

Covid-19 challenge – Regaining trust in public transport

Exchange of experience on pandemic-resistant public transport

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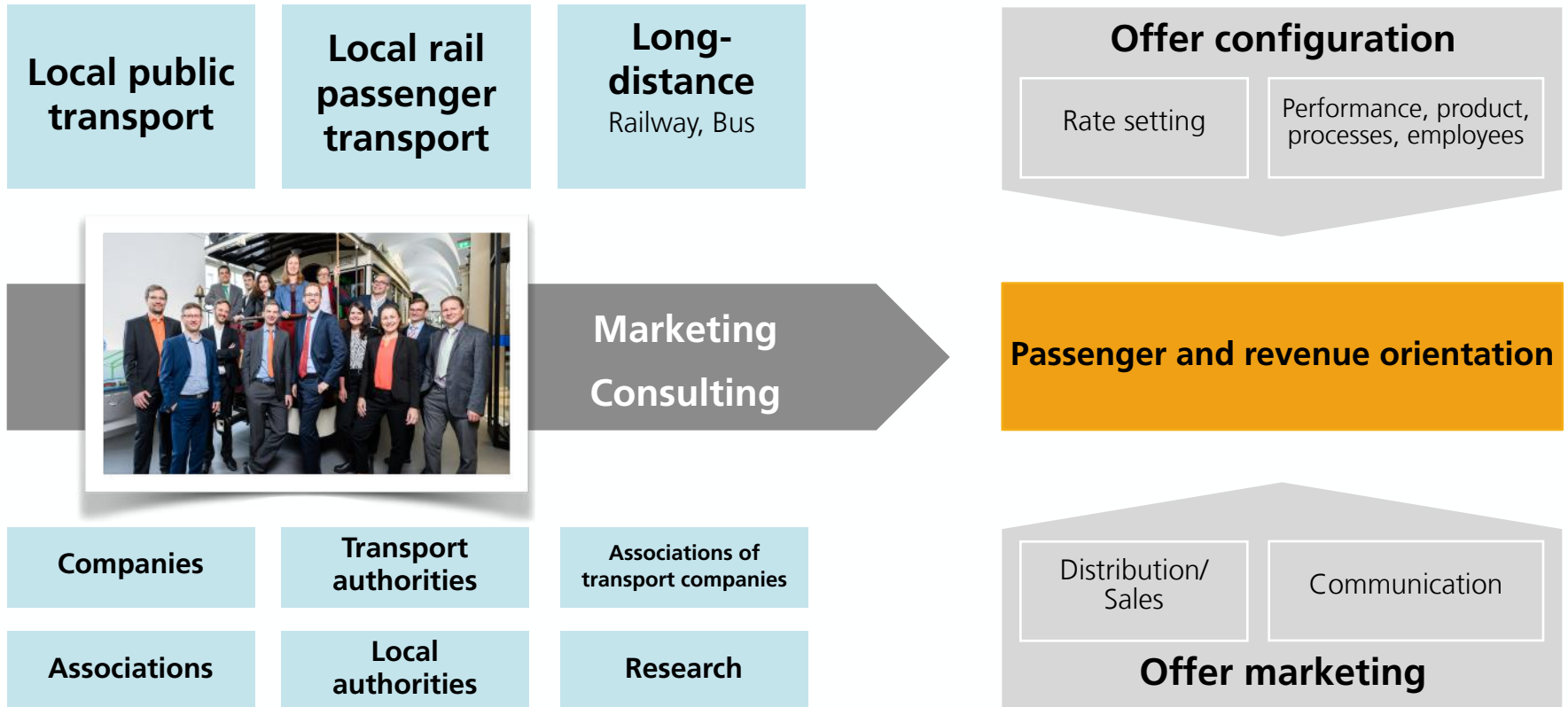
Team at Probst & Consorten Marketing-Beratung

We are an interdisciplinary team of engineers, economists and communication scientists.



Consulting focus

We advise transport companies and transport associations on how to improve their passenger and revenue orientation.



Probst & Consorten supports the University of Kassel in its project to develop a pandemic-resistant public transport.

