



TRAVEL MEDICINE IN THE PANDEMIC

DEC 13, 2021

SCOTT D. OLEWILER, MD

INFECTIOUS DISEASES

LEWES, DE

OUTLINE

- General Travel Medicine approach
 - Travel vaccines / medication update
- Additional risks of Travel in the C19 era
 - Is the plane safe?

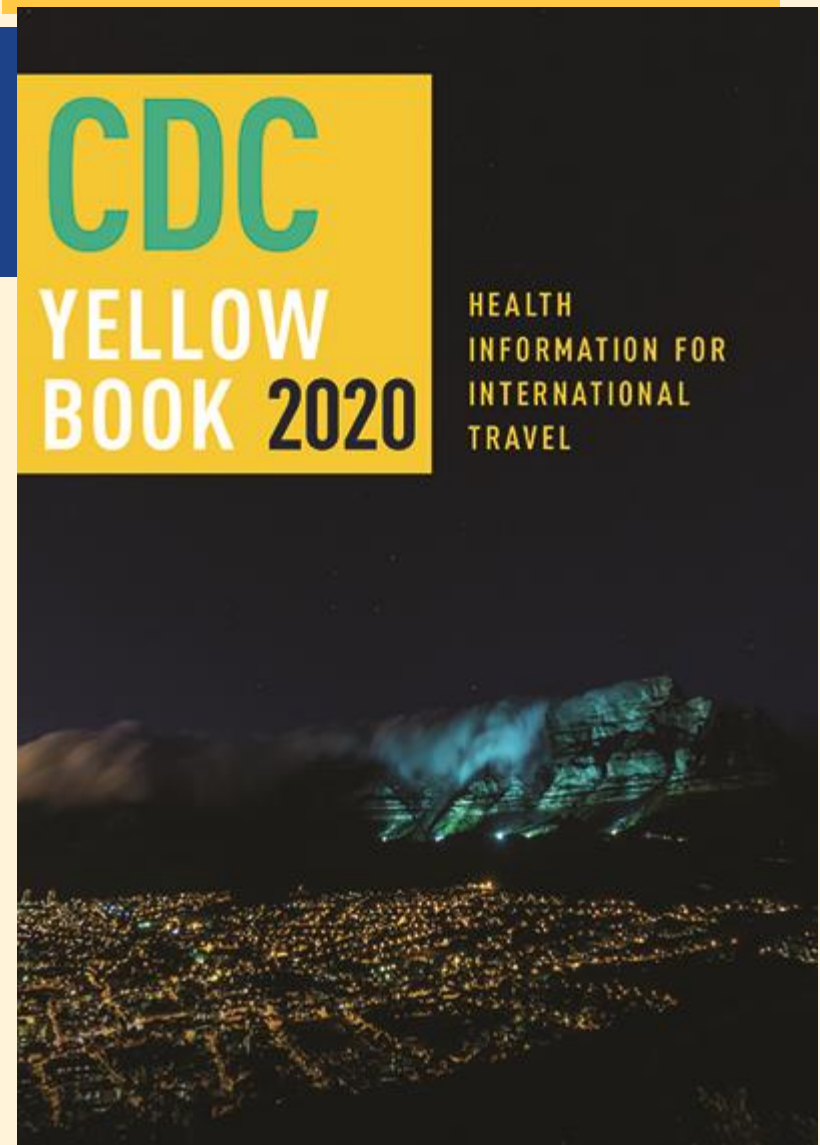


TRAVEL MEDICINE THE OFFICE VISIT

CENTRAL SOURCE OF TRAVEL-RELATED INFO

- CDC Yellow Book
- CDC <https://wwwnc.cdc.gov/travel>
- Tropimed <https://www.tropimed.com/tropimed/>
- Travel Health Assist
<https://www.conseilsantevoyage.com/en/>

- Sherpa <https://www.all-travel.com/travel-resources/sherpa-travel-restrictions/>



GENERAL TRAVEL MEDICINE

- 3542 rule

3542 RULE.

TOPICS TO DISCUSS

- 3 bugs you get from mosquitoes
 - YF JE Malaria
- 5 bugs you eat
 - Polio HAV typhoid Cholera dysentery
- 4 standard vaccines you'd get even in USA
 - Tdap Flu Pneumococcus Meningococcus
- 2 pills you need to prescribe.
 - Malaria Dysentery

3542

TOPICS TO DISCUSS

- 3 mosquito-borne:
 - Yellow fever
 - Japanese Encephalitis
 - Malaria

YELLOW FEVER

- 200,000 cases / yr²
- Hepatic failure, Renal failure, DIC, Shock, Cerebral edema
- Case-fatality 15% - 50%¹
- LIVE VIRUS Vaccine 95% protective
 - Often required q 10 yrs
 - Immunity 35 yrs, likely for life²
 - AE: 1% fever, aches → curtail activity few days²
- vaccine encephalitis
 - 1 case in USA since 1965. Risk < 1 : 8 million doses²



1. WHO. https://www.who.int/csr/resources/publications/surveillance/Yellow_fever.pdf

2. Cetron M. MMWR 2002;51(RR17):1-10

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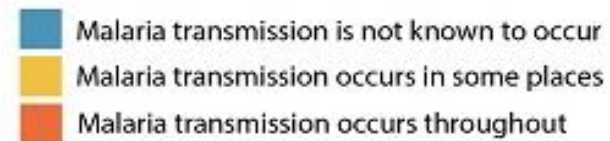
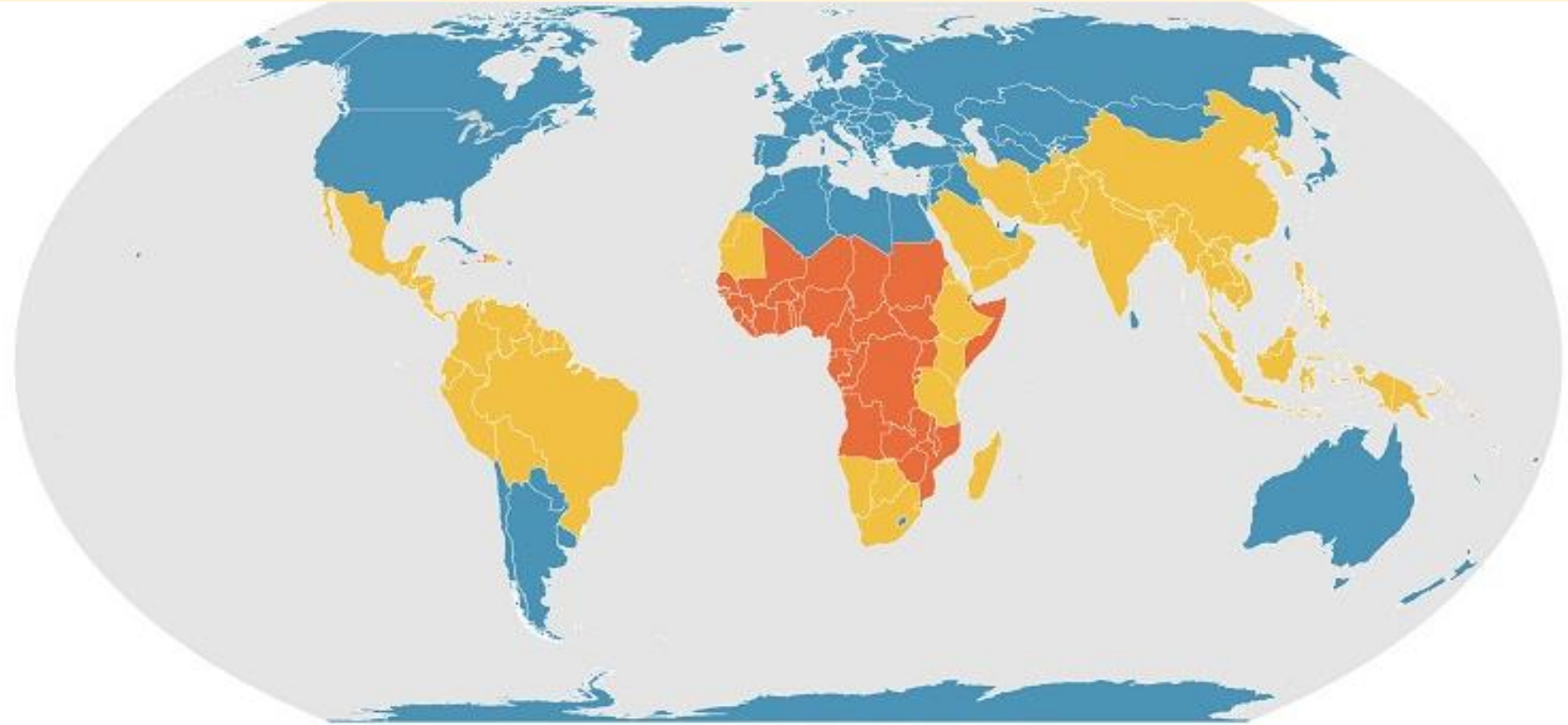


