Edge Health

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Impact of travel restrictions on Omicron in Italy and Finland

Oxera and Edge Health

Prepared for ACI Europe and IATA

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Summary: what has Omicron taught us about travel restrictions? (I)

y and Finland introduced pre-departure testing for air passengers in mid- and late-December respe
esponse to the Omicron variant.

s was six to eight weeks after Omicron was first identified, meaning that the variant was likely bein
ded in these countries for a number of weeks before travel restrictions were imposed.

a result, additional travel testing introduced in December was ineffective at preventing the spread
icron.

o travel testing had been introduced at all, Omicron’s spread in Italy and Finland would not have be
pacted.

n if more stringent travel testing requirements had been in place from the beginning of November
day South Africa reported Omicron to the WHO—they would not have had any meaningful impac
spread of Omicron in Finland, and would have had a small impact on the spread of Omicron in Ital

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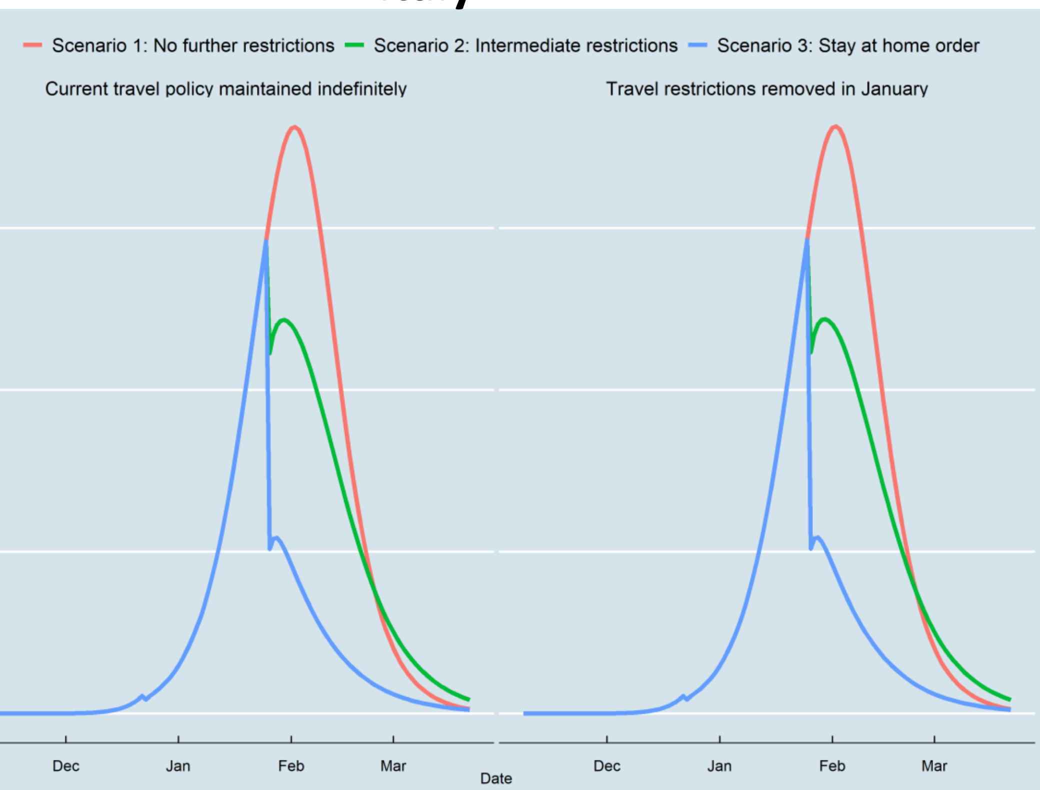
Summary: what has Omicron taught us about travel restrictions?

ow that Omicron is highly prevalent in Italy and Finland, removing all travel testing requirements would not in
omestic Omicron spread. However, continuing to impose travel restrictions would impose a significant econor
st on the Italian and Finnish economies.

Italy



Finland

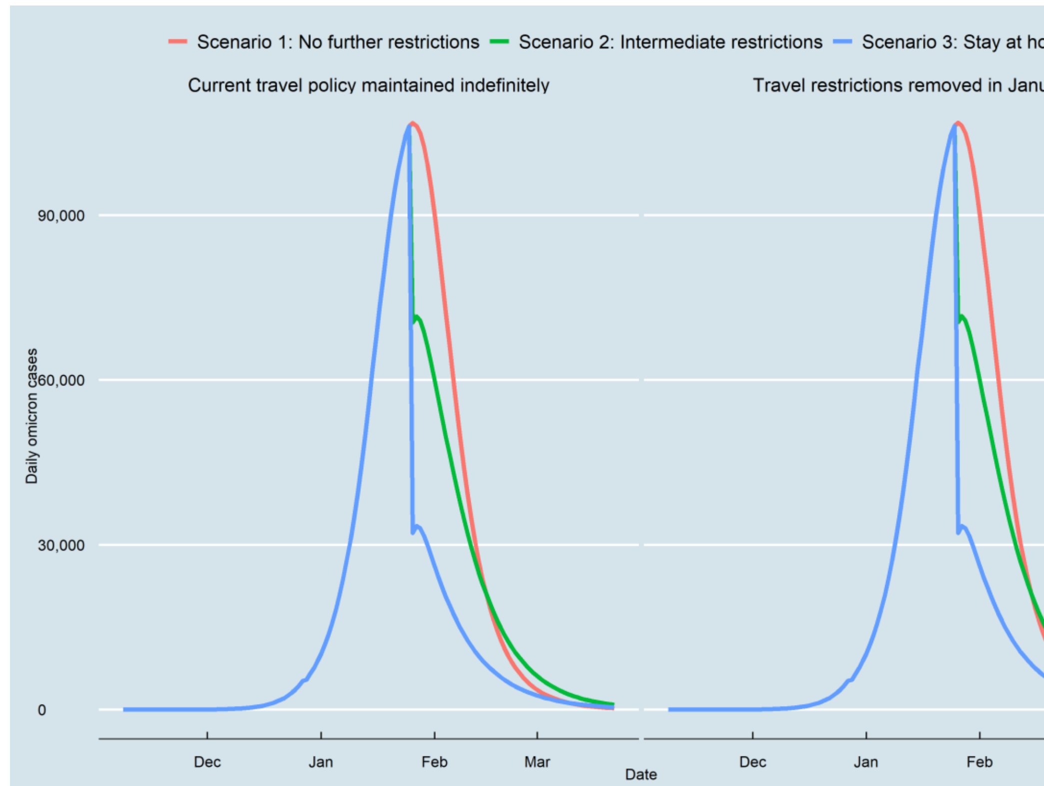
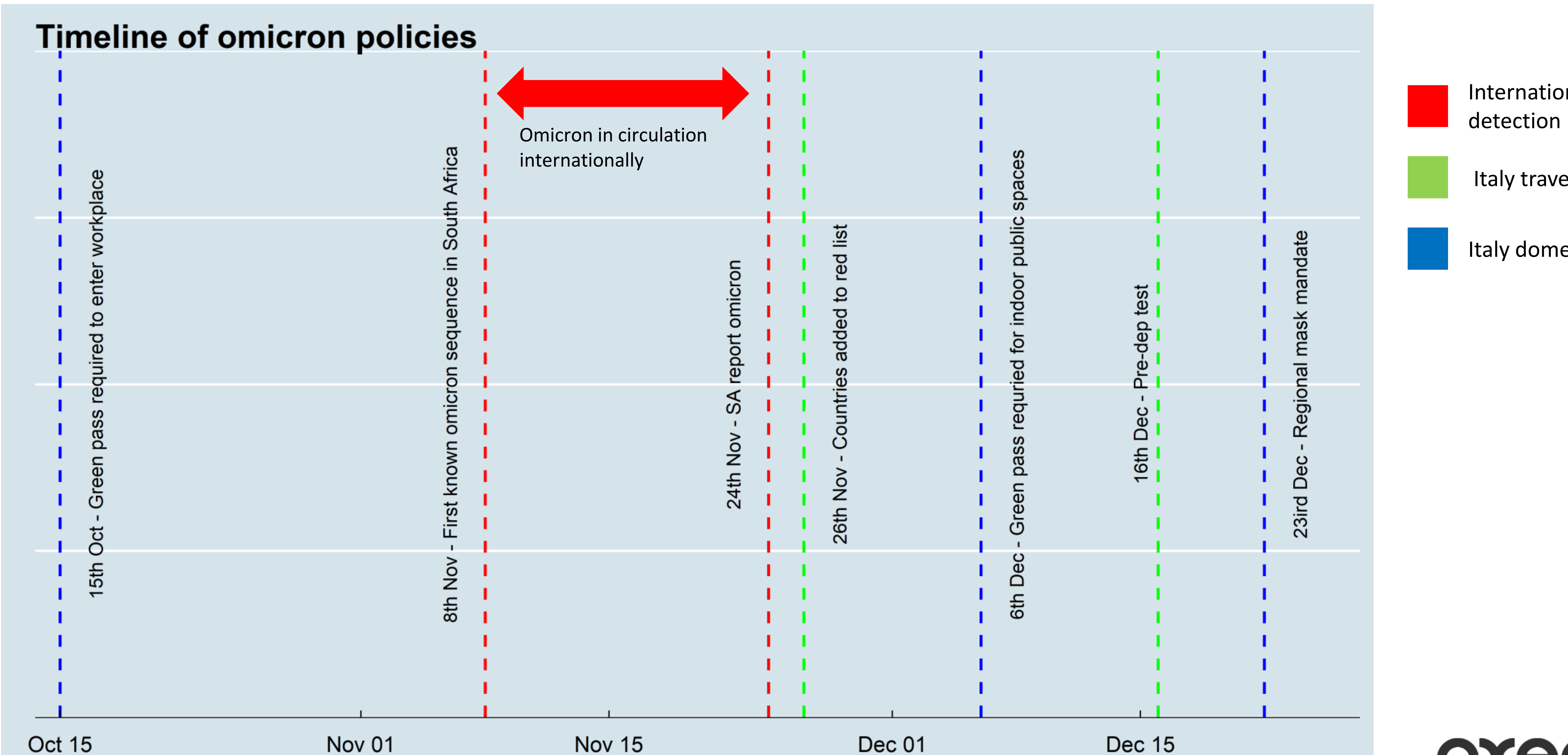