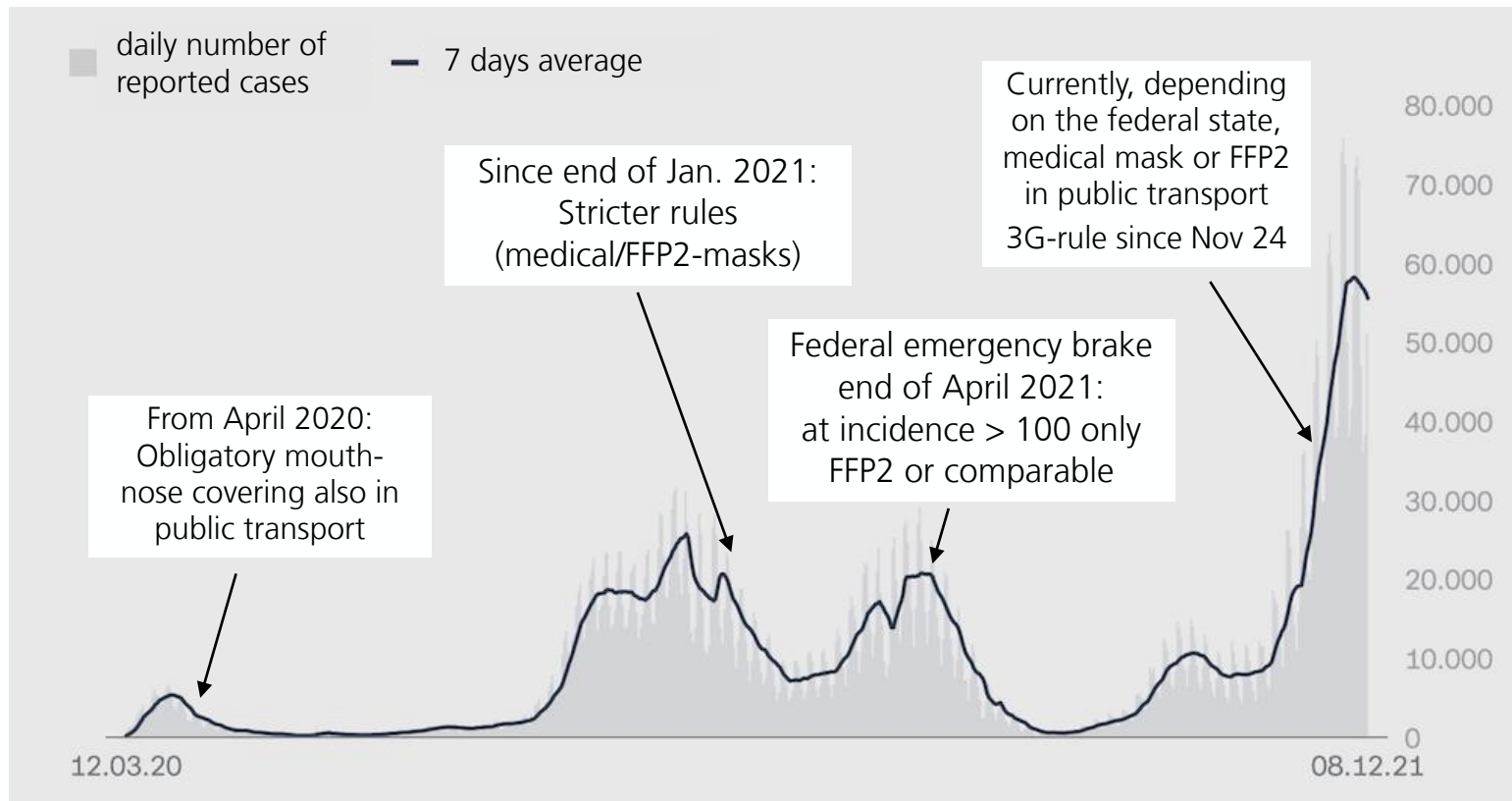
U N I K A S S E L
V E R S I T Ä T



- ▶ **EMILIA:** "Development of a pandemic-resistant public transport"
- ▶ The German Federal Ministry of Transport and Digital Infrastructure (BMVI) is funding the EMILIA research project for the next three years with around 1.3 million euros.
- ▶ Currently, the team led by Prof. Dr. Carsten Sommer, head of the Department of Transportation Planning and Systems at the **University of Kassel**, a simulation of the spread of aerosols in vehicles is conducted for:
 - ▶ assessing the risk of infection in trains and buses and deriving how vehicles can be designed to reduce the risk of infection.
- ▶ The team also wants to determine what the pandemic means, for example, for the financing of public transport, how fares should be designed and how customers should be approached, and make appropriate recommendations for action.