1. WHO. https://www.who.int/csr/resources/publications/surveillance/Yellow_fever.pdf

2. Cetron M. MMWR 2002;51(RR17):1-10

MALARIA PREVENTION

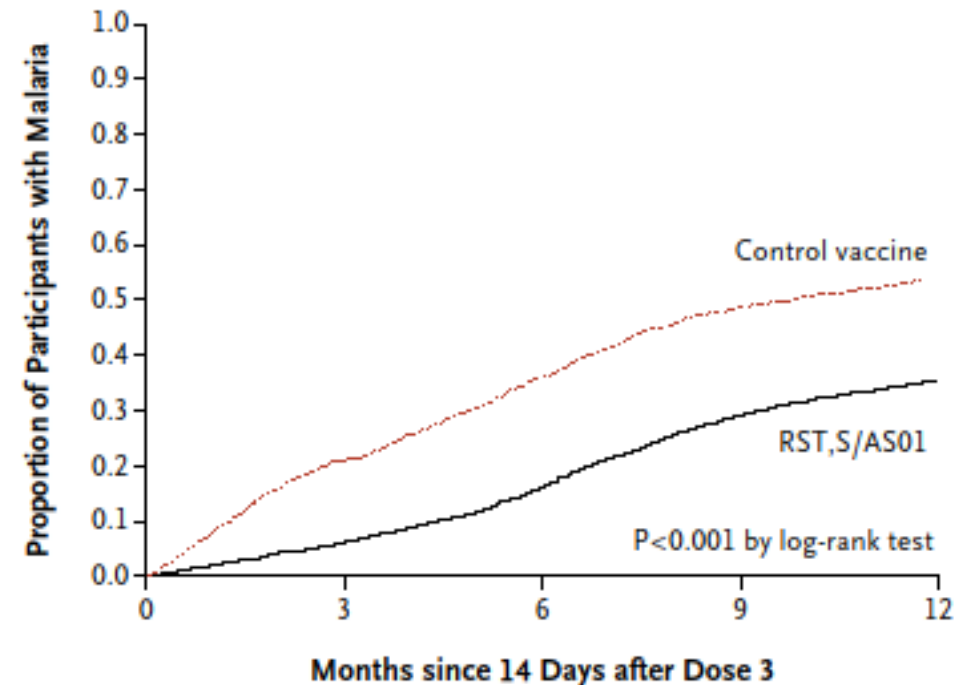
- Vaccine
- Atov-Prog
- Doxycycline
- Chloroquine
- Mefloquine
- Tafenoquine



MALARIA VACCINE – GSK RTS,S/AS01 VACCINE IM

- recombinant protein-based vaccine.
- Protects only against *P. falciparum*
- 3 doses IM q month
- Children: reduced clinical malaria 55%, 14 months after 1st dose. (per protocol)
- For children 5 mos – 17 mos old
- WHO: rec widespread use in Africa 10/6/21
- AE: some concern for febrile Sz 1: 1000 doses
- Not approved in USA

A Per-Protocol Population



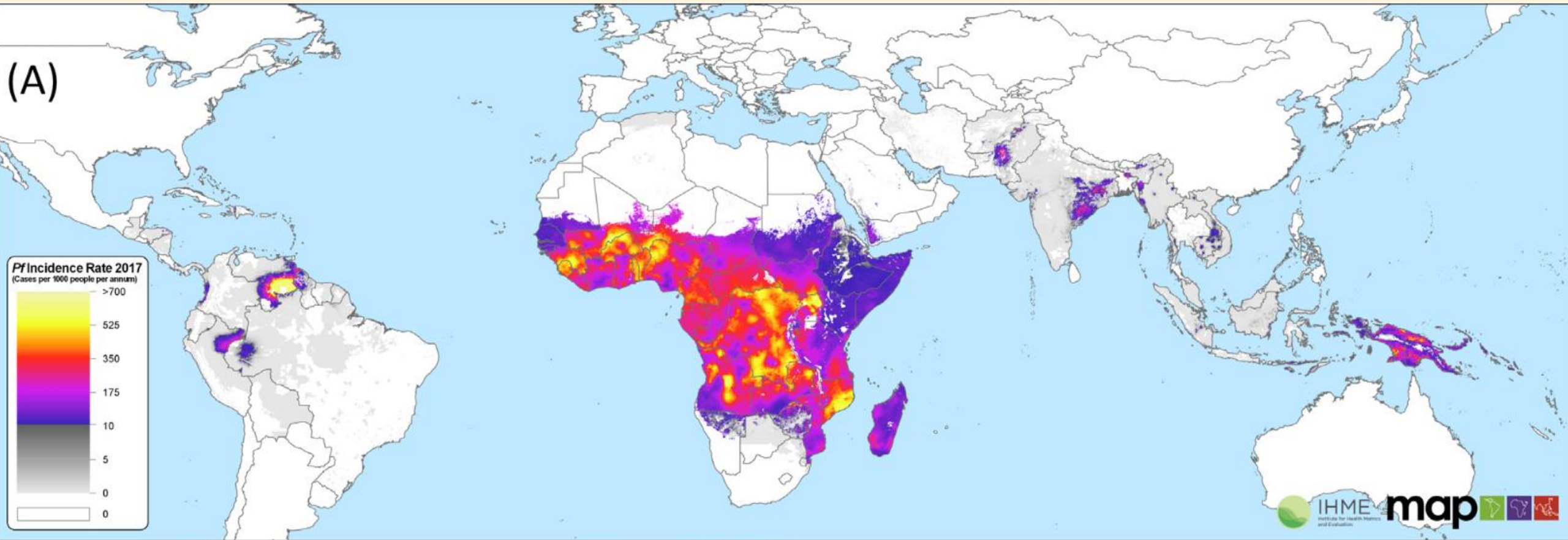
No. at Risk

RTS,S/AS01	2830	2602	2279	1885	698
Control vaccine	1466	1137	909	712	274

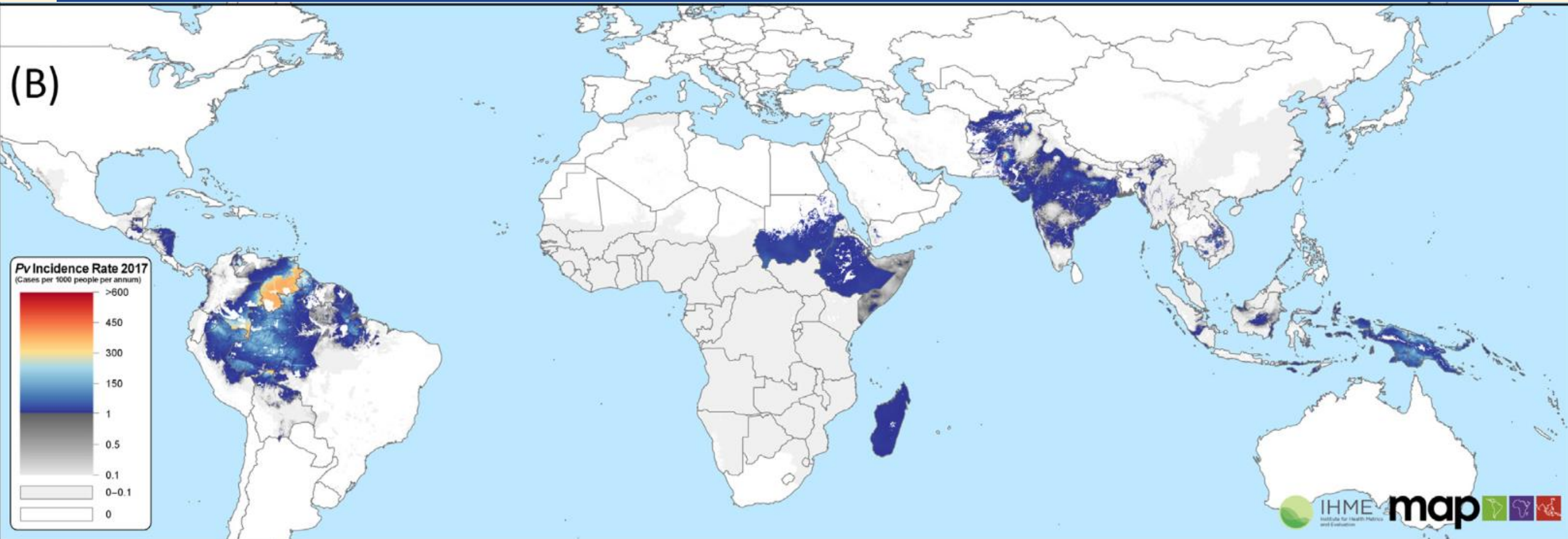
NOT GOING TO REPLACE PILLS

- ~ not useful for travel outside Africa
- 3 doses over 3 months
- No current data in adults
- 55% protective