Table of contents

1. Impact of travel restrictions on Omicron in Italy

1.1 Background – the Omicron response in Italy

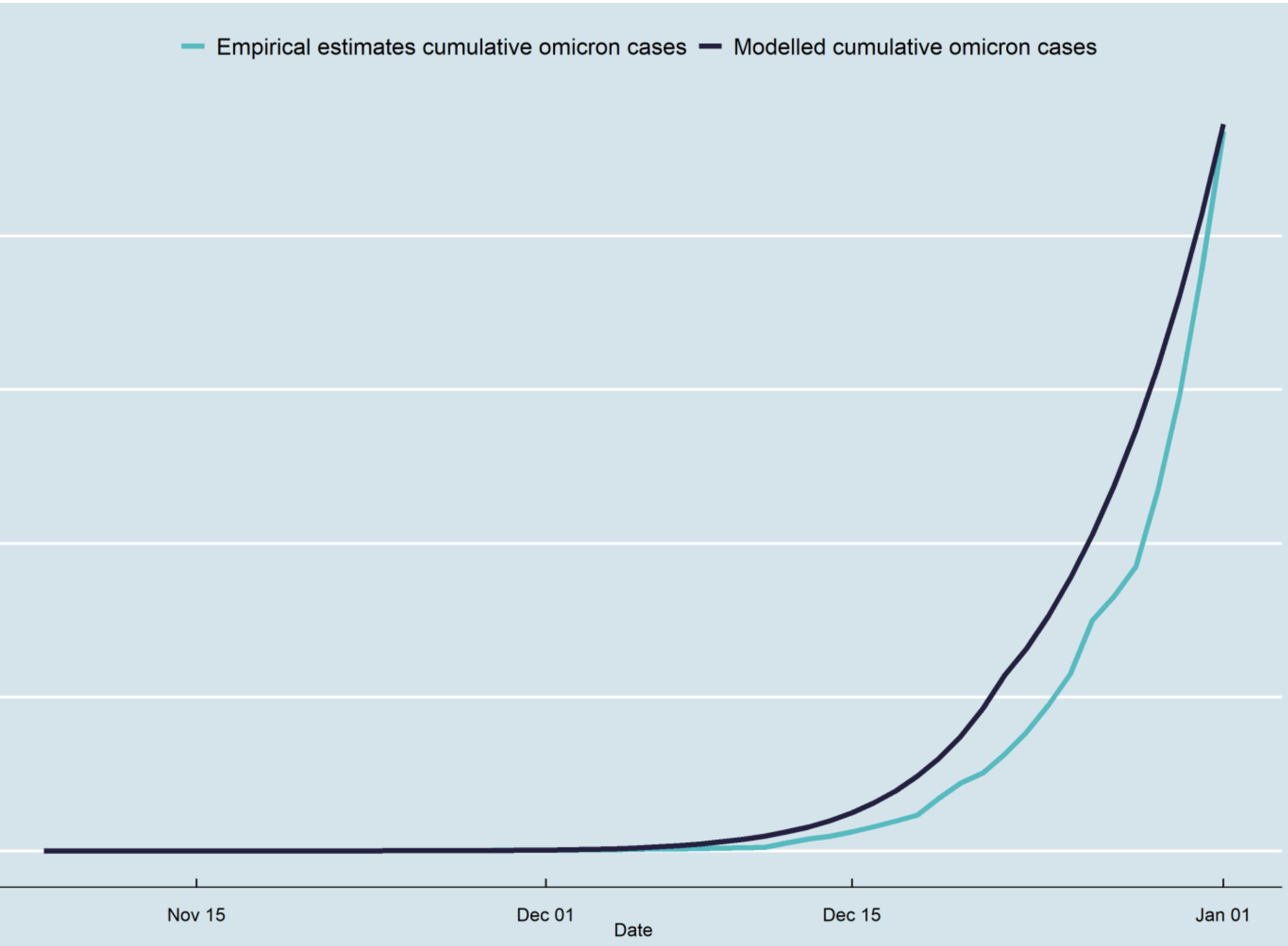
Testing of air travellers was introduced on 16 December, a few weeks after South Africa reported Omicron. The variant was likely in circulation internationally for a month prior to being reported, meaning that it was **being seeded for at least six weeks** before the travel restrictions were introduc



Note: Date indicates the date the policy came into effect

1.2 Travel testing and quarantine policy - what we can learn from the Omicron response in Italy

Our model predictions closely match empirical estimates of Omicron cases in Italy. Both suggest that cases are growing exponentially.



- Based on the Italian government's travel testing policy in November / December* and estimates of Omic prevalence among passengers,** c modelled cumulative Omicron cas closely match empirical estimates Omicron cases in Italy.***
- We estimate Omicron cases in Ital based on recorded cases and domestic sequencing data.

*The Italian government introduced pre-departure PCR testing on 1 December.
**Based on an average of sequencing data across European countr (ECDC).
***Based on data from the ECDC.

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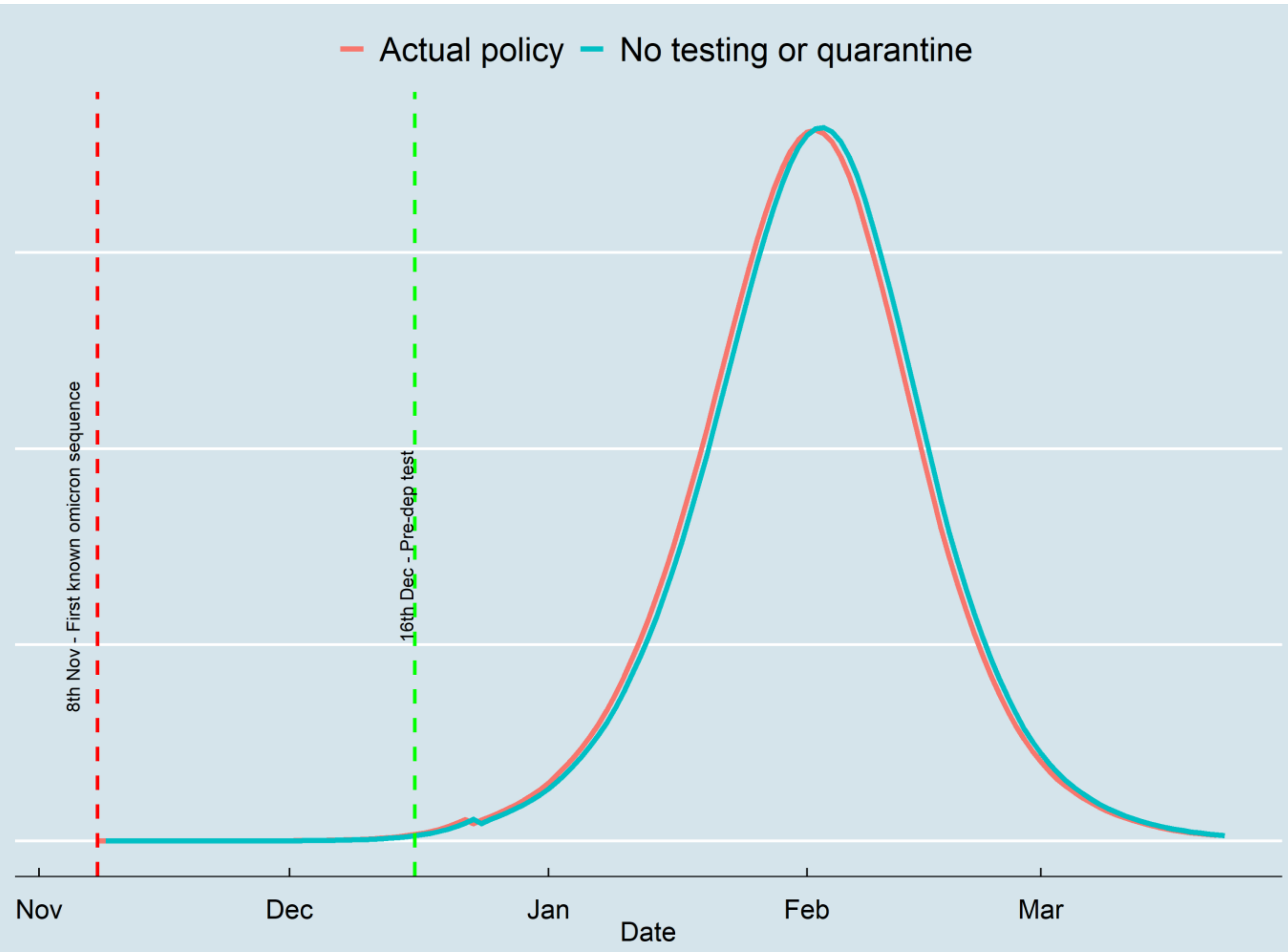
Additional travel testing introduced in mid-December was ineffective a preventing the spread of Omicron in Italy