New infections in Germany

We have been at a peak of infection in Germany at the beginning of December.



Source: <https://www.zdf.de/nachrichten/heute/coronavirus-ausbreitung-infografiken-102.html>

The 7-day incidence has been at a new record level in Germany.

7-day incidence:

427

new infections in 100.000
inhabitants during the last 7 days
(Status: Dec 8, 2021)

Hospitalization rate:

5,79

number of persons hospitalized
with Covid in 100.000
inhabitants during the last 7 days
(Status: Dec 8, 2021)

Vaccinated at least once:

72,2%

(Status: Dec 7, 2021)

Daily number of reported cases:

69.601

(Status: Dec 8, 2021)

7 days R-value:

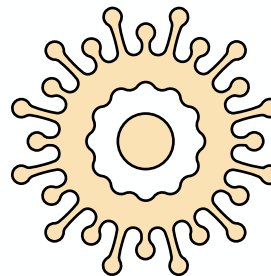
0,91

average infections per
infected person
(Status: Dec 8, 2021)

Fully vaccinated:

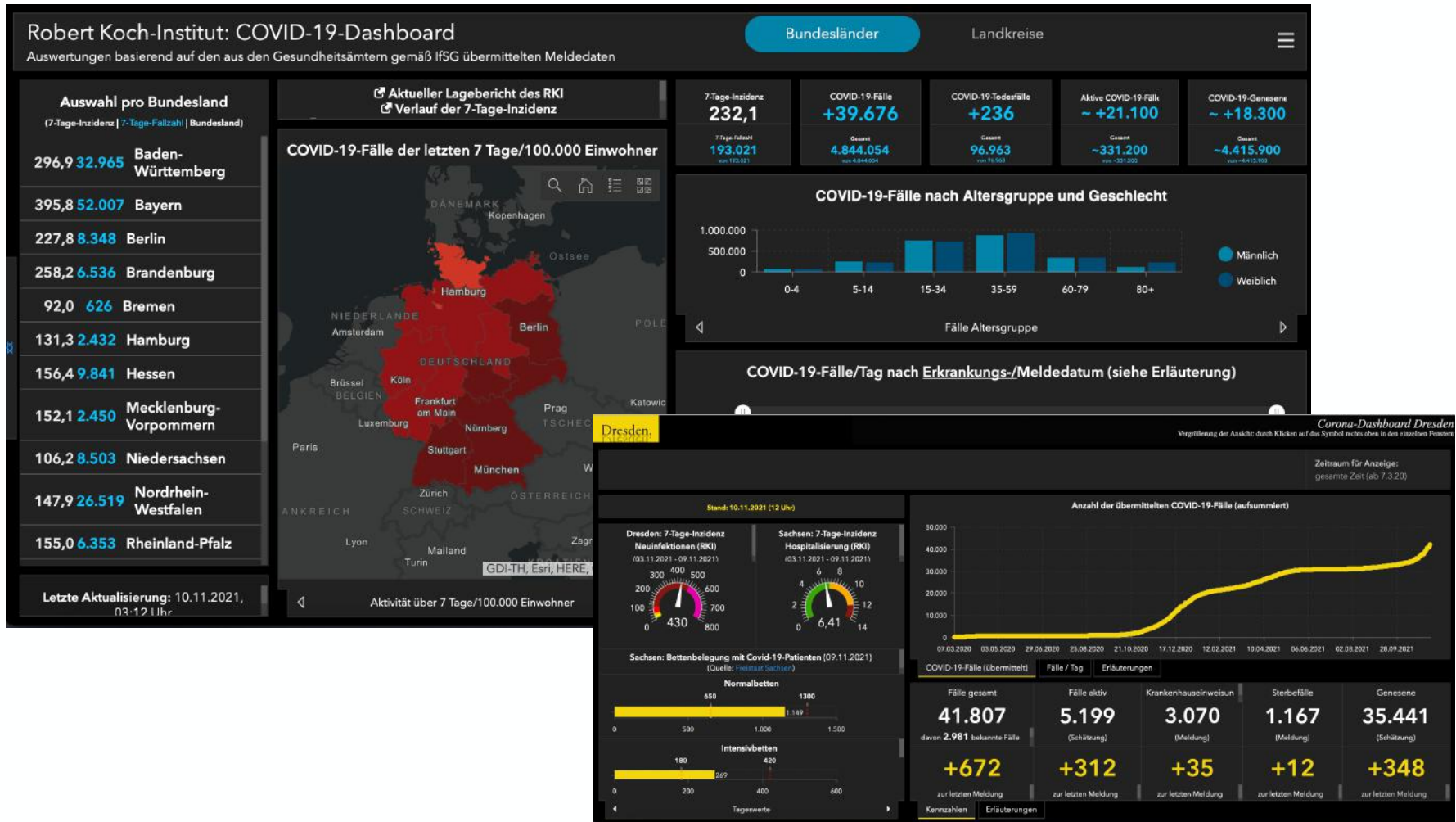
69,2%

(Status: Dec 7, 2021)



Source: https://experience.arcgis.com/experience/478220a4c454480e823b17327b2bf1d4/page/page_0/;
<https://www.bundesregierung.de/breg-de/aktuelles/fallzahlen-coronavirus-1738210>

The key figures of the pandemic are communicated through a wide variety of channels – including daily updated RKI dashboards.



Source: https://experience.arcgis.com/experience/478220a4c454480e823b17327b2bf1d4/page/page_0/
<https://experience.arcgis.com/experience/d2386f3214c1451c81b242be69bb3d50>

The new Infection Protection Act came into force in Germany at the end of November – it includes the rule of 3G in public transport.