FALCIPARUM MALARIA, DISTRIBUTION 2017



VIVAX MALARIA, 2017



MALARIA PROPHYLACTIC MEDICATION - I

- Atovaquone-proguanil : 2002. \$ 1.70 / pill

Contraindicated: CLcr < 30

Proguanil: megaloblastic anemia, pancytopenia

Use TFQ, MFQ or Doxy instead

AE: none > placebo

Take with food or milk

1d before travel until 7d after return.

- Doxycycline

100 mg po qD with food

Lots of dietary precautions

Photosensitivity: DOSE RELATED¹

6% of Lyme ECM pts 100 BID

16% of Australian troops 100 qD for malaria px

Take 1d prior to travel until 1 month after return.

- Chloroquine phosphate

300 mg base (500 mg salt) q wk

2 wk before travel, until 4 wks home

Only where chloroquine resistance is absent : Central America

G6PD: probably safe, but wise to check.

- Mefloquine 1989: 2013 black box

250 mg q wk (Rx dose = 1250 mg / 24 hrs)

2 wks before travel until 4 wks home

Concern for psychiatric disturbances: psychosis, toxic encephalopathy, convulsions,

Reported 1% - 10% of travelers: vertigo, visual difficulties.

Idiosyncratic peripheral neuropathy, paresthesias, tremor.

Potentiate AV Block if taken with B-blocker – high degree AV block.²

1. Goetze S. Skin Pharmacol Physiol 2017;30:76-80

2. Abecasis J. Rev Port Cardiol. 2009 Oct;28(10):1153-9.

3. Nevin R. Int J Parasitol Drugs Drug Resist 2014 Aug;4(2):118-125.

MALARIA PROPHYLACTIC MEDICATION - 2

- **Tafenoquine [Krintafel, Arakoda]**
 - 7/20/18 approval: Prevention of all species malaria, cure of liver phase malaria.
 - 200 mg po with food qD X 3d
 - Then 200 mg po qwk maintenance dose
 - After return: single 200 mg dose 1 wk after the last maintenance dose.
 - Single dose anti-relapse Rx: 300 mg po X 1
 - Approval is currently limited to 6 months use.
 - MUST R/O G6PD Defic. Prior to use
 - Renal failure – “not defined.” Excretion “unknown”. T $\frac{1}{2}$ 16.5d. Monitor for AEs.
- Pharmacology: 8-aminoquinoline, analogue of primaquine, developed as alternative to primaquine.
- **Advantage: T $\frac{1}{2}$ = 16d : qWk dosing**
- **Other quinolines:**
 - Mefloquine
 - Chloroquine
 - Primaquine
 - Hydroxychloroquine
- Thus potential for neuro-psych AEs
- **CI: Psychosis** History. Caution if Psych disorder.

TAFENOQUINE SAFETY 6 MONTHS (OFF-LABEL 1 YEAR)

- 300 TFQ, 300 placebo healthy volunteers
 - Age 18-55 yo. **INCLUDING psych illness**, so long as judged stable. 42% + history in TFQ group, 50% placebo.
- Enrolled in Australia and USA
- 200mg qwk vs placebo X 52 weeks
- ~ 30% lost to f/u in each group
- Stopped Rx due to AE:
 - 3.7% TFQ group,
 - 1.7% Placebo group
- GI most common: 1.3% in TFQ group,
only nausea significantly > placebo
- 1 suicide attempt in each group
Relationship breakup, “considerable” baseline psych history.
Judged unlikely related to Rx

TAFENOQUINE SAFETY 6 MONTHS (OFF-LABEL 1 YEAR)

- No apparent risk of neuropsychiatric events in 1 year
- Including administration to 42% of the group with h/o psych disorder

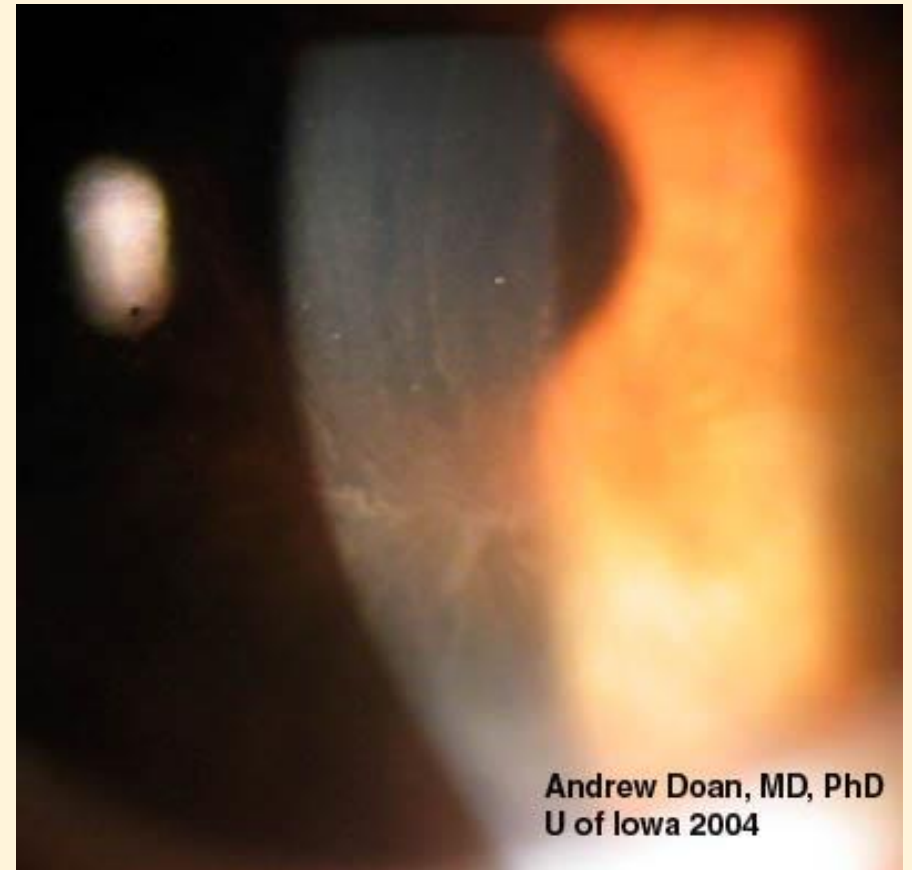
1 YEAR TFQ – CORNEA VERTICILLATA

- No retinal effects
- Cornea verticillata ++ association
Accumulation of phospholipids in cornea
– can cause blurry/glare
 Manage with artificial tears, carboxymethyl cellulose + saline
 Does not require cessation of Rx
 OPHTHO: no concern
- Did not cause cessation of Rx in any patient.
- First apparent on exam 12-24 wks of Rx
- Resolved 93% by 3 months after cessation

	TFQ	Placebo	
Retinal effects	18.2%	19%	
C. vertic.	54.5%	3.7%	P < 0.001
Diarrhea	10.6%	8.1%	P = 0.326
Nausea	13%	7.7%	P = 0.044
Dizziness	6.6%	10.7%	