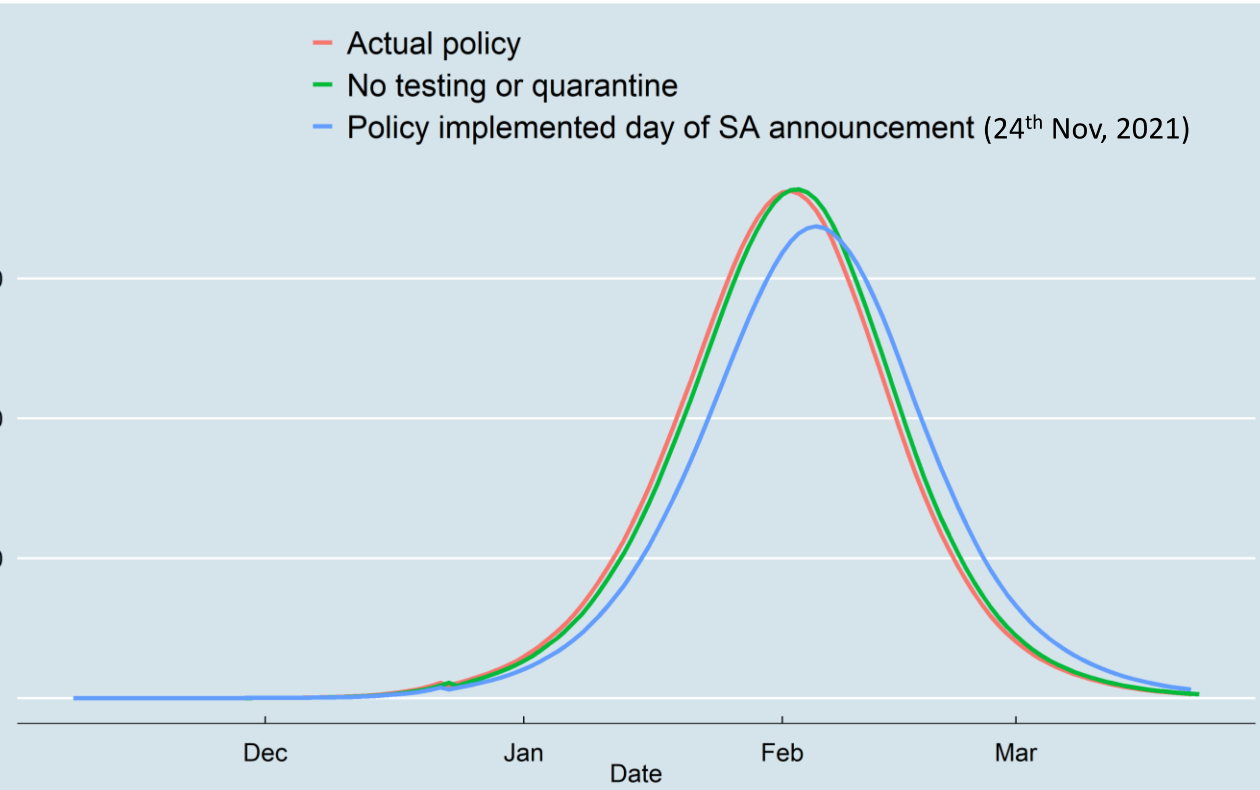
- We model Italy's actual travel testi policy* (red line) and compare it to what would have happened had th government made no changes to t testing policy—i.e. no testing or quarantine (blue line)

- The modelled trajectories of Omicr cases in Italy are **virtually indistinguishable**, suggesting that **introducing further travel restricti on 16 December was ineffective**.

* The Italian government introduced pre-departure PCR t on 16 December.

assume that domestic policies continue as-is for all of the above scenarios. We have also lagged the position of the ustrative purposes, however, the raw modelling results in two perfectly overlapping curves.

Even if travel testing had been in place in November (i.e. the day Omicron was identified as an issue by the WHO), Omicron's spread in Italy would have only bee minimally impacted

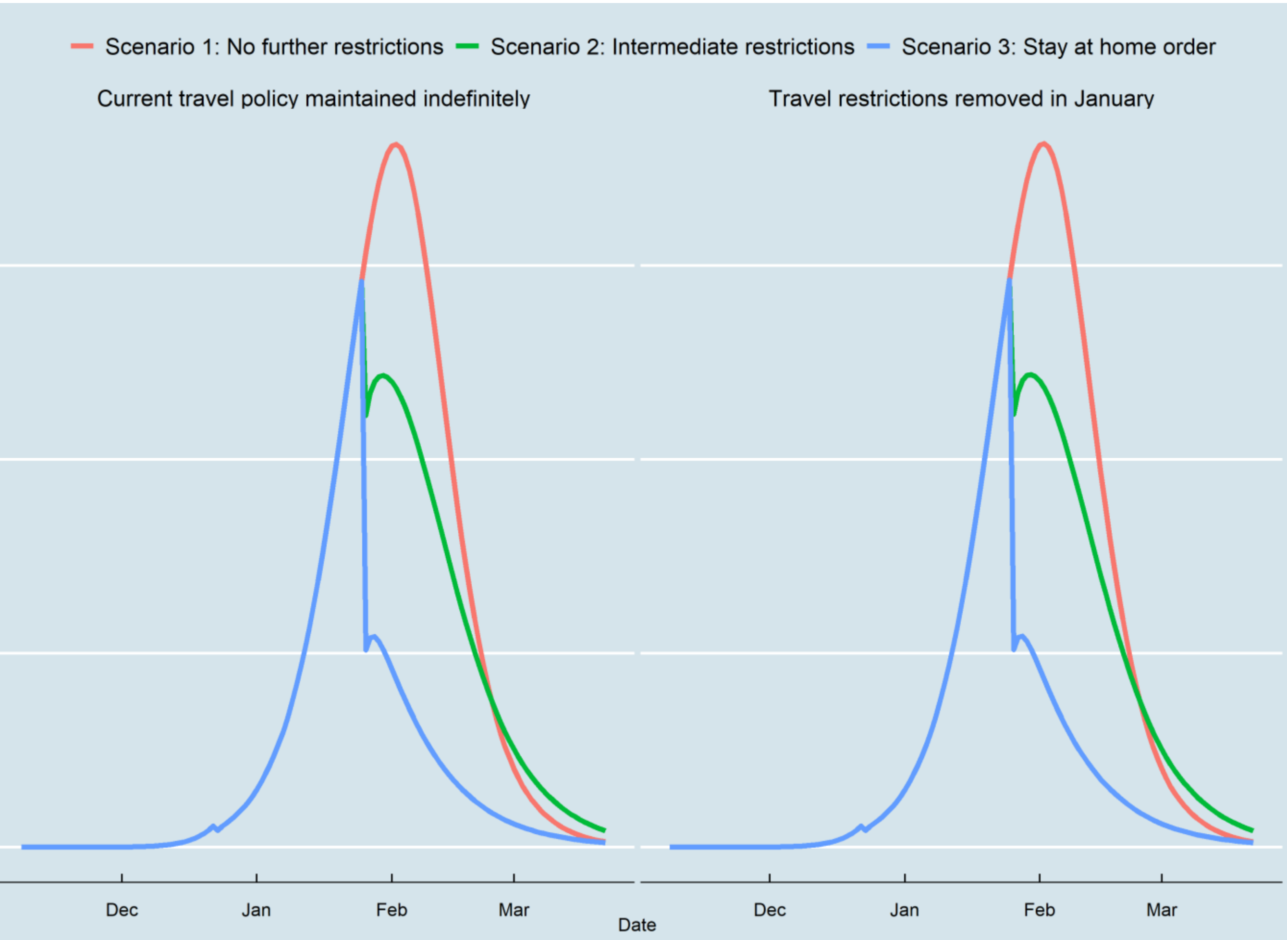


e assume that domestic policies continue as-is for all of the above scenarios. We assume that arture antigen (24h) or PCR (48h) testing policy was put in place either on 24 November, the day frica reported Omicron to the WHO (Policy implemented day of SA announcement) or on the ecember (Actual policy).

- If the government had not had any travel restrictions in place in November/December (green line), cases would have peaked only **t days** sooner compared to a scenario where t restrictions were put in place on the same d that Omicron was flagged as an issue to the on 24 November (blue line).
- The peak would have been 8% higher withou travel testing compared to a scenario where travel restrictions were introduced on the sa day that Omicron was flagged as an issue to WHO in November (blue line).
- This is in large part to due the ongoing vaccination campaigns for children aged 5-1 the booster dose campaign.

1.3 Current response to the Omicron variant – weighing the impact of travel and domestic responses going forward in Italy

Now that Omicron is highly prevalent in Italy, removing all travel testing would not impact domestic Omicron spread. Domestic restrictions would now have a more significant impa on Omicron cases in Italy than travel testing.



endix A.3 for assumptions on the impact of domestic restrictions.

- Removing all travel testing would not impact the spread of Omicron in Italy.
  - We consider a scenario where tra tests were lifted on 1 January 20 Peaks are 0.11%-0.23% higher wl travel restrictions are removed.
- On the other hand, retaining travel tes could impose a significant cost on the Italian economy.
- This is consistent across scenarios whe different domestic restrictions (e.g. lir on gathering, work from home orders applied on 26 January 2022.