- ▶ on Nov 25, 2021 the „epidemic emergency of national scope“ as the legal basis for the nationwide Covid measures expires
- ▶ German Bundestag passes Infection Protection Act, among other things, the **3G rule** is to be introduced in the workplace and **in public transport** from Nov 24
 - ▶ exceptions: school children, children under 6 years
 - ▶ the transport companies are responsible for the controls (locally with the help of the police and public order office)
- ▶ 3G means „vaccinated, recovered or tested“
- ▶ partly controversial discussion in the industry:
 - ▶ there is a duty to transport („Beförderungspflicht“)
 - ▶ controls are problematic, especially in local transport
 - ▶ the proof could be uploaded with ticket booking in long-distance transport
 - ▶ nevertheless also supporters of this rule

Source: <https://www.tagesschau.de/wirtschaft/unternehmen/bahn-3g-corona-101.html>

Risk of infection in public transport

Contact tracing on public transport is quite difficult – applications like the „Covid Warning App“ can be used.

- ▶ Germany Nov 16, 2020: **Unnecessary journeys by public transport are currently to be avoided.**
- ▶ But how high is the risk of infection in public transport?
 - ▶ difficult to say whether people have been infected on buses or trains, because **contact tracing** is much more **difficult** than in the private sector
 - ▶ overall, experts tend to assume a **low risk of infection** if the **distance** is guaranteed
- ▶ Whether a passenger catches an infection depends on many factors, including these:

Virus amount of the infected person

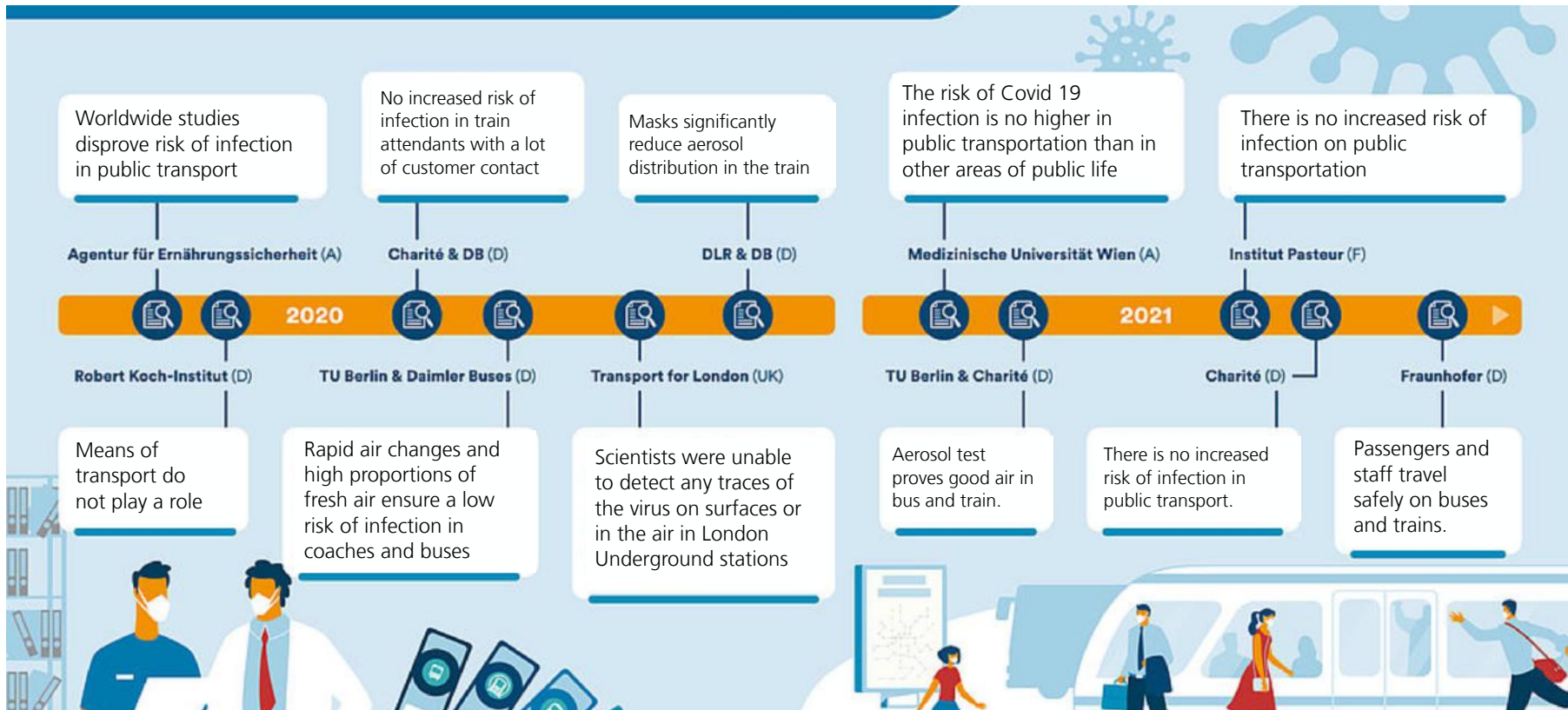
Virus dose in the room

Contact duration and distance to infected person

Source: https://zdfheute-stories-scroll.zdf.de/Ansteckungsgefahr_Corona_Bus_Bahn/index.html; <https://www.besserweiter.de/wissenschaftsticker-bus-und-bahn.html>

Study results on contagion in public transport

Various studies show that the risk of infection is not increased on buses and trains – if hygiene rules are followed.

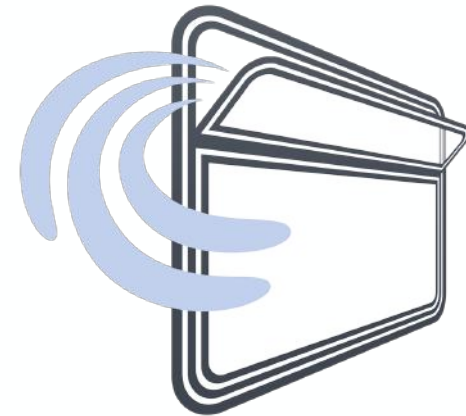


Source: Translated from <https://www.besserweiter.de/wissenschaftsticker-bus-und-bahn.html>

Risk of infection in public transport

Regular air exchange and correct wearing of face masks are effective means for the prevention of infection.

- ▶ Regular **air exchange** through opening doors, tilt windows and ventilation systems reduces the risk of infection.
 - ▶ according to the Association of German Transport Companies (VDV), there is an "almost complete exchange of air" at every stop (based on calculations every 50 seconds).
 - ▶ the higher the proportion of fresh air, the faster the virus concentration decreases
- ▶ The **mandatory use of masks** on public transport also minimizes the risk of infection.



