Department, Army Medical Center	Virology Laboratory, Scientific Department, Army Medical Center	Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anella Monte, Anna Anselmo, Vanessa Vera Fain, Francesco Giordani, Nino D'Amore, Filippo Molinari, Giancarlo Petralito, Florio Lista
EPI_ISL_856883	Virology Laboratory, Scientific Department, Army Medical Center	Virology Laboratory, Scientific Department, Army Medical Center	Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anella Monte, Anna Anselmo, Vanessa Vera Fain, Francesco Giordani, Nino D'Amore, Filippo Molinari, Giancarlo Petralito, Florio Lista
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EPI_ISL_856887	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; AUOC Policlinico Bari, UOC Igienne, Bari, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Maria Chironna, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_856888	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; A.O.R. San Carlo di Potenza, Laboratorio Microbiologia e Virologia, Potenza, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Antonio Picerno, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_856889	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
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EPI_ISL_856891, EPI_ISL_856892	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; AORN dei Colli, UOC Microbiologia Virologia, Napoli, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Luigi Atripaldi, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_856893, EPI_ISL_856894	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; ASL Città di Torino, S.C. Microbiologia e Igienne e Sanità Pubblica, Trieste, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Pierlanfranco D'Agaro, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_856895, EPI_ISL_856896	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; Ospedali Riuniti, Laboratorio Virologia, Ancona, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Patrizia Bagnarelli, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_856897	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; PO Cardarelli, Laboratorio Analisi Microbiologia e Virologia, Campobasso, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Massimiliano Scutella, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_856898, EPI_ISL_856899	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; ASL di Roma, S.C. Microbiologia e Virologia, Torino, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Valeria Ghisetti, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_856900, EPI_ISL_856901	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; AOUP V. Emanuele di Catania, P.O. Gaspare Rodolico, Catania, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Guido Scalia, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_856902	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; AS Alto Adige, Microbiologia e Virologia, Bolzano, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Elisabetta Pagani, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_856903	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; PO Santa Chiara, Microbiologia e Virologia, Trento, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Paolo Lanzafame, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_856904	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_856905, EPI_ISL_856906	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; AO S.M. della Misericordia, S.C. Microbiologia, Perugia, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Barbara Camillon, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