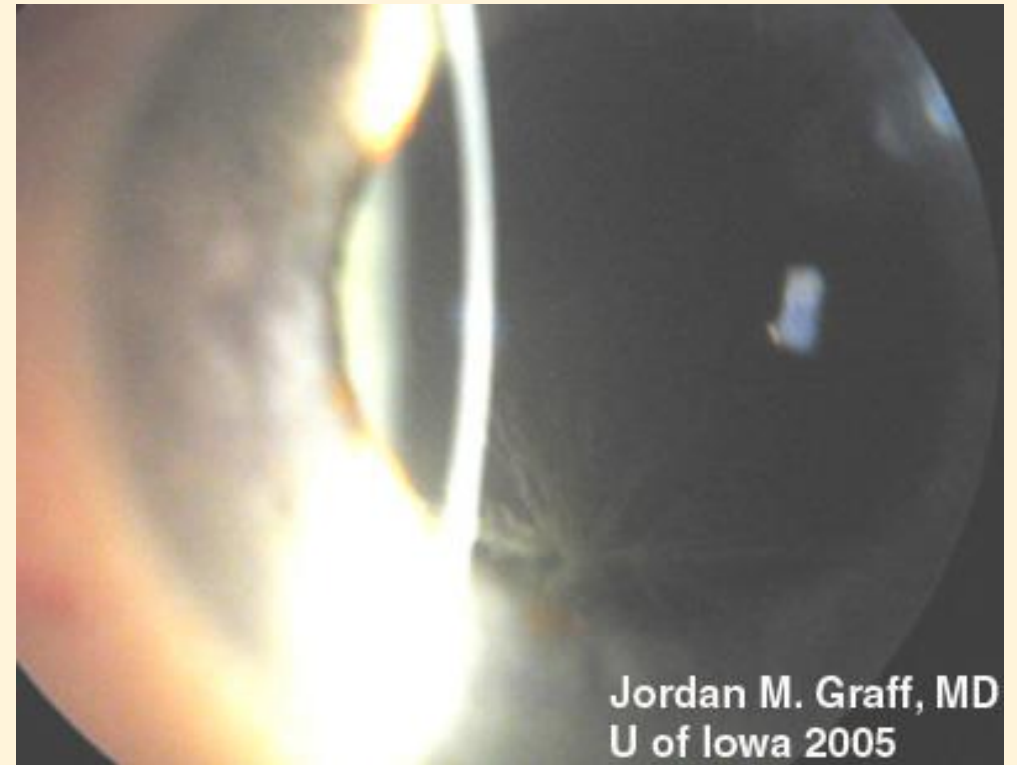
CORNEA VERTICILLATA

- Grey whorls or lines inferior cornea, b/l
- Most often asymptomatic
- Amiodarone most common cause
- CA ChemoRx
- HCQ high doses
- Phenothiazines, other drugs
- Fabry disease

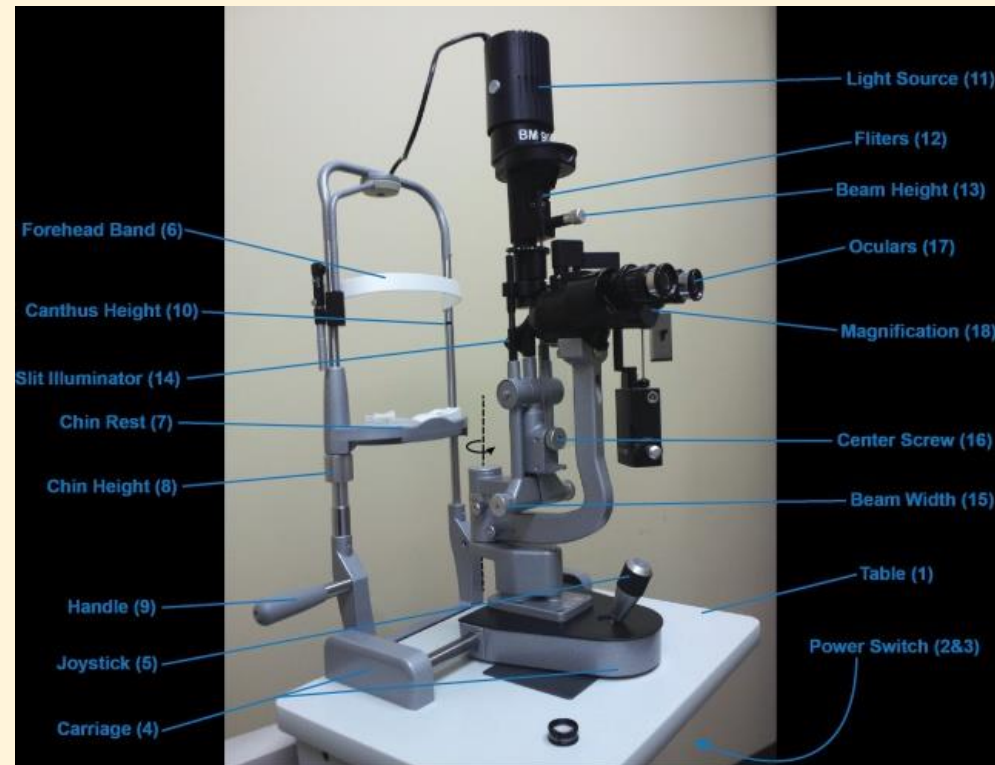


Andrew Doan, MD, PhD
U of Iowa 2004

CORNEA VERTICILLATA



SLIT LAMP



https://eyewiki.aao.org/Slit_Lamp_Examination

JAPANESE ENCEPHALITIS

- *Culex* mosquitoes, night feeders*.
- Clinical:
 - Sudden onset Fever, HA, seizure, in 1/250 infections
 - Flaccid paralysis
 - Mortality rate with encephalitis 30%, often with permanent sequelae for survivors.
- SE Asia, India
- Vaccine indications:
 - > 30 days exposure during transmission season
 - For shorter trips if high risk activities (agricultural work, no air conditioning, uncertain itinerary).
 - Not for short trip with urban travel only



*Schultz G. Southeast Asian J Trop med Pub Health 1992Sep;23(3):464-9.

JAPANESE ENCEPHALITIS VACCINATION

- Inactivated culture-derived vaccine.
- 0.5 mL IM X 2 doses 1 month apart , booster at 1 yr. If continued exposure
- (accelerated series now FDA approved on day 0 and 7)
- complete series > 1 wk prior to travel (concern for allergic reactions)
- AE: HA, myalgia, fatigue > 10%**



*Schultz G. Southeast Asian J Trop med Pub Health 1992Sep;23(3):464-9.

** CDC Yellow book on travel vaccination accessed. 12/5/21
<https://wwwnc.cdc.gov/travel/yellowbook/2020/travel-related-infectious-diseases/japanese-encephalitis>

3542:

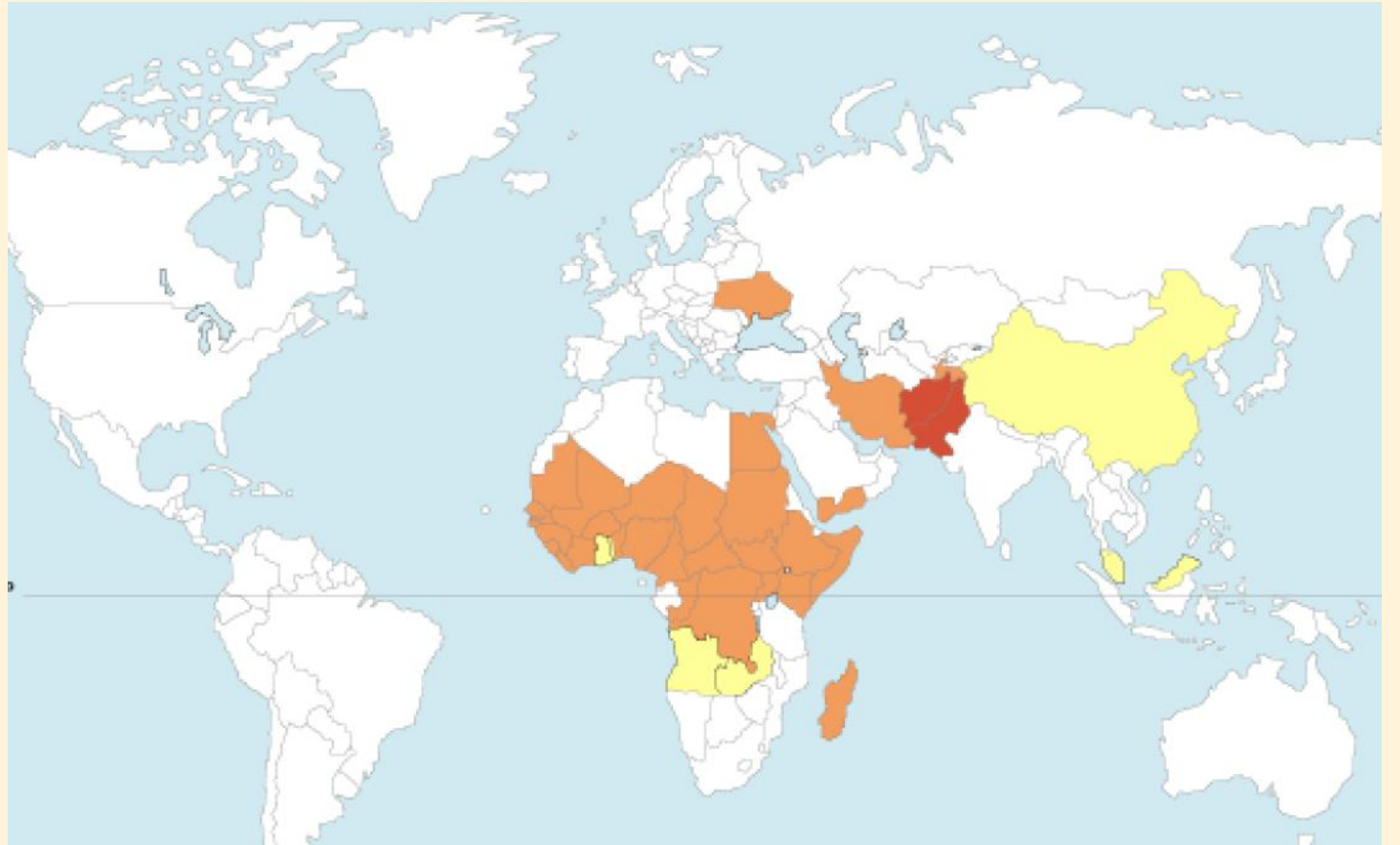
5 BUGS YOU EAT

- Polio
- HAV
- Typhoid
- Cholera
- dysentery

3542:

5 BUGS YOU EAT POLIO

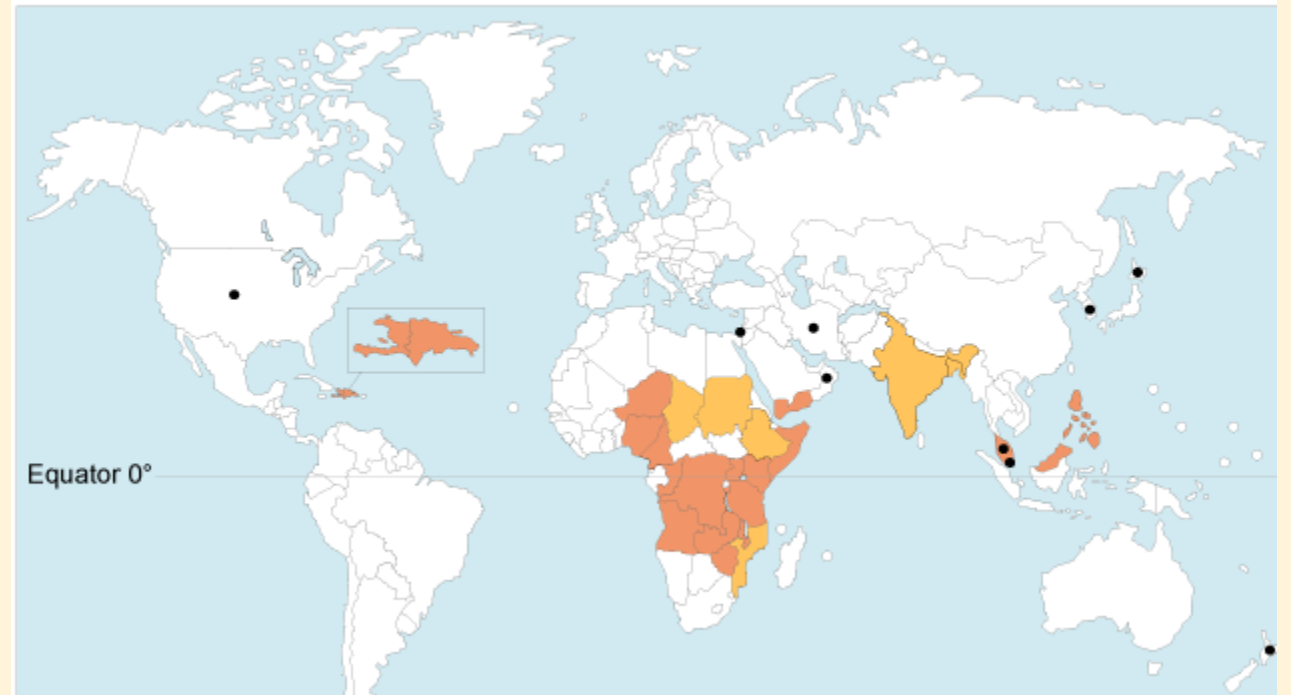
- Red: WPV
- Orange: cVDPV
- If unvaccinated, give full series for any of these countries
- Adults previously vaccinated: give single dose booster 0.5 ml SC X 1



3542:

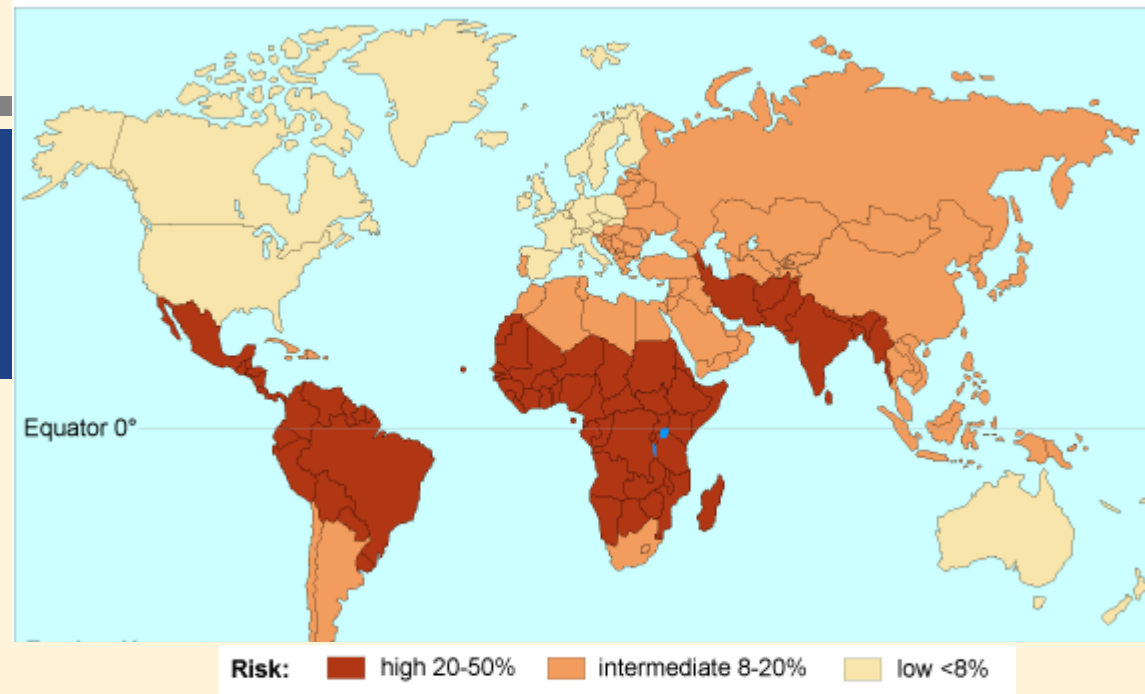
5 BUGS YOU EAT

- Polio
- HAV
 - Routine childhood schedule since 2006
- Typhoid
 - PO vaccine no longer available (?late 2022?)
 - IM vaccine q 2 yrs
- Cholera live oral (\$300)
 - Approved 2016 – after Dec 2020, not available in US.
 - Due to ↓ international travel and demand by CI9
 - Live, oral single dose, at least 10d prior to travel
 - Protection 90% @ 10d, 80% at 3 months – after that?
 - Booster interval not known
 - **local risk due to raw oysters (Lewes)
- dysentery