Speaking without mask

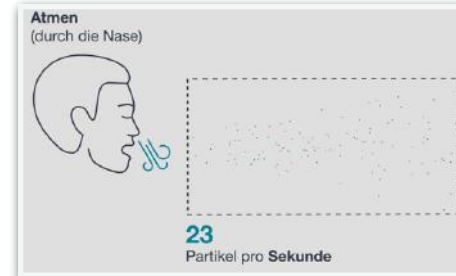
Speaking with mask

Source: https://zdfheute-stories-scroll.zdf.de/Ansteckungsgefahr_Corona_Bus_Bahn/index.html; <https://www.mvg.de/services/aktuelles/belueftung.html>; <https://www.besserweiter.de/wissenschaftsticker-bus-und-bahn.html>

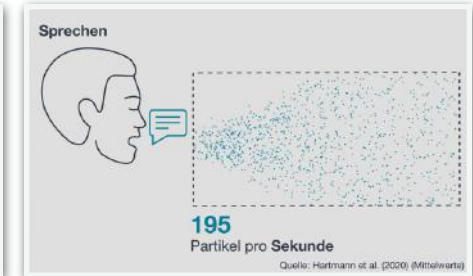
Risk of infection in public transport

In public transport, people speak less than in other places and usually do not stay there for very long.

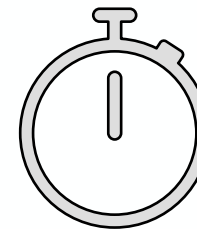
- ▶ **Fewer conversations** are held on public transport:
 - ▶ people talk less on public transport than e.g. in a bar
- ▶ **Short journey times** of around 15 minutes make public transport less dangerous in terms of an infection:
 - ▶ according to the Association of German Transport Companies (VDV), 15 minutes as average travel time
 - ▶ scientists assume that the critical contact time with an infected person is more than 15 minutes



Particles when only breathing



Particles when speaking



∅ average travel time of 15 minutes in public transport

Source: https://zdfheute-stories-scroll.zdf.de/Ansteckungsgefahr_Corona_Bus_Bahn/index.html; <https://www.besserweiter.de/wissenschaftsticker-bus-und-bahn.html>

The risk of infection in long-distance travel depends on the passenger load and the ventilation system in the vehicle.

- ▶ But what about **long-distance travel**, e.g. on the train, where doors do not open very often and people spent much more time?
 - ▶ depends on the ventilation systems
 - ▶ proportion of fresh air should be as high as possible
 - ▶ certain amount of the virus nevertheless remains in the vehicle as long as an infected person continues to exhale
 - ▶ the longer one stays in a virus-laden vehicle, the higher the risk of infection
 - ▶ distance should be maintained as far as possible



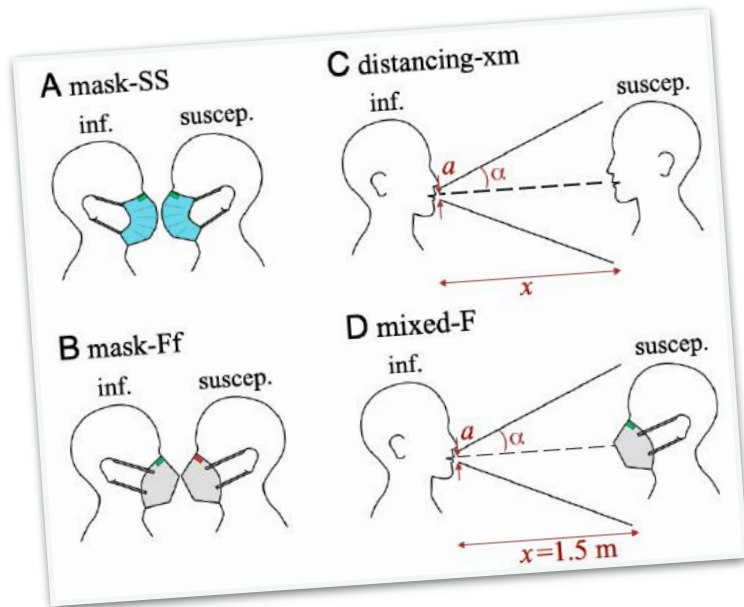
- ▶ **People's behavior** is therefore essential:
 - ▶ Avoid crowded means of transport.
 - ▶ Wear masks properly and change them regularly.
 - ▶ Comply with hygiene measures.
 - ▶ Do not use public transport when having symptoms.