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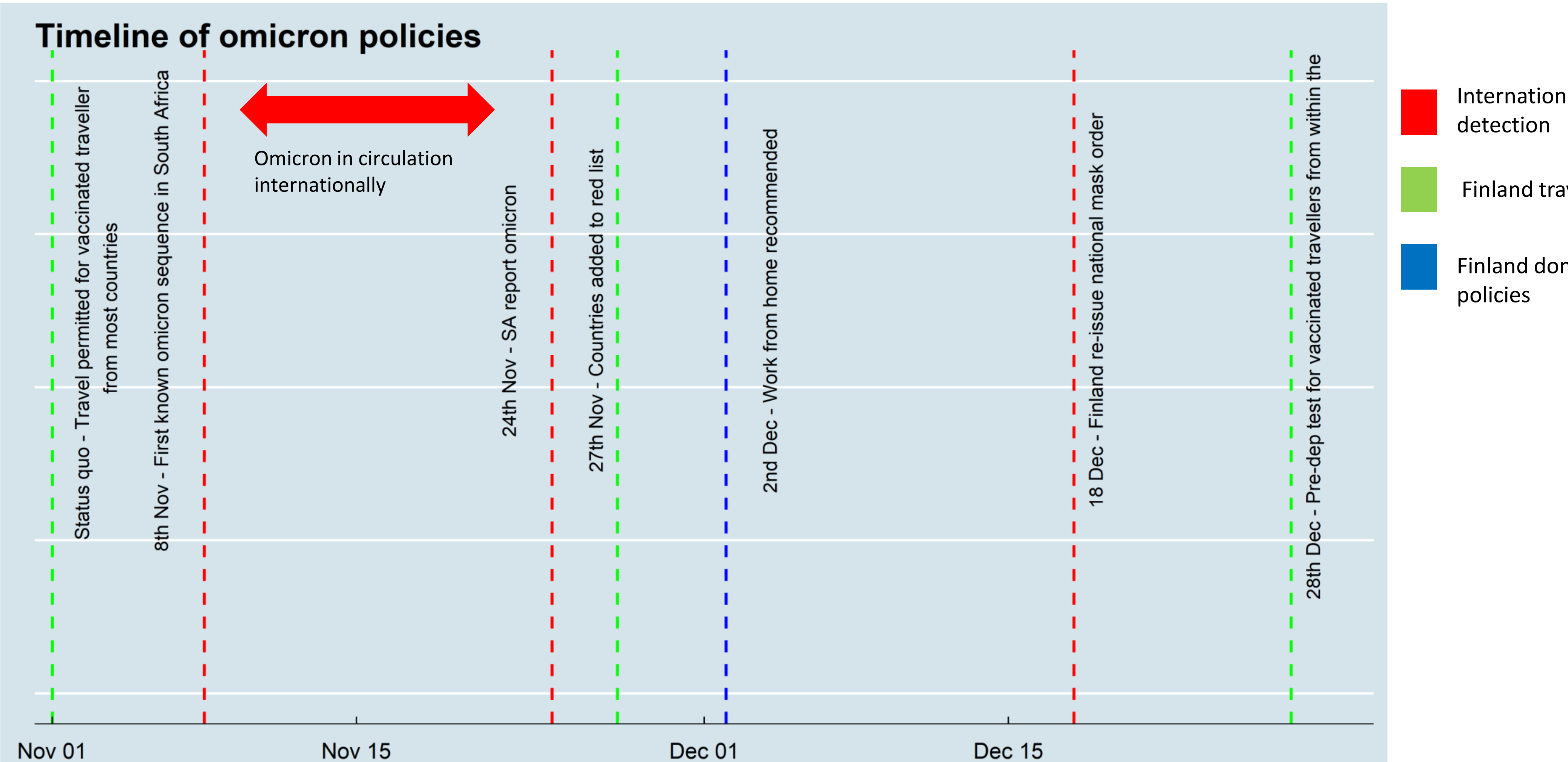
2. Impact of travel restrictions on Omicron in Finland

2.1 Background – the Omicron response in Finland

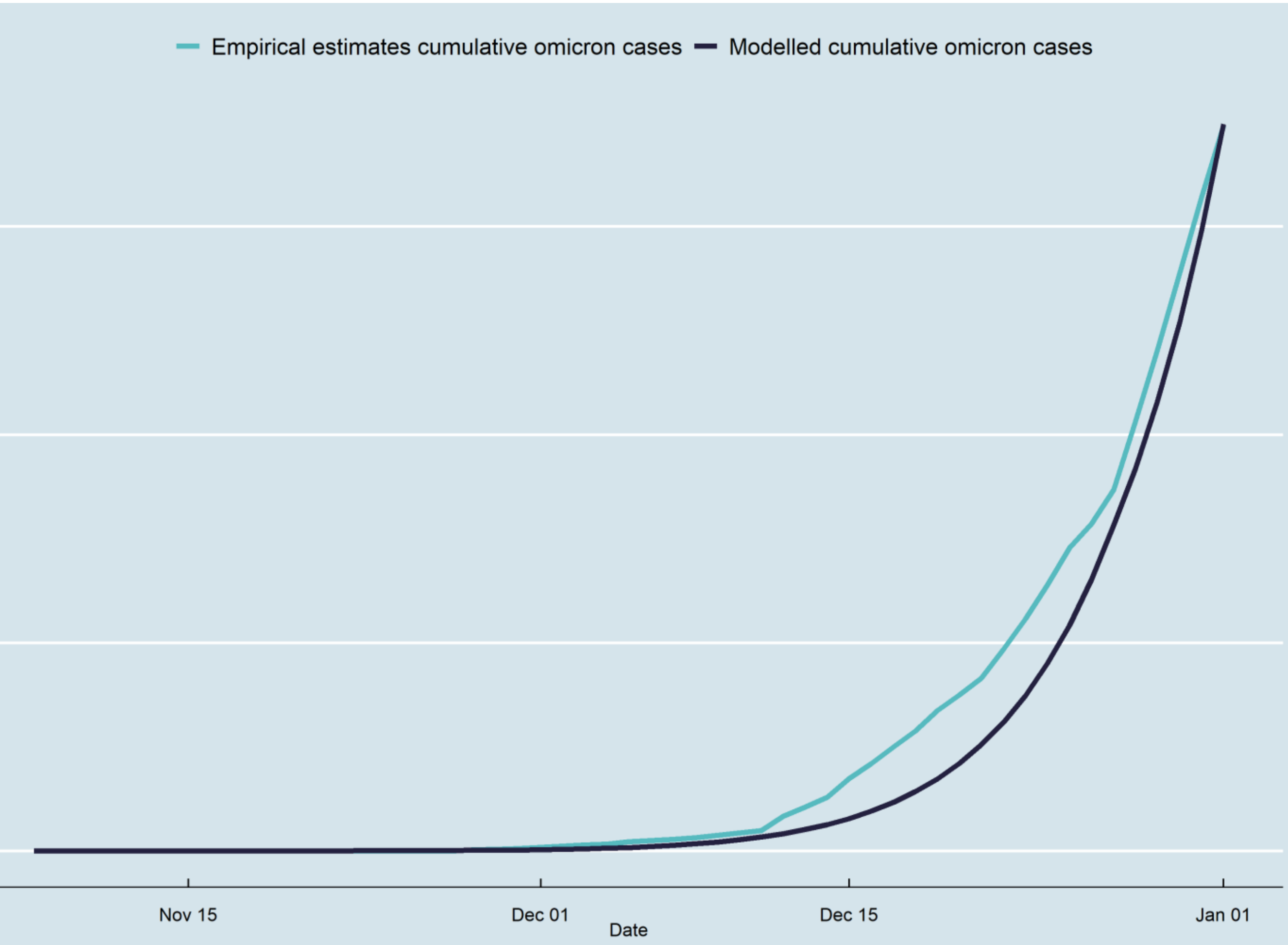
Testing of air travellers was introduced on 28 December, a month after South Africa reported Omic
The variant was likely in circulation internationally for a month prior to being reported, meaning th
was **being seeded for at least eight weeks** before the travel restrictions were introduced.



Note: Date indicates the date the policy came into effect

2.2 Travel testing and quarantine policy - what we can learn from the Omicron response in Finland

Our model predictions closely match empirical estimates of Omicron cases in Finland. Both suggest that cases are growing exponentially.