Cholera – endemic areas

TRAVELER'S DIARRHEA: DYSENTERY



Scott D. Olewiler, MD
Infectious Diseases, Travel Medicine

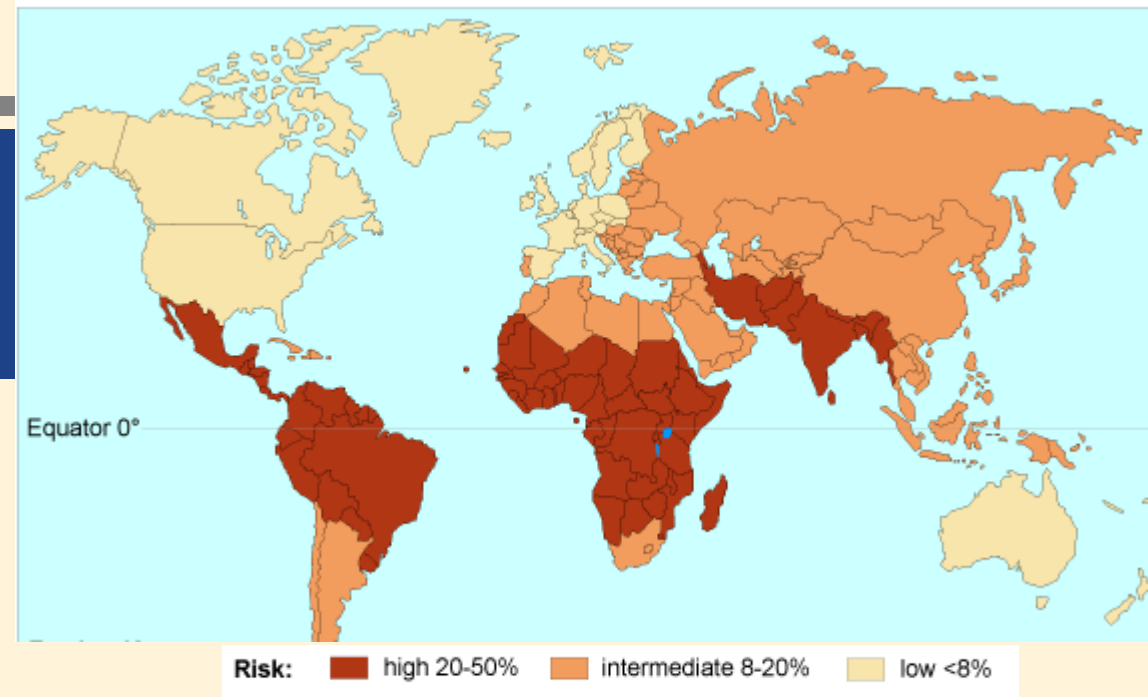
COOK IT, PEEL IT YOURSELF, OR DON'T EAT IT

Risks of Contaminated Food and Water

Highest-Risk Areas:

All developing countries in Latin America, Africa, Middle East, and Asia.

TRAVELER'S DIARRHEA



- Bacteria, viruses, parasites (giardia, Entamoeba, cryptosporidium, Cyclospora)
- Illness: lasts 4d commonly,
90% are resolved in 1 week without Rx.

TRAVELER'S DIARRHEA – MY OWN RECOMMENDATIONS

- **Stress careful food / water precautions**

Ice cubes

Salad

toothbrush



TRAVELER'S DIARRHEA – MY OWN RECOMMENDATIONS

- No prophylactic abx nor bismuth subsalicylate
- Mild: loperamide 4 mg, then 2 mg q stool (max 16 mg/d)
- Day # 3-4: no improvement
 - Fever, blood in stool, pus in stool
 - STOP loperamide during abx Rx
 - Azith 500 qD X 3d
 - CIP 500 BID X 3d
 - ~~Rifaximin~~ Rifaximin 200 mg po TID (only for NONinvasive E. coli)
 - STOP STATIN medication if CIPROFLOXACIN
(But Azithro now thought to be safe)



3542: FOUR “STANDARD” VACCINES

- Tdap
- Flu
- Pneumococcus
 - Age > 65
 - Smoker
 - Med conditions: DM, EtOHism, CSF leak, cochlear implant, Heart Dz, COPD, Asthma, asplenia, sickle disease, HIV, CA, SOTx, Drug immunosuppression,
- Meningococcus →



3542: TWO PILLS

- Malaria pills
- Dysentery pills



COVID CONSIDERATIONS FOR TRAVEL



THE HORROR OF C19 HOSPITALIZATION AND DEATH

- Days or weeks SOB on high flow O₂
- Spouse, family ill or dying at same time.
- Dying in isolation,
- convey this story to patients and really rethink this risk.


- “I’ll just take zinc, Vit D, and ivermectin”
- Space shuttle : it seems really easy and safe, until it’s not.




WHAT IS THE QUESTION

- PATIENT: What shots do I need?
- ME: should you be traveling?