Source: https://zdfheute-stories-scroll.zdf.de/Ansteckungsgefahr_Corona_Bus_Bahn/index.html; https://www.dzsf.bund.de/SharedDocs/Downloads/DZSF/Veroeffentlichungen/Forschungsberichte/2021/ForBe_12_2021.pdf?__blob=publicationFile&v=3; <https://sbahn.berlin/fahren/bauen-stoerung/informationen-zum-coronavirus-covid-19/>; <https://www.besserweiter.de/wissenschaftsticker-bus-und-bahn.html>

Effectiveness masking

A recent study on the risk of infection makes it clear: FFP2 masks worn correctly are very effective.



- ▶ social distancing even at **3 m** between two people speaking **without a mask** -> after a few minutes up to **90% risk of infection** in a closed room
- ▶ person with mask and infected person speaks at a distance of 1.5 m -> with a surgical mask the upper bound reaches 90% after 30 minutes; with an FFP2 mask it remains at about 20% even after 1 hour
- ▶ both with surgical mask and infected person speaks --> very conservative upper bound still below 30% after 1 hour
- ▶ **both with well-fitting FFP2 mask -> 0.4%**
- ▶ wearing appropriate masks in community provides good protection for others and self
- ▶ **social distancing seems not that important if masks are worn correctly**

Source: <https://www.pnas.org/content/pnas/118/49/e2110117118.full.pdf>

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December 21, 2021

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The industry signals "using public transport is dangerous" and increases the amount of prohibition signs.



The passenger ...

- ▶ ...sees numerous **prohibition signs** and notices: "Cover your mouth and nose", "Keep your distance", "Only drive when necessary".
- ▶ ...notices the area near the bus driver cordoned off with **flutter tape** and the abolition of driver sales
- ▶ ...perceives public transport as a „viral and anxiety area“

Source: <https://www.maz-online.de/Brandenburg/Brandenburg-plant-Imagekampagne-fuer-Nutzen-des-OePNV-in-Corona-Zeiten/>;

own pictures P&C

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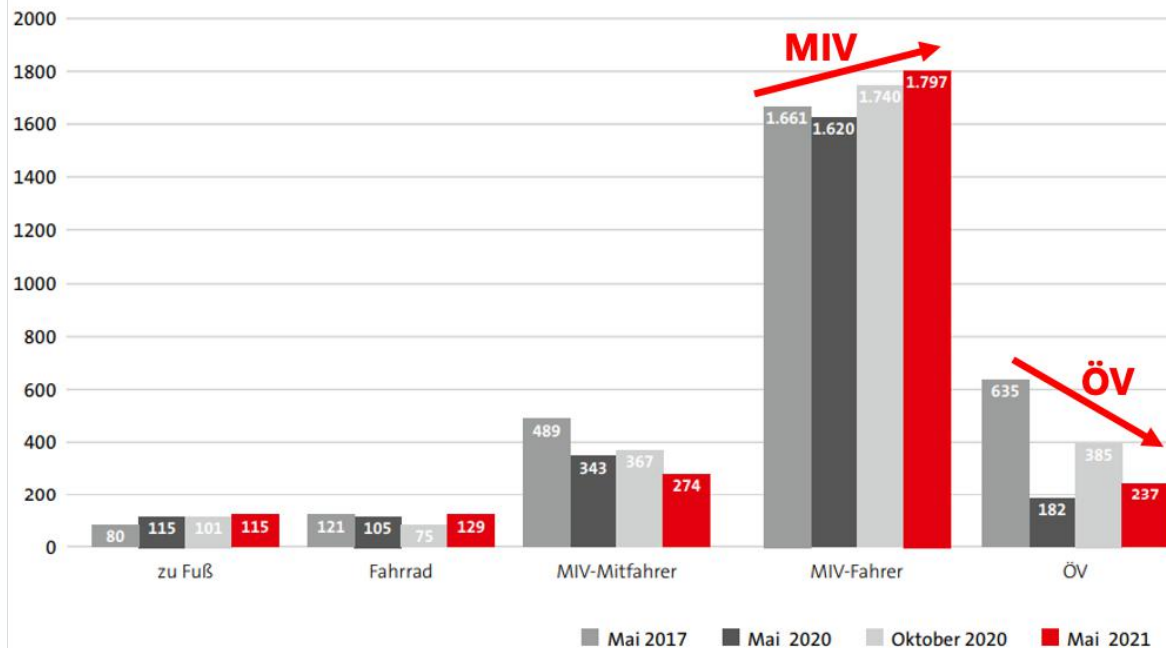
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General mobility behavior during the pandemic

In terms of mobility motorized individual transport, bicycling and walking are seeing increases in the pandemic.