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EPI_ISL_856908	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; PO Madre Teresa di Calcutta, UOC, Laboratorio Analisi ULSS 6 Euganea, Padova, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Giacomo Mezzapelle, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_856909	Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; ULSS 8 Benica Vicenza, UOC Microbiologia, Vicenza, Italy	Virology Laboratory, Scientific Department, Army Medical Center	Paola Stefanelli, Angela Di Martino, Alessandra Lo Presti, Stefano Fiore, Mario Rassu, Silvia Fillo, Giovanni Faggioni, Riccardo De Sanctis, Antonella Fortunato, Anna Anselmo, Francesco Giordani, Vanessa Vera Fain, Nino D'Amore, Florigio Lista
EPI_ISL_872027, EPI_ISL_872028, EPI_ISL_872029, EPI_ISL_872030, EPI_ISL_872031, EPI_ISL_872032, EPI_ISL_872033, EPI_ISL_872034, EPI_ISL_872035, EPI_ISL_872036	Ospedale "Di Venere"	Beacontlab (Bioinformatics, Evolution and Comparative Genomics lab), Dept of Biosciences, University of Milan	Iacobellis M, d'Avenia M, Pilusio R, Parisi A, Chiara M, Manzari C, Pesole G
EPI_ISL_875674	"1.AO Universitaria 'S. Giovanni di Dio e Ruggi D'Aragona, Scuola Medica Salernitana' Hospital / 2.UOC di Virologia e Microbiologia, Università della Campania 'L. Vanvitelli' / 3.AO Universitaria 'Federico II' Napoli Hospital / 4.AORN 'San Giuseppe Moscati' Avellino Hospital / 5.AO 'San Pio' - presidio G. Rummo' Benevento Hospital / 6.AO 'Sant'Anna e San Sebastiano' Caserta Hospital / 7.PO 'Maria Santissima Addolorata' Eboli Hospital / 8.Biogen Istituto di Ricerche Genetiche"	"1. Genome Research Center for Health (CRGS) / 2. Laboratory of Molecular Medicine and Genomics(LMMGE) / 3. Center for Research in Pure and Applied Mathematics (CRMPA)"	"Giorgio Giurato (Corresponding Author), Francesca Rizzo (Corresponding Author), Alessandro Weisz (Corresponding Author), Gianluigi Franci, Giovanni Nassa, Pasquale Pagliano, Roberta Tarallo, Elena Alexandrova, Ylenia D'Agostino, Carlo Ferravante, Jessica Lamberti, Viola Melone, Domenico Memoli, Valeria Mirio Cappa, Domenico Palumbo, Giovanni Pecoraro, Assunta Sellitto, Oriana Strianese, Ilaria Terenzi, Giuseppe Fenza, Aniello Gentile, Antonello Saccomanno, Sonia Amabile, Teresa Rocco, Annamaria Salvati, Emilia Vaccaro, Massimiliano Galdiero, Michele Cennamo, Giuseppe Portella, Maria Grazia Foti, Mariarosaria Ingino, Maria Landi, Maurizio Fumi, Vincenzo Rocco, Rita Greco, Vittoria Letizia, Arnolfo Petruzzello, Maddalena Schioppa, Gregorio Goffredi, Francesca Marciano, Michele Caraglia, Alessia Cossu, Marianna Scrima"
EPI_ISL_876042, EPI_ISL_876043	1.AO Universitaria 'S. Giovanni di Dio e Ruggi D'Aragona, Scuola Medica Salernitana' Hospital / 2.UOC di Virologia e Microbiologia, Università della Campania 'L. Vanvitelli' / 3.AO Universitaria 'Federico II' Napoli Hospital / 4.AORN 'San Giuseppe Moscati' Avellino Hospital / 5.AO 'San Pio' - presidio G. Rummo' Benevento Hospital / 6.AO 'Sant'Anna e San Sebastiano' Caserta Hospital / 7.PO 'Maria Santissima Addolorata' Eboli Hospital / 8.Biogen Istituto di Ricerche Genetiche	1. Genome Research Center for Health (CRGS) / 2. Laboratory of Molecular Medicine and Genomics(LMMGE) / 3. Center for Research in Pure and Applied Mathematics (CRMPA)	Giorgio Giurato, Francesca Rizzo, Alessandro Weisz, Gianluigi Franci, Giovanni Nassa, Pasquale Pagliano, Roberta Tarallo, Elena Alexandrova, Ylenia D'Agostino, Carlo Ferravante, Jessica Lamberti, Viola Melone, Domenico Memoli, Valeria Mirio Cappa, Domenico Palumbo, Giovanni Pecoraro, Assunta Sellitto, Oriana Strianese, Ilaria Terenzi, Giuseppe Fenza, Aniello Gentile, Antonello Saccomanno, Sonia Amabile, Teresa Rocco, Annamaria Salvati, Emilia Vaccaro, Massimiliano Galdiero, Michele Cennamo, Giuseppe Portella, Maria Grazia Foti, Mariarosaria Ingino, Maria Landi, Maurizio Fumi, Vincenzo Rocco, Rita Greco, Vittoria Letizia, Arnolfo Petruzzello, Maddalena Schioppa, Gregorio Goffredi, Francesca Marciano, Michele Caraglia, Alessia Cossu, Marianna Scrima

EPI_ISL_876811, EPI_ISL_876812, EPI_ISL_876813	Istituto Zooprofilattico Sperimentale della Puglia e della Basilicata	Istituto Zooprofilattico Sperimentale della Puglia e della Basilicata	Parisi A., Bianco A., Capozzi L., Del Sambro L., Manzulli V., Rondinone V., Pace L., Cipolletta D., Galante D.