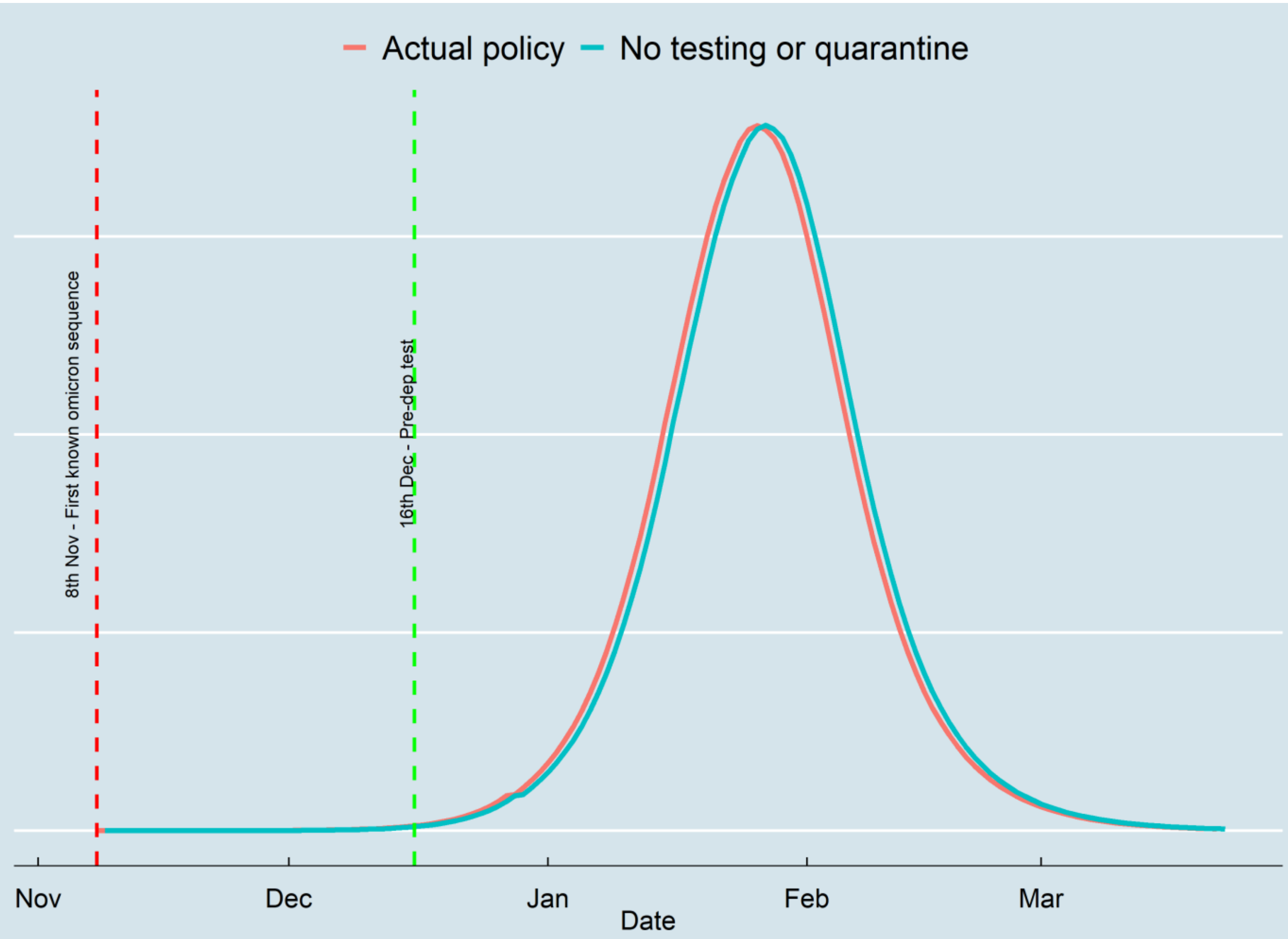
- Based on the Finnish government' travel testing policy over the cours November/December* and estima of Omicron prevalence among passengers,** our modelled cumulative Omicron cases closely match empirical estimates of Omi cases in Finland.***
- We estimate Omicron cases in Finl based on recorded cases and domestic sequencing data.

*The Finnish government introduced pre-departure PCR testing on December.

**Based on an average of sequenced cases across European countr (ECDC).

***Based on data from the ECDC.

Additional travel testing introduced at the end of December was ineffective at preventing the spread of Omicron in Finland



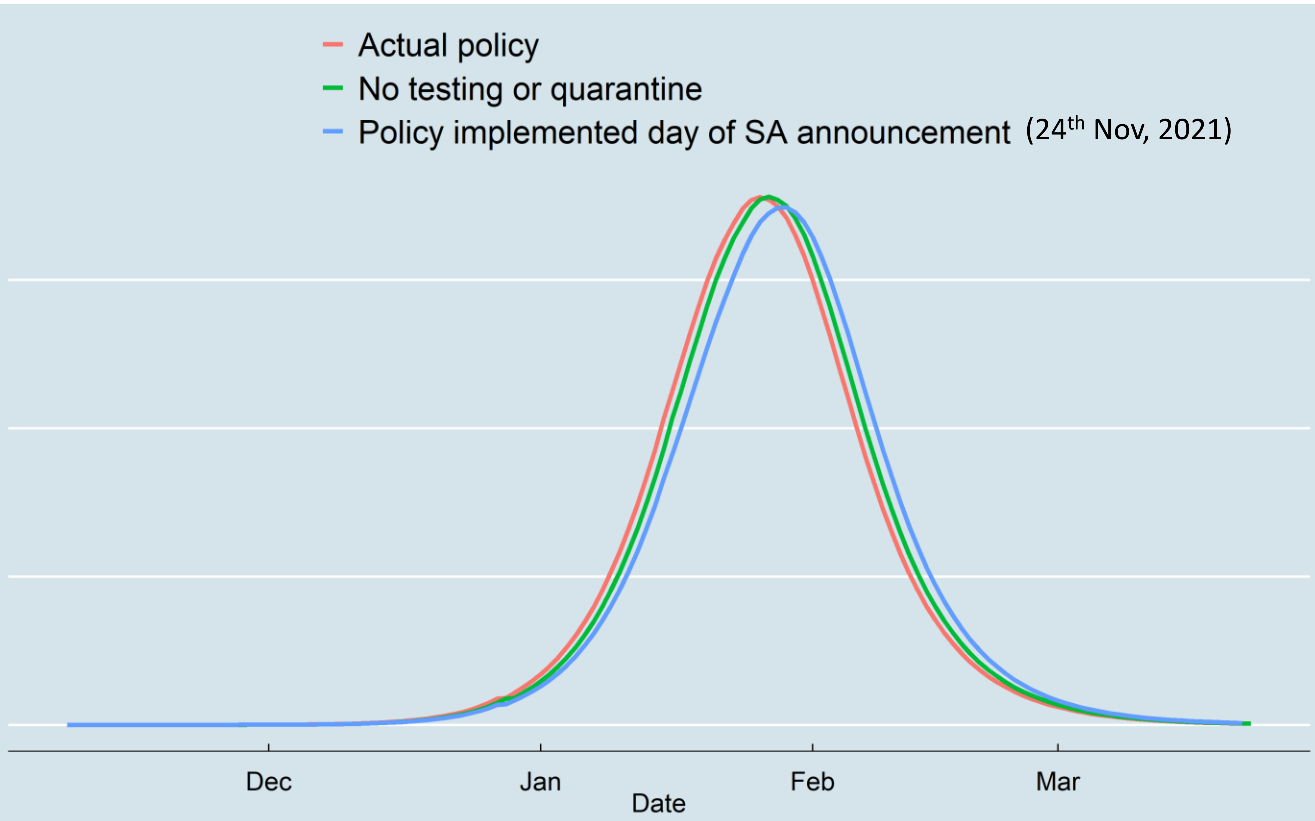
- We model Finland's actual travel t policy* (red line) and compare it t would have happened had the government made no changes to testing policy—i.e. no testing or quarantine (blue line).

- The modelled trajectories of Omic cases in Finland are **indistinguisha** suggesting that **introducing trave restrictions on 28 December was ineffective.**

*The Finnish government introduced pre-departure PC on 28 December.

e assume that domestic policies continue as-is for all of the above scenarios. We have also lagged the position of the llustrative purposes, however, the raw modelling results in two perfectly overlapping curves.

Even if travel testing had been in place in November (i.e. the day Omicron was identified as an issue by the WHO), Omicron's spread in Finland would not have been impacted



- If the government had not had any trav restrictions in place in November/Dece (green line), cases would have peaked **three days** sooner compared to a scen where travel restrictions were put in pl on the same day that Omicron was flag as an issue to the WHO on 24 Novemb (blue line).
- The peak would have been 2% higher without any travel testing compared to scenario where travel restrictions were in place immediately once Omicron wa flagged as an issue to the WHO in November (blue line).

'e assume that domestic policies continue as-is for all of the above scenarios. We assume that arture antigen (48h) or PCR (48h) testing policy was put in place either on 24 November, the day frica reported omicron to the WHO (Policy implemented day of SA announcement) or on 28 er (Actual policy).

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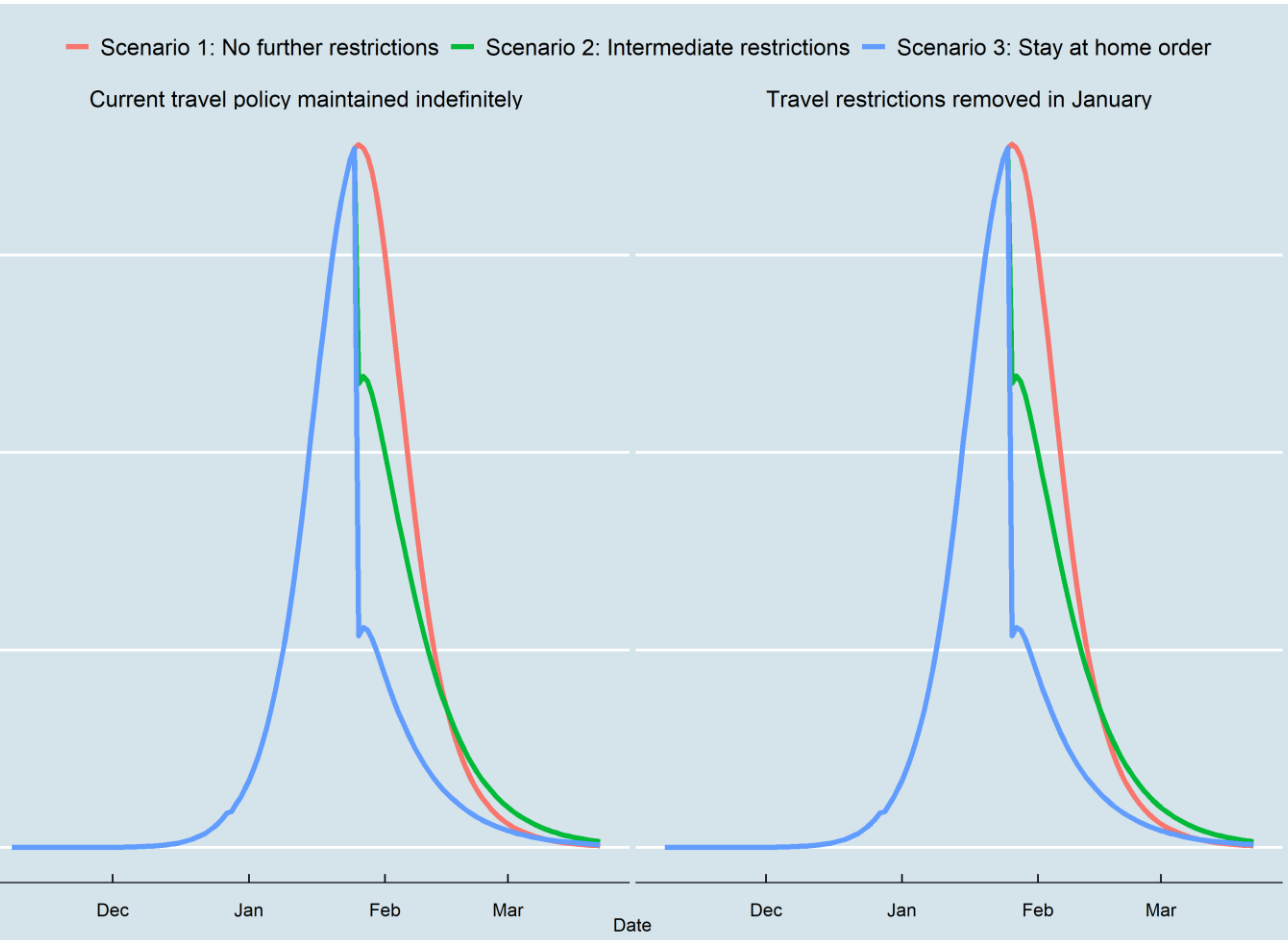
2.3 Current response to the Omicron variant – weighing the impact of travel and domestic responses going forward in Finland