Transport performance per day in absolute terms by mode of transport (extrapolation in million passenger kilometers)

Verkehrsleistung pro Tag absolut nach Verkehrsmitteln
Hochrechnung in Millionen Personenkilometern



Explanation

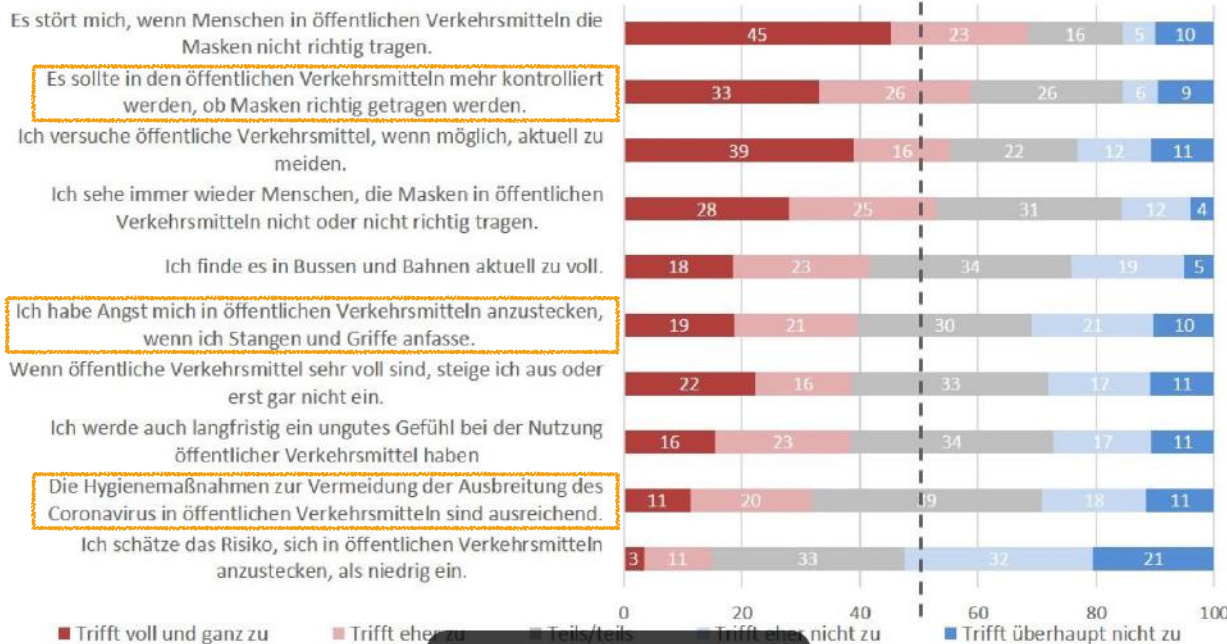
- ▶ People are still less mobile than before the pandemic. Since May 2021 the trend has been rising again.
- ▶ The distance traveled by public transport (May 2021: -60 % compared to 2017) is significantly behind the pre-pandemic level.
- ▶ motorized individual transport (MIV; +8 %), cycling (+7 %) and walking (+44 %) are winning

Source: WZB, infas, MOTIONTAG (2021): Mobilitätsreporte (Nr. 5) <https://www.infas.de/neuigkeit/mobilitaet-und-corona-wie-veraendert-sich-der-alltagsverkehr/>

Non-compliance with hygiene regulations is a major problem for many public transport users.

Assessment of the current situation by public transport users (n=1,000 per survey wave)

Explanation



- ▶ There is a high level of fear that there is a risk of infection in public transport.
- ▶ The public transport users worry if people do not wear the masks correctly and this is not adequately controlled.
- ▶ 40 % are afraid of infection via the poles and handles.

4. DLR-Befragung zur Mobilität in Krisenzeiten | 18. Jahrgang, Sonderausgabe | Probst & Consorten | Vor Corona an mindestens ein bis drei Tagen pro Monat genutzt haben, Angaben in Prozent

Source: 1st - 4th DLR (German Aerospace Center) panel survey on mobility in times of crisis (last survey April/May 2021)
https://www.dlr.de/content/en/articles/news/2020/03/20200928_second-dlr-study-on-covid-19-and-mobility.html