EPI_ISL_876970, EPI_ISL_876971, EPI_ISL_876972, EPI_ISL_876973, EPI_ISL_876974, EPI_ISL_876975, EPI_ISL_876977, EPI_ISL_876978, EPI_ISL_876979, EPI_ISL_876980, EPI_ISL_876981, EPI_ISL_876982, EPI_ISL_876983, EPI_ISL_876984, EPI_ISL_876985, EPI_ISL_876986, EPI_ISL_876987, EPI_ISL_876988, EPI_ISL_876989, EPI_ISL_876990, EPI_ISL_876991, EPI_ISL_876992, EPI_ISL_876993, EPI_ISL_876994, EPI_ISL_876995, EPI_ISL_876996, EPI_ISL_876997, EPI_ISL_876998, EPI_ISL_876999, EPI_ISL_877000, EPI_ISL_877001, EPI_ISL_877002, EPI_ISL_877003, EPI_ISL_877004, EPI_ISL_877005, EPI_ISL_877007, EPI_ISL_877008, EPI_ISL_877009, EPI_ISL_877010, EPI_ISL_877011, EPI_ISL_877012, EPI_ISL_877013, EPI_ISL_877014, EPI_ISL_877015, EPI_ISL_877016, EPI_ISL_877017, EPI_ISL_877018, EPI_ISL_877019, EPI_ISL_877020, EPI_ISL_877021, EPI_ISL_877022, EPI_ISL_877023, EPI_ISL_877024, EPI_ISL_877025, EPI_ISL_877026, EPI_ISL_877027	1.AO Universitaria 'S. Giovanni di Dio e Ruggi D'Aragona, Scuola Medica Salernitana' Hospital / 2.UOC di Virologia e Microbiologia, Università della Campania 'L. Vanvitelli' / 3.AO Universitaria 'Federico II' Napoli Hospital / 4.AORN 'San Giuseppe Moscati' Avellino Hospital / 5.AO 'San Pio' - presidio G. Rummo' Benevento Hospital / 6.AO 'Sant'Anna e San Sebastiano' Caserta Hospital / 7.PO 'Maria Santissima Addolorata' Eboli Hospital / 8.Biogen Istituto di Ricerche Genetiche	1. Genome Research Center for Health (CRGS) / 2. Laboratory of Molecular Medicine and Genomics(LMMGE) / 3. Center for Research in Pure and Applied Mathematics (CRMPA)	Giorgio Giurato (Corresponding Author), Francesca Rizzo (Corresponding Author), Alessandro Weisz (Corresponding Author), Gianluigi Franci, Giovanni Nassa, Pasquale Pagliano, Roberta Tarallo, Elena Alexandrova, Ylenia D'Agostino, Carlo Ferravante, Jessica Lamberti, Viola Melone, Domenico Memoli, Valeria Mirici Cappa, Domenico Palumbo, Giovanni Pecoraro, Assunta Sellitto, Oriana Strianese, Ilaria Terenzi, Giuseppe Fenza, Aniello Gentile, Antonello Saccomanno, Sonia Amabile, Teresa Rocco, Annamaria Salvati, Emilia Vaccaro, Massimiliano Galdiero, Michele Cennamo, Giuseppe Portella, Maria Grazia Foti, Mariarosaria Ingino, Maria Landi, Maurizio Fumi, Vincenzo Rocco, Rita Greco, Vittoria Letizia, Arnolfo Petruzzello, Maddalena Schioppa, Gregorio Goffredi, Francesca Marciano, Michele Caraglia, Alessia Cossu, Marianna Scrima
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EPI_ISL_883499, EPI_ISL_887506, EPI_ISL_887507, EPI_ISL_894218	1.AO Universitaria 'S. Giovanni di Dio e Ruggi D'Aragona, Scuola Medica Salernitana' Hospital / 2.UOC di Virologia e Microbiologia, Università della Campania 'L. Vanvitelli' / 3.AO Universitaria 'Federico II' Napoli Hospital / 4.AORN 'San Giuseppe Moscati' Avellino Hospital / 5.AO 'San Pio' - presidio G. Rummo' Benevento Hospital / 6.AO 'Sant'Anna e San Sebastiano' Caserta Hospital / 7.PO 'Maria Santissima Addolorata' Eboli Hospital / 8.Biogen Istituto di Ricerche Genetiche	1. Genome Research Center for Health (CRGS) / 2. Laboratory of Molecular