Now that Omicron is highly prevalent in Finland, removing all travel testing would not impact domestic Omicron spread. Domestic restrictions would now have a more significa impact on Omicron cases in Finland than travel restrictions.



endix A.3 for assumptions on the impact of domestic restrictions.

- Removing all travel testing in January v not impact the spread of Omicron in F
    - We consider a scenario where tra testing was lifted on 1 January 20 Peaks are 0.06%-0.07% higher wh travel testing is removed.
- On the other hand, retaining travel tes could have a significant cost on the Fir economy.
- This is consistent across scenarios whe different domestic restrictions (e.g. lim gathering, work from home orders) are applied on 26 January 2022.

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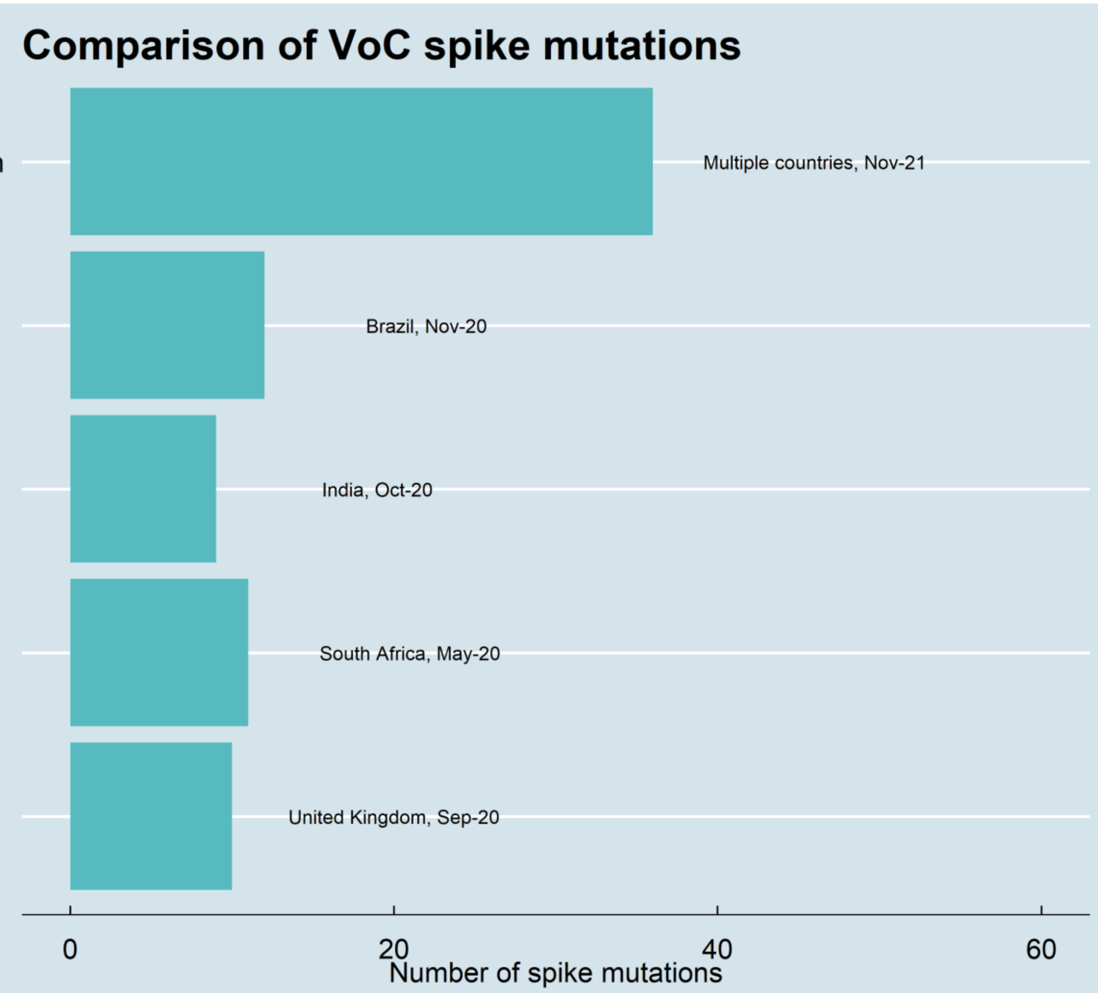
3. Appendix – literature review, modelling methodology and assumptions

A.1 Literature review – what we know about the Omicron variant

Omicron has more mutations in the spike protein than previous variants. While some of these mutations may be associated with increased infectiousness, others may be associated with reduced severity.



ote: Graph annotations indicate the month, year, and location where each
riant was first sequenced (WHO).

- SARS-Cov-2's spike protein has an importan
role in infectiousness and severity of Covid-
as it is how the virus attaches to human cel
- Many mutations in this area may change th
infectiousness, severity, and ability of the variant to evade immunity.
- Omicron is thought to be more infectious. However, mutations in this area may also contribute to reducing the severity of resul
illness after infection. **

* https://www.who.int/en/activities/tracking-SARS-CoV-2-variants/
** biorxiv.org/content/10.1101/2021.12.17.473248v2

Although evidence is still in early stages, laboratory and real-world studies to date indicat that while Omicron is more infectious and vaccines are less effective at preventing infections, illnesses resulting from infections may be less severe.

	Infectiousness	Vaccine efficacy (i.e. immune escape)	Severity
icron characteristics, ative to Delta (previously minant variant in Italy and land)	• Data and laboratory studies to date indicate that Omicron is 2-3 times more infectious than delta. • As studied populations are now highly vaccinated or have high levels of natural immunity, it is difficult to attribute the increase in observed infectiousness of Omicron relative to Delta to innate infectiousness or to immune escape/decreases in vaccine efficacy. It is likely to be a combination of both.	• Data and laboratory studies to date indicate that vaccines are 25-66% as effective at preventing Omicron compared to Delta infections (varies by dose). • As studied populations are now highly vaccinated or have high levels of natural immunity, it is difficult to attribute the increase in observed infectiousness of Omicron relative to Delta to innate infectiousness or to immune escape/decreases in vaccine efficacy. It is likely to be a combination of both.	• While studies and emerging data are still in early stages, several studies are now pointing to Omicron infections being milder than Delta infections. Real-world data suggests that patients' hospital admission risk decreased by 62%. • This effect is demonstrated even when variation in vaccination status is accounted for.

A.2: Modelling methodology

Background on SARS-Cov-2 infection spread dynamics

One measure of how easily a virus is spread from one person to another is the virus' reproductive ratio (called its 'R' value). Rt represents the average number of secondary infections that will result from an initial infection at a given time.

Effective reproduction number is determined by the following:

- **R0, basic reproduction number**: the average number of secondary infections resulting from an initial infection in a fully susceptible population.
- **Vaccination-induced immunity**: the proportion of the population prevented from being infected by the virus (either symptomatically or asymptomatically) and hence prevented from spreading the virus due to being vaccinated.
- **Natural immunity**: the proportion of the population prevented from being infected by the virus (either symptomatically or asymptomatically) and hence prevented from spreading the virus due to previous exposure to the virus
- **Behavioural patterns**: different patterns in interactions may hinder the spread of a virus. For example, reduced social interactions, social distancing and masks will contribute to reducing the spread.

If Rt > 1, the virus will spread in a population.