DESTINATION – LEVEL OF C19 ACTIVITY

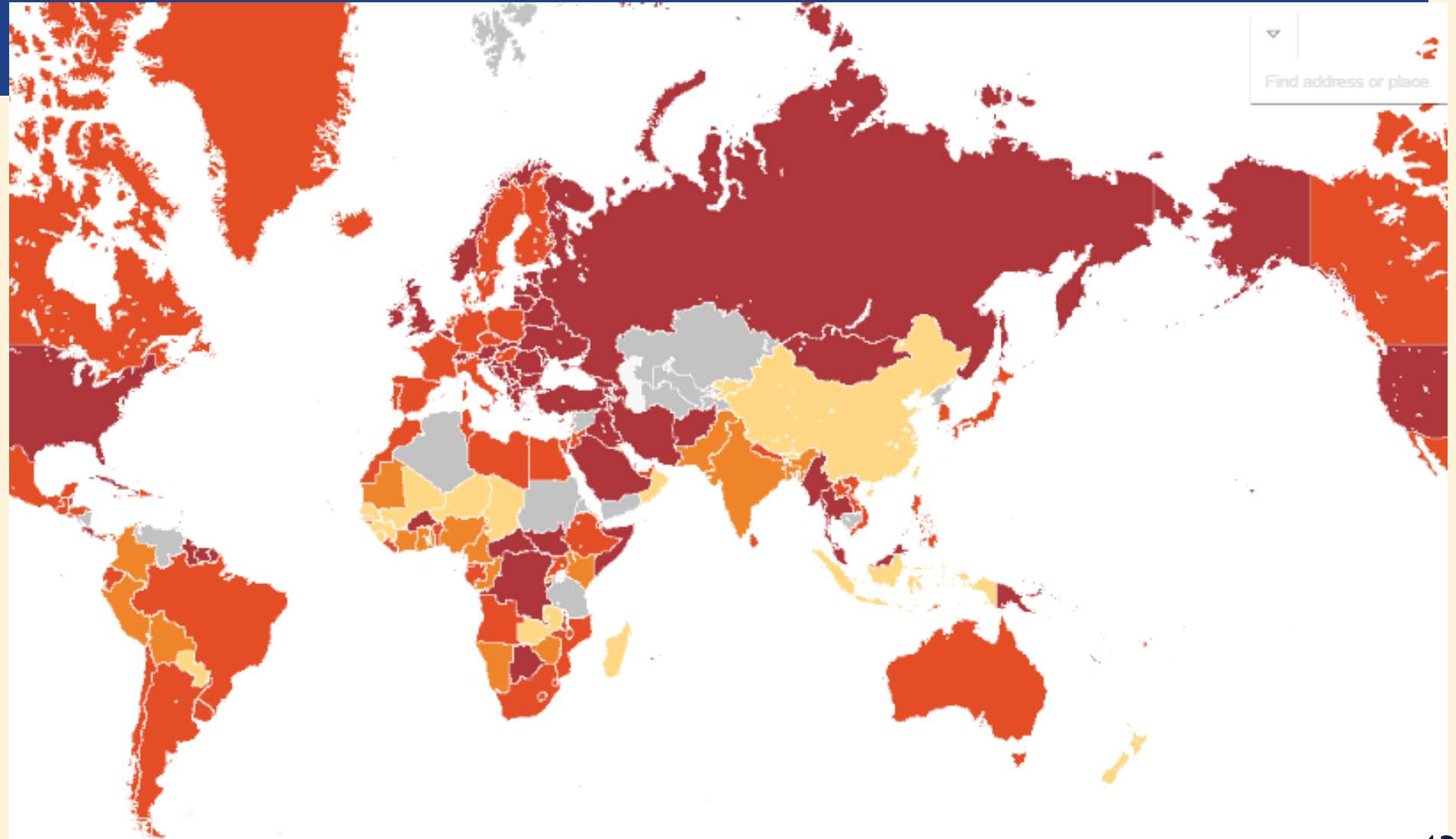
 -4. very high –
Avoid

 -3. HIGH - Avoid
nonessential

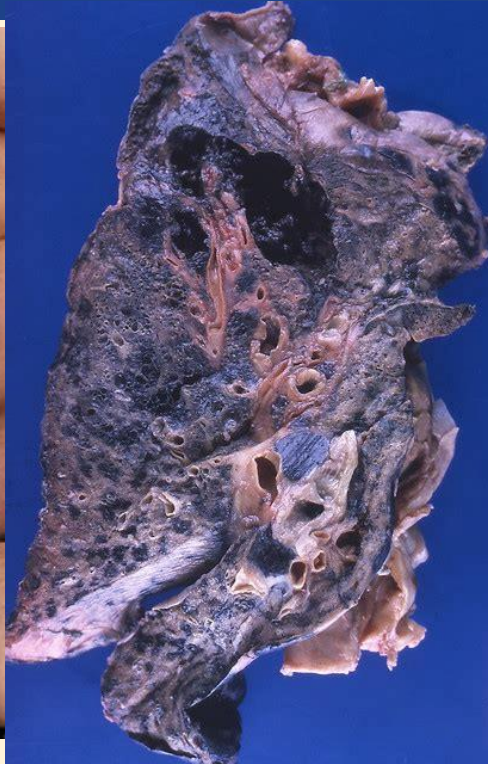
 -2. MOD - Avoid
noness. If ↑ risk
factors

 1. LOW
-be vaccinated

 - Avoid. Be
vaccinated



MAJOR RISKS FOR SEVERE COVID-19

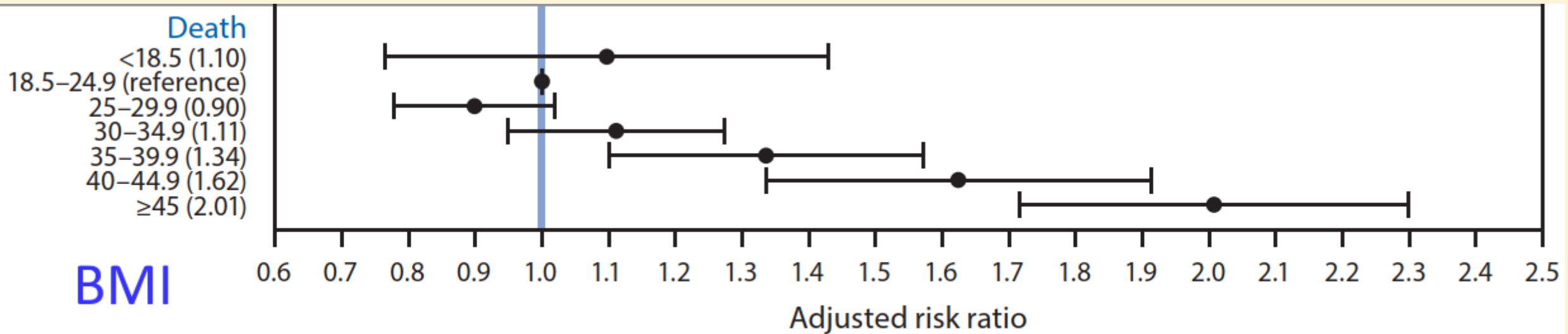


INC RISK FOR SEVERE C19 DISEASE

- **Severe dz** \equiv hospitalization, ICU, vent, or death
- **Age: 50** \rightarrow 0.3% mortality*
 - 65 \rightarrow 1.5%
 - 80 \rightarrow 11%
- **CA**
- **CKD**
- **Liver Dz**
- **Chronic Lung Dz, including mod/severe Asthma**
- **DM**
- **CAD, CHF, HTN**
- **HIV**
- **Primary immune deficit**
- **Obesity (BMI \geq 30, <40)**
- **Morbid obesity (BMI \geq 40)**
- **Pregnancy**
- **Smoker**
- **SOTx, HSCTx**

*O'Driscoll, M. et al. "Age-specific mortality and immunity patterns of SARS-CoV-2." Nature. DOI: 10.1038/s41586-020-2918-0 (2020).

OBESITY RISK FOR DEATH, ~ 148,000 US ADULTS WITH ER DX C19 INFECTION MAR-DEC 2020

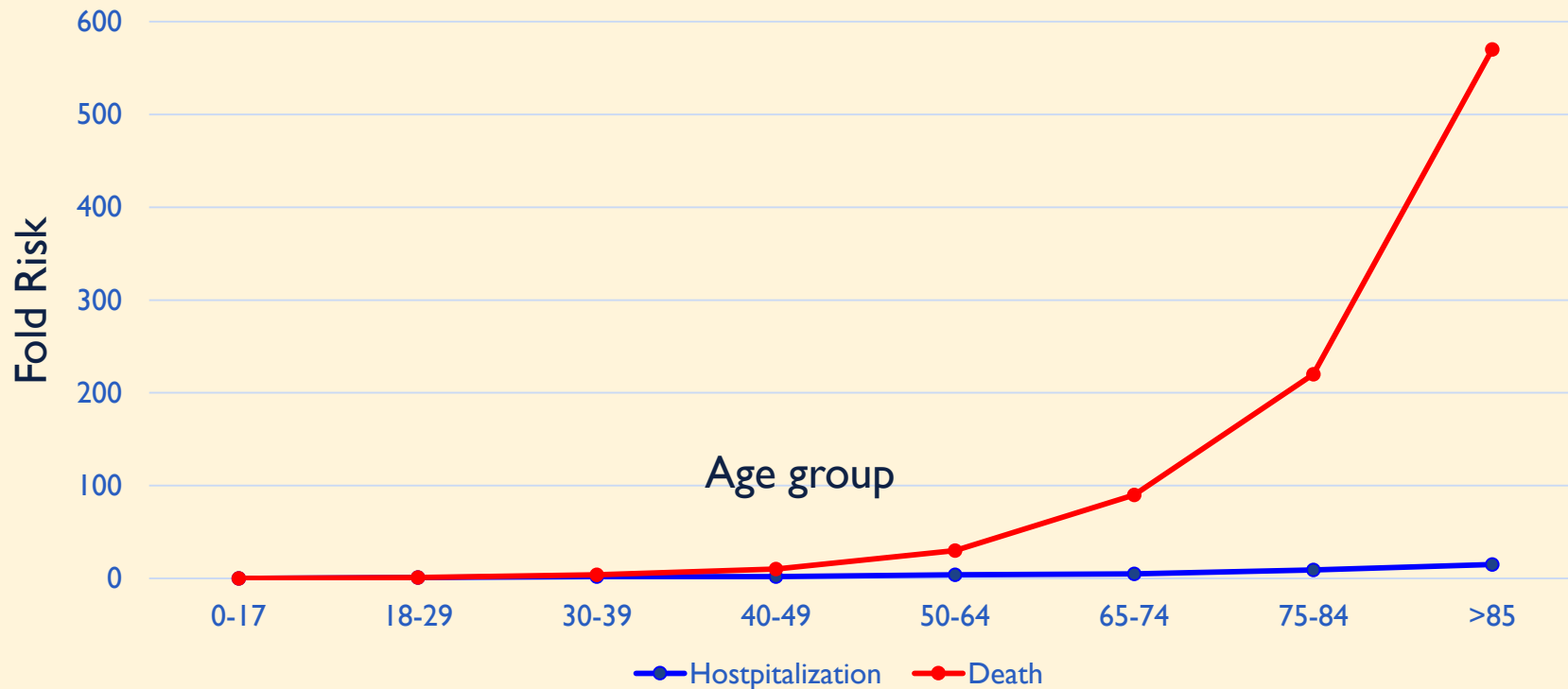


Data USA, March – Dec 2020

MMWR Weekly / March 12, 2021 / 70(10);355–361

DEATH BY AGE GROUP

Fold Change, Risk
18-29 comparator group



- 65-74 yo: 5 x HOSP,
90 x DEATH
 - 75-84 yo: 9 x HOSP,
220 x DEATH
 - ≥ 85 yo: 15 x HOSP,
570 x DEATH
- (ref group = 18-29)

NCHS data: Death by Age Group, Data through 8/18/21

<https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-age.html>

COVID AGE TOOL

- First Published 5/20/20
- COVID-Age to quantify risk factors for death from C19 infection
- Race, BMI, variety of medical risk factors.