Medicine and Genomics(LMMGE) / 3. Center for Research in Pure and Applied Mathematics (CRMPA)	Giorgio Giurato, Francesca Rizzo, Alessandro Weisz, Gianluigi Franci, Giovanni Nassa, Pasquale Pagliano, Roberta Tarallo, Elena Alexandrova, Ylenia D'Agostino, Carlo Ferravante, Jessica Lamberti, Viola Melone, Domenico Memoli, Valeria Mirici Cappa, Domenico Palumbo, Giovanni Pecoraro, Assunta Sellitto, Oriana Strianese, Ilaria Terenzi, Giuseppe Fenza, Aniello Gentile, Antonello Saccomanno, Sonia Amabile, Teresa Rocco, Annamaria Salvati, Emilia Vaccaro, Massimiliano Galdiero, Michele Cennamo, Giuseppe Portella, Maria Grazia Foti, Mariarosaria Ingino, Maria Landi, Maurizio Fumi, Vincenzo Rocco, Rita Greco, Vittoria Letizia, Arnolfo Petruzzello, Maddalena Schioppa, Gregorio Goffredi, Francesca Marciano, Michele Caraglia, Alessia Cossu, Marianna Scrima
EPI_ISL_918128, EPI_ISL_918412, EPI_ISL_918413, EPI_ISL_918414, EPI_ISL_918415, EPI_ISL_918416, EPI_ISL_918417, EPI_ISL_918418, EPI_ISL_918419, EPI_ISL_918420, EPI_ISL_918421, EPI_ISL_918422	see above		
	1.AO Universitaria 'S. Giovanni di Dio e Ruggi D'Aragona, Scuola Medica Salernitana' Hospital / 2.UOC di Virologia e Microbiologia, Università della Campania 'L. Vanvitelli' / 3.AO Universitaria 'Federico II' Napoli Hospital / 4.AORN 'San Giuseppe Moscati' Avellino Hospital / 5.AO 'San Pio' - presidio G. Rummo' Benevento Hospital / 6.AO 'Sant'Anna e San Sebastiano' Caserta Hospital / 7.PO 'Maria Santissima Addolorata' Eboli Hospital / 8.Biogen Istituto di Ricerche Genetiche	1. Genome Research Center for Health (CRGS) / 2. Laboratory of Molecular Medicine and Genomics(LMMGE) / 3. Center for Research in Pure and Applied Mathematics (CRMPA)	Giorgio Giurato (Corresponding Author), Francesca Rizzo (Corresponding Author), Alessandro Weisz (Corresponding Author), Gianluigi Franci, Giovanni Nassa, Pasquale Pagliano, Roberta Tarallo, Elena Alexandrova, Ylenia D'Agostino, Carlo Ferravante, Jessica Lamberti, Viola Melone, Domenico Memoli, Valeria Mirici Cappa, Domenico Palumbo, Giovanni Pecoraro, Assunta Sellitto, Oriana Strianese, Ilaria Terenzi, Giuseppe Fenza, Aniello Gentile, Antonello Saccomanno, Sonia Amabile, Teresa Rocco, Annamaria Salvati, Emilia Vaccaro, Massimiliano Galdiero, Michele Cennamo, Giuseppe Portella, Maria Grazia Foti, Mariarosaria Ingino, Maria Landi, Maurizio Fumi, Vincenzo Rocco, Rita Greco, Vittoria Letizia, Arnolfo Petruzzello, Maddalena Schioppa, Gregorio Goffredi, Francesca Marciano, Michele Caraglia, Alessia Cossu, Marianna Scrima
EPI_ISL_934419, EPI_ISL_934420, EPI_ISL_934421, EPI_ISL_934423	1.AO Universitaria 'S. Giovanni di Dio e Ruggi D'Aragona, Scuola Medica Salernitana' Hospital / 2.UOC di Virologia e Microbiologia, Università della Campania 'L. Vanvitelli' / 3.AO Universitaria 'Federico II' Napoli Hospital / 4.AORN 'San Giuseppe Moscati' Avellino Hospital / 5.AO 'San Pio' - presidio G. Rummo' Benevento Hospital / 6.AO 'Sant'Anna e San Sebastiano' Caserta Hospital / 7.PO 'Maria Santissima Addolorata' Eboli Hospital / 8.Biogen