Basic SEIR modelling review

ntire population is split into groups corresponding to the *S*, E, *I*, and *R* states

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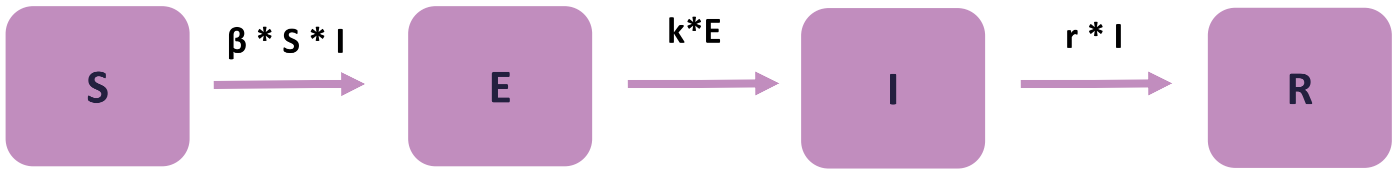
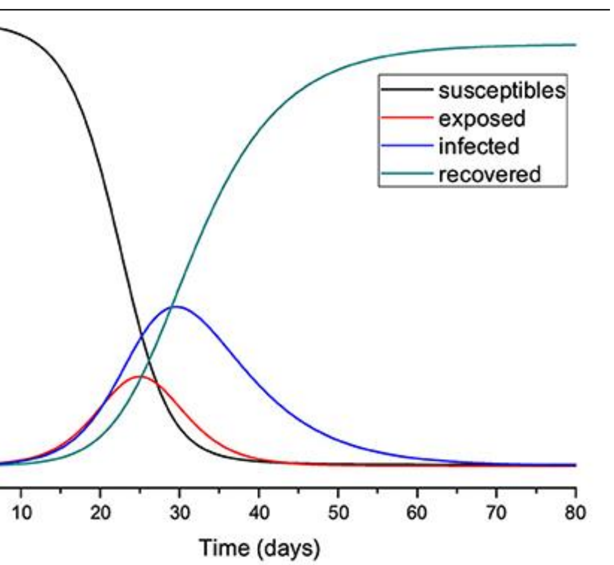


where:
- **β** is the parameter for inf
- **r** is the constant per capit rate
- **k** is the constant per capit progression from exposed infectious rate



Assumptions

- No one is added to the susceptible group, since we are ignoring births and immigration
- The only way an individual leaves the susceptible group is by becoming infected
- A fixed fraction of the infected group recovers (or dies) every day and is immune to the d

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Our modelling approach: SEIR modelling including vaccinations and imported cases

ntire population is split into groups corresponding to the *S*, E, *I*, and *R* states and others

ceptible
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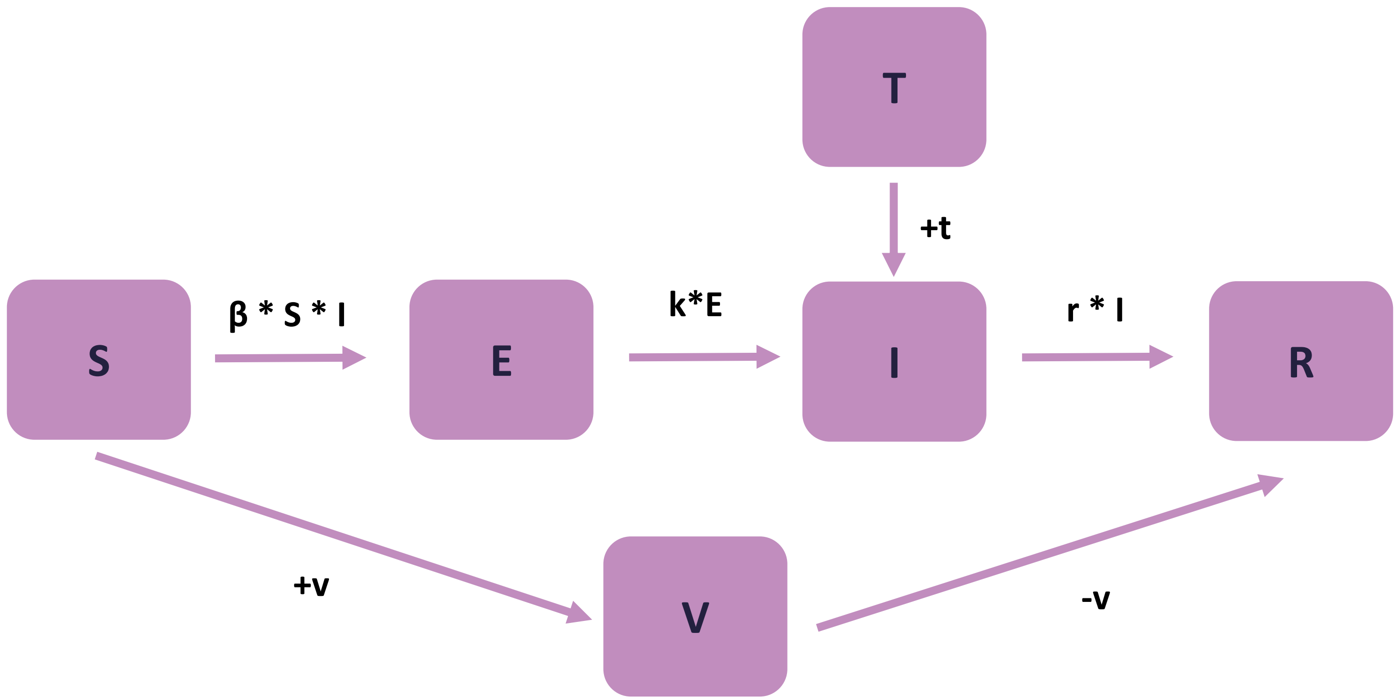
moved
cinated
vel-related cases



where:

- **β** is the param
infectivity
- **r** is the consta
capita recover
- **k** is the consta
capita progres
exposed to inf
rate
- **v** is the change
induced immu
population
- **t** is daily travel
cases

otions

e is added to the susceptible group, since we are ignoring births and immigration

nly way an individual leaves the susceptible group is by becoming infected or vaccinated

d fraction of the infected group recovers (or dies) every day and is immune to the disease

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Scenarios considered in the modelling

Key question:
at would the impact of different travel policies have been on the outcome of Omicron spread in Italy / Finland?

What would the spread and impact of the Omicron variant in Italy / Finland have been under the follow scenarios:

- Pre-departure antigen (24h) or PCR testing (48h) - Italy
- Pre-departure antigen (48h) or PCR testing (48h) - Finland
- Actual policy (a combination of all of the above, at different points in time)
- No testing or quarantine

Key question:
Now that the Omicron variant is highly valent in Italy / Finland, what would the lative impact of domestic measures be ompared to further travel restrictions?

What will the the spread and impact of the Omicron variant in Italy / Finland be under the following sce

Italy:
- Mandatory masks, symptomatic testing
- Some restrictions on businesses (i.e. green pass/super green pass)
- Intermediate scenario: Limits on gathering sizes to 10 people, in addition to some restrictions of businesses
- Stay at home order: businesses closed, schools and universities closed in conjunction

Finland:
- Symptomatic testing
- Mandatory masks and work-from home order
- Intermediate scenario: Some restrictions to businesses and limits of gathering sizes to 10 people
- Stay at home order: businesses closed, schools and universities closed in conjunction

Compared with:
- Continued pre-departure policy or
- No testing or quarantine January onwards

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A.3: Literature review and modelling assumptions

Assumptions: travel volumes and air passenger prevalenc

	Description	Value	Source
s days an air s at their	Without quarantine and testing schemes, when a passenger is infected in another country, they will spend some of their infectious days in their country of departure and some in their country of arrival. Using a simulation model based on a paper from LSHTM, we estimated that the median number of infectious days a passenger will spend in their country of arrival is 3.	3 days	Oxera and Edge Health (2021) 'Effectiveness of d schemes for air passengers'. For LSHTM's work s (2020), 'Strategies to reduce the risk of SARS-Co introduction from international travellers', 25 Ju
lumes (Italy)	We use publicly available data on passenger volumes from the Association of Italian airports (AIGA). We assume that most passengers are completing round trips, so total passenger volumes are divided by two to get inbound passengers. We project travel volumes by scaling the latest available values using seasonal scaling factors from 2019 (pre-pandemic). As data from November 2021 and December 2021 was not yet publicly available, at the time of writing we use the same assumptions for these months as well.	**2021/2022** — Inbound passengers October: 5,339,928 November: 4,167,357 December: 4,232,595 January: 3,926,630 February: 3,479,699 March: 4,407,654	https://assaeroporti.com/statistiche_202110/
lumes (Finland)	We use publicly available data on passenger volumes from the Finish National Statistics Office. We use arriving passenger data. We project travel volumes by scaling the latest available values using seasonal scaling factors from 2019 (pre-pandemic). As data from November 2021 and December 2021 was not yet publicly available, at the time of writing we use the same assumptions for these months as well.	**2021/2022** — Inbound passengers October: 382,728 November: 432,580 December: 443,064 January: 393,528 February: 375,352 March: 432,295	https://www.stat.fi/til/ilma/2021/06/ilma_2021_ 28_tie_001_en.html
vid-19 prevalence	We estimate the prevalence of incoming air passengers, using UK Government Test-and-Trace data available up to 13 December. Using tourism data and passengers numbers by country for Italy and Finland, we adjust the UK values with relative weights to estimate a country-specific proxy for the prevalence among inbound passengers. We conservatively use prevalence in mid-October, before the UK government moved to Day 2 antigen testing.	Italy prevalence: 0.53% Finland prevalence: 0.70%	https://www.gov.uk/government/publications/w for-nhs-test-and-trace-england-2-to-8-decembe https://www.bancaditalia.it/pubblicazioni/indag internazionale/2021-indagine-turismo-internazionale/statistiche_ITI_18062021.pdf https://www.finavia.fi/en/about-finavia/about-a statistics/traffic-statistics-year
ve traveller cases icron	The percentage share of Omicron cases are based on the European average from the "SARS-CoV-2 variants dashboard" disclosed by the European Centre for Disease Prevention and Control.	Date — % of positive omicron November: 0.12% December: 30.66% January: 70.94%	https://www.ecdc.europa.eu/en/covid-19/situat updates/variants-dashboard https://www.iss.it/cov19-cosa-fa-iss-varianti

SARS-Cov-2 and Omicron-specific parameters (1)

t	Description	Value	Source
	Initial data suggests that the Rt and secondary attack rates of the Omicron variant is 2-3 times higher than that of the Delta variant. While some of this difference is likely due to differing immunity for the variants in the population, we conservatively assume that Omicron is 2.5 times more infectious than delta.	8, assuming that Delta has an Ro of ~3.2 (this assumes pre-pandemic mixing patterns).	https://www.medrxiv.org/content/10.1101/2021.12.19.212680 https://assets.publishing.service.gov.uk/government/uploads/sy /attachment_data/file/1043466/20211222_OS_Daily_Omicron_ https://github.com/blab/rt-from-frequency-dynamics/tree/master/estimates/omicron-countries. Ro of Delta https://academic.oup.com/jtm/article/28/7/taab124/6346388
ous	We use the median time an individual is infectious calculated from previous variants.	7.35 days	Oxera and Edge Health (2021) 'Effectiveness of dual-testing sche passengers'. For LSHTM's work see: Clifford et al. (2020), 'Strateg the risk of SARS-CoV-2 re-introduction from international travell
period	Preliminary evidence suggests that the time from exposure to symptoms is shorter for the Omicron variant compared to other variants.	3 days	https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2021.26.50.2101147
f Omicron cases o Delta cases	The ECDC publishes estimates of the % of sequenced samples which were determined to be Omicron by EU country. We use this to estimate the curves shown on pages 9 and 18.	---	https://www.ecdc.europa.eu/en/covid-19/situation-updates/var dashboard
een vaccination efficacy	While immunity builds up over time after individuals are vaccinated, there is still substantial protection from vaccinations (~60%) on the first day after vaccination. Using a step function we are able to approximate this effect.	Step function, 1 week	http://www.bccdc.ca/Health-Info-Site/Documents/COVID-19_vaccine/Public_health_statement_deferred_second_dose.pd

SARS-Cov-2 and omicron-specific parameters (2)

	Description	Value	Source
ural immunity a variant)	Studies conducted in England suggest that a previous history of infection reduces the risk of re-infection by 84%. Infections with previous variants were protective against infection with the Alpha variant. Immunity was observed for a minimum of 7 months after initial infection. We assume that the immunity for the Delta variant is similar, and apply scaling based on estimates of the relative efficacy of vaccines to the Omicron and Delta variants.	84% decrease in risk of infection, immune escape of 16%	https://www.sciencedirect.com/science/article/pii/S014067362 token=d-Aupl8roEYAAAAA:E_YnW1p75HlEH7DgPN_N_7aCANo7QcSrk93T 6rCwhCpwh8eYPh-bMGIscQ6k
unity for Omicron Delta variant	We estimate this using the relative efficacy (for vaccinated individuals with 2 or 3 doses) against the Omicron variant compared to the Delta variant, using a weighted average of the Pfizer +Pfizer and AZ + Pfizer combination.	54%	https://www.imperial.ac.uk/media/imperial-college/medicine/m 12-16-COVID19-Report-48.pdf
l population who y been infected	We conservatively assume that a portion of the unvaccinated population have natural immunity, based on confirmed covid cases in Italy and Finland in the 7 months prior to November 2021. Using modelling comparing reported cases with the actual burden of disease, we estimate that that only roughly a third of cases are reported.	Finland: 14% Italy: 21%	https://covid19.who.int/info?openIndex=2 https://demo.istat.it/popres/index.php?anno=2021&lingua=ita https://www.stat.fi/til/vaerak/tau_en.html
ative efficacy of against Omicron ared to the Delta	Modelling from Imperial has estimated the relative efficacy of vaccinations against the Omicron variant, extrapolating laboratory studies to real-world efficacy. We supplement this with data on real-world efficacy, which is now starting to become available. These estimates are conservative compared to the range of scenarios estimated by other modelling groups (LSHTM).	See table 1, page 14	https://www.imperial.ac.uk/media/imperial-college/medicine/m 12-16-COVID19-Report-48.pdf and https://assets.publishing.service.gov.uk/government/uploads/sy attachment_data/file/1043807/technical-briefing-33.pdf for real supplementary data. https://cmmid.github.io/topics/covid19/reports/omicron_englar dec_2021.pdf

Assumptions: travel testing efficacy

t	Description	Value	Source
re antigen or pre- CR, 48 hours before	We use the efficacy of pre-departure testing at screening incoming air passenger infectious days as a model input. We used the estimated efficacy of antigen and PCR tests taken 48 h pre-departure, taking the weighted average assuming that 2/3s of passengers will opt for the cheaper antigen test option.	48%	Oxera and Edge Health (2021), 'Assessment of the of rapid testing for SARS-CoV-2'.
re antigen 24 hours rture of PCR 48 hours re	We use the efficacy of pre-departure testing at screening incoming air passenger infectious days as a model input. The estimated efficacy of these two different types of tests taken at different time periods is the same. From some countries pre-departure PCR testing is 72 h pre-departure, however we conservatively assume that PCR testing is 48 h from all countries.	54%	Oxera and Edge Health (2021), 'Assessment of the of rapid testing for SARS-CoV-2'.

We assume a 24 h delay to receive PCR test results. **Only used to model the impact of red-listing countries

Assumptions: vaccine roll-out

input	Description	Value	Source
c vaccination rates	We use age-stratified daily vaccination data for Italy and Finland to estimate age-stratified vaccination uptake. We divide vaccine counts by population pyramid estimates to obtain vaccination rates.	See source.	https://sampo.thl.fi/pivot/prod/en/vaccreg/cov19_cov19covareatime https://github.com/italia/covid19-opendata-vaccir https://demo.istat.it/popres/index.php?anno=202 https://www.stat.fi/til/vaerak/tau_en.html
ted vaccination rates	We calculate the average daily vaccinations delivered by age band in the last week of currently available data to estimate the speed of the vaccination roll-out. We assume that the number of individuals receiving a second dose cannot exceed the number of individuals who had received a first dose 3 months prior. This is based on medical recommendations to get second doses within 3 months of the previous dose. Equally, we assume that the number of individuals receiving a third dose (booster) cannot exceed the number of individuals who had received a second dose. As the speed of vaccination roll-out is dose-specific, to prevent a violation of the assumption above in later stages of the projection, the speed of roll-out of for a dose is set to the speed of the dose of the lower tier where required. We do not assume that anyone under the age of 12 for Finland or 5 for Italy will be vaccinated as they are ineligible for vaccination at the time of writing.	--	https://sampo.thl.fi/pivot/prod/en/vaccreg/cov19_cov19covareatime https://github.com/italia/covid19-opendata-vaccir https://demo.istat.it/popres/index.php?anno=202 https://www.stat.fi/til/vaerak/tau_en.html

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Assumptions: impact of domestic social distancing measures on infection spread (Italy)

nput	Description	Value	Source
f mandatory masks, natic testing	The reduction in Rt resulting from non-pharmaceutical interventions.	-17.9%	https://www.medrxiv.org/content/10.1101/2020.05.28.20116129 http://epidemicforecasting.org/containment-calculator https://bmcmedicine.biomedcentral.com/articles/10.1186/s12916 8/figures/5
f some businesses being ed/restricted mation of green pass and een pass)	The reduction in Rt resulting from non-pharmaceutical interventions. This is additive with impact of mandatory masks, symptomatic testing, limits of gathering sizes to 1000.	-46.3%	https://www.medrxiv.org/content/10.1101/2020.05.28. v4.full.pdf, http://epidemicforecasting.org/containment
diate restrictions: Impact of gathering sizes to 10	The reduction in Rt resulting from non-pharmaceutical interventions. All interventions are additive (i.e. in addition to interventions mentioned in previous scenarios).	-61.0%	https://www.medrxiv.org/content/10.1101/2020.05.28. v4.full.pdf, http://epidemicforecasting.org/containment
f stay at home order, es closed, schools and ties closed in conjunction	The reduction in Rt resulting from non-pharmaceutical interventions. All interventions are additive (i.e. in addition to interventions mentioned in previous scenarios).	-82.2%	https://www.medrxiv.org/content/10.1101/2020.05.28. v4.full.pdf, http://epidemicforecasting.org/containment

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Assumptions: impact of domestic social distancing measures on infection spread (Finland)

nput	Description	Value	Source
f symptomatic testing	The reduction in Rt resulting from non-pharmaceutical interventions.	-9.6%	https://www.medrxiv.org/content/10.1101/2 20116129v4.full.pdf, http://epidemicforecasting.org/containment- https://bmcmedicine.biomedcentral.com/art 86/s12916-020-01872-8/figures/5
f work-from-home orders and mask	The reduction in Rt resulting from non-pharmaceutical interventions. All interventions are additive (i.e. in addition to interventions mentioned in previous scenarios).	-32.0%	https://bmcmedicine.biomedcentral.com/art 86/s12916-020-01872-8#Abs1
iate restrictions: Some restrictions sses and limits of gathering sizes to e	The reduction in Rt resulting from non-pharmaceutical interventions. All interventions are additive (i.e. addition to interventions mentioned in previous scenarios).	-61.0%	https://www.medrxiv.org/content/10.1101/2 20116129v4.full.pdf, http://epidemicforecasting.org/containment-
f stay at home order, businesses chools and universities closed in on	The reduction in Rt resulting from non-pharmaceutical interventions. All interventions are additive (i.e. addition to interventions mentioned in previous scenarios).	-82.2%	https://www.medrxiv.org/content/10.1101/2 20116129v4.full.pdf, http://epidemicforecasting.org/containment-