Istituto di Ricerche Genetiche	1. Genome Research Center for Health (CRGS) / 2. Laboratory of Molecular Medicine and Genomics(LMMGE) / 3. Center for Research in Pure and Applied Mathematics (CRMPA)	Giorgio Giurato (Corresponding Author), Francesca Rizzo (Corresponding Author), Alessandro Weisz (Corresponding Author), Gianluigi Franci, Giovanni Nassa, Pasquale Pagliano, Roberta Tarallo, Elena Alexandrova, Ylenia D'Agostino, Carlo Ferravante, Jessica Lamberti, Viola Melone, Domenico Memoli, Valeria Mirici Cappa, Domenico Palumbo, Giovanni Pecoraro, Assunta Sellitto, Oriana Strianese, Ilaria Terenzi, Giuseppe Fenza, Aniello Gentile, Antonello Saccomanno, Sonia Amabile, Teresa Rocco, Annamaria Salvati, Emilia Vaccaro, Massimiliano Galdiero, Michele Cennamo, Giuseppe Portella, Maria Grazia Foti, Mariarosaria Ingino, Maria Landi, Maurizio Fumi, Vincenzo Rocco, Rita Greco, Vittoria Letizia, Arnolfo Petruzzello, Maddalena Schioppa, Gregorio Goffredi, Francesca Marciano, Michele Caraglia, Alessia Cossu, Marianna Scrima, Edmondo Adorisio, Morena D'Avenia, Michela Iacobellis, Rosanna Pluscio, Giorgio Dirani, Vittorio Sambri, Simona Semprini, Silvia Zanolì, Francesco Curcio, Stefania Marzinotto, Andreina Baj, Fausto Sessa.
EPI_ISL_940753	University of Bari Biomedical Sciences and Human Oncology	University of Bari Biomedical Sciences and Human Oncology	Chironna M., Sallusto A., Loconsole D., Accogli M.
EPI_ISL_954216	1.AO Universitaria 'S. Giovanni di Dio e Ruggi D'Aragona, Scuola Medica Salernitana' Hospital / 2.UOC di Virologia e Microbiologia, Università della Campania 'L. Vanvitelli' / 3.AO Universitaria 'Federico II' Napoli Hospital / 4.AORN 'San Giuseppe Moscati' Avellino Hospital / 5.AO 'San Pio' - presidio G. Rummo' Benevento Hospital / 6.AO 'Sant'Anna e San Sebastiano' Caserta Hospital / 7.PO 'Maria Santissima Addolorata' Eboli Hospital / 8.Biogen Istituto di Ricerche Genetiche	1. Genome Research Center for Health (CRGS) / 2. Laboratory of Molecular Medicine and Genomics(LMMGE) / 3. Center for Research in Pure and Applied Mathematics (CRMPA)	Giorgio Giurato, Francesca Rizzo, Alessandro Weisz, Gianluigi Franci, Giovanni Nassa, Pasquale Pagliano, Roberta Tarallo, Elena Alexandrova, Ylenia D'Agostino, Carlo Ferravante, Jessica Lamberti, Viola Melone, Domenico Memoli, Valeria Mirici Cappa, Domenico Palumbo, Giovanni Pecoraro, Assunta Sellitto, Oriana Strianese, Ilaria Terenzi, Giuseppe Fenza, Aniello Gentile, Antonello Saccomanno, Sonia Amabile, Teresa Rocco, Annamaria Salvati, Emilia Vaccaro, Massimiliano Galdiero, Michele Cennamo, Giuseppe Portella, Maria Grazia Foti, Mariarosaria Ingino, Maria Landi, Maurizio Fumi, Vincenzo Rocco, Rita Greco, Vittoria Letizia, Arnolfo Petruzzello, Maddalena Schioppa, Gregorio Goffredi, Francesca Marciano, Michele Caraglia, Alessia Cossu, Marianna Scrima, Edmondo Adorisio, Morena D'Avenia, Michela Iacobellis, Rosanna Pluscio, Giorgio Dirani, Vittorio Sambri, Simona Semprini, Silvia Zanolì, Francesco Curcio, Stefania Marzinotto, Andreina Baj, Fausto Sessa.