Risk	Rel Risk	Add years	Quality of data
Female	0.6x	-5	Mod
HTN	~3.0x	12 if young	Provisional
CHF	2.2x	8	Provisional
COPD	1.9	6	Mod
DM2, A1C > 7.5%	2.0	7	Mod
CKD: HD	3.7	13	Mod
Heme Malig	2.8	10	Provisional
SOTx	3.6	12	Provisional

Coggon D. *Occup Med.* 2020;70(7):461–464.
doi: 10.1093/occmed/kqaa150.

COVID AGE CALCULATOR

Current age

60

If below 20, enter 20. If over 75, enter 75.

Sex [?]

Female Male

Ethnic background [?]

White

BMI Group

Calculate

30 to 34.

Asthma[†]

None

Diabetes

Type 2 and other - Ht

Chronic kidney disease

Estimated GFR 30-60

Heart conditions

None

Cancer: blood related[†]

None

Cancer: non-blood related[†]

None

Other conditions

- Other chronic respiratory disease
- Hypertension
- Cerebrovascular disease
- Liver disease
- Chronic neurological disease other than stroke or dementia[†]
- Organ transplant recipient

Your Covid-age:

$$60 + 31 = 85+$$

In the absence of vaccination or previous infection, the probability that infection would be fatal is estimated to lie between 0.04 per 1000 and 0.1 per 1000

For Covid-ages less than 20, the risk of fatality may be even lower than indicated

Group	Variable	Modifier	Information
BMI	30 to 34.9	3	
Diabetes	Type 2 and other HbA1c less than or equal to 58 mmol/mol in past year	12	
Chronic kidney disease	Estimated GFR 30-60 mL/min	11	
Other	Hypertension	5	
Total		31	

- Cage < 50:
 - LOW
 - Fatal 0.04 – 2.9 / 1000
- Cage 50-69
 - MOD
 - Fatal 0.8 to 23 / 1000
- Cage 70-84
 - HIGH
 - 6.4-43 / 1000
- Cage ≥85
 - VERY HIGH
 - 60 – 120 / 1000.

IS THE PLANE SAFE?

- Chance of infectious source passenger on plane
- Window of infectivity: 2d before sx to 5d after – then wanes
- Recirculated air in small container?
- Effects of passenger screening

DOCUMENTED AIRPLANE WITH > 1 TRANSMISSION

- 4 reports in 2020,
- very long flights
- without mask policy
- Few other reports, all Jan – Mar 2020 (Bielecki*), with single transmission

EID Dec 2020;26(12) https://wwwnc.cdc.gov/eid/article/26/12/20-3910_article

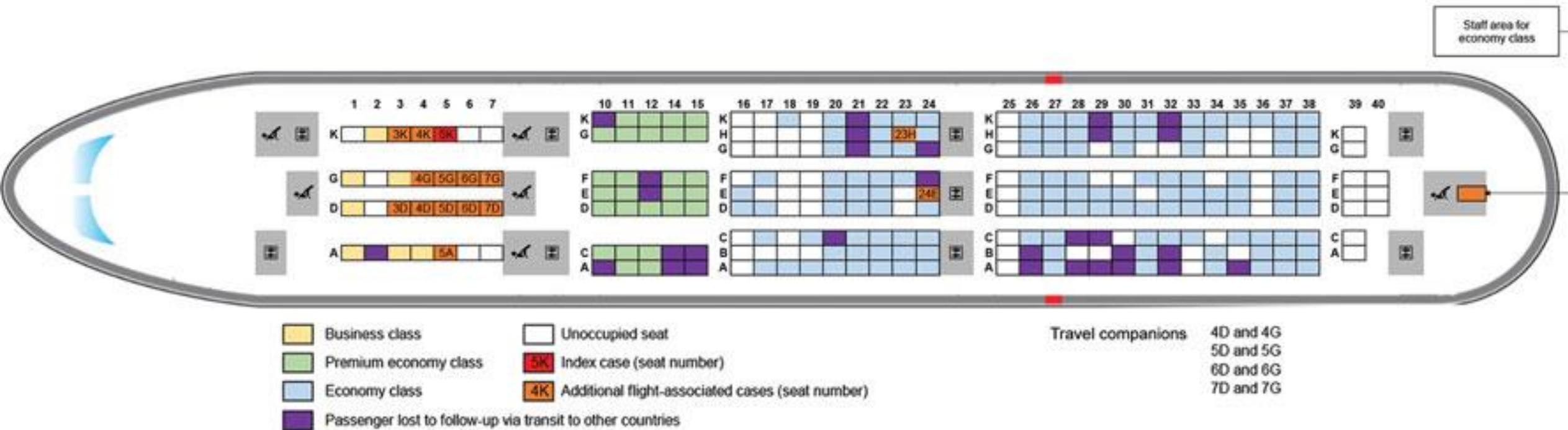
*Bielecki M. Travel Med Infect Dis Nov 2021;39.

REPORTS OF > 1 TRANSMISSION IN AIR

		Date	Aircraft	Duration	1° infect	2° infect
CX811 ¹	Boston – Hong Kong	3/9/20	B777-ER, 396	15 hr	2	2
QF577 ²	Sydney-Perth	3/19/20	A330-200, 240	5 hr	11	11
VN54 ³	London-Hanoi, VN	3/2/20	B787	10 hr	1	15
EK448 ⁴	Dubai-New Zealand	9/28/20	B777-300 ER	18 hr	2	5

1. EID Nov 2020;11(26). https://wwwnc.cdc.gov/eid/article/26/11/20-3254_article
2. EID Dec 2020;26(12) https://wwwnc.cdc.gov/eid/article/26/12/20-3910_article
3. Khanh N. EID Nov 2020 . <https://wwwnc.cdc.gov/eid/article/26/11/20-3299-t2>
4. Swadi T. EID MAR 2021. https://wwwnc.cdc.gov/eid/article/27/3/20-4714_article

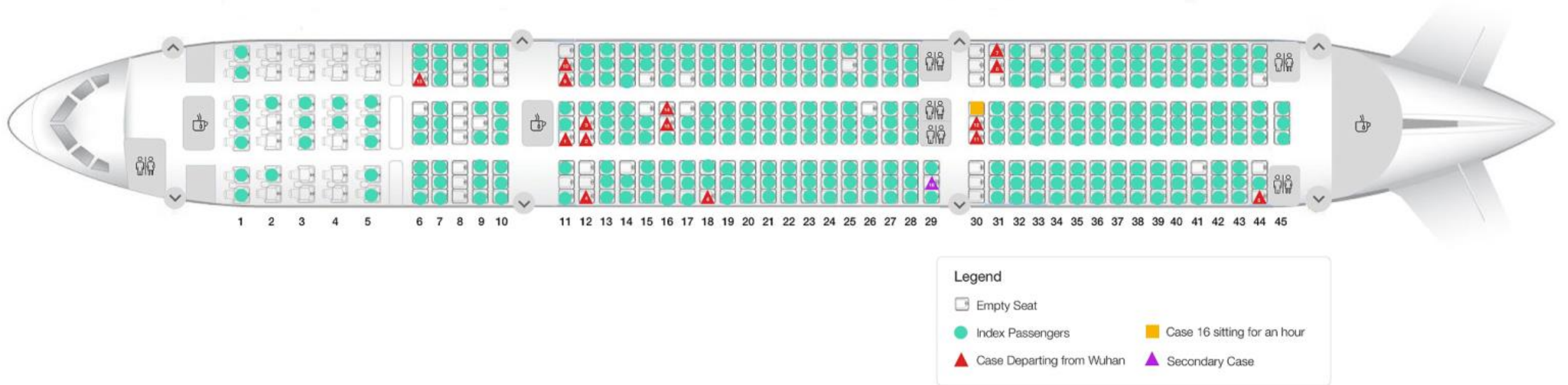
VN 54 3/2/20 10 HR FLIGHT



- 15 likely transmissions, 12 in business class
- 11/12 business class cases within 2 rows
- Masks not commonly used. ? If index used.

SINGAPORE-HANGZHOU 5 HR FLIGHT 1/24/20

Boeing 787-9. Seat occupancy on the flight was 89% (335/375)



- All passengers quarantined X 14d after flight
- Contact tracing study after flight, after arrival: 3 total passengers symptomatic
- All tested with PCR day #2 and #13 after flight
- **15 index cases** on board (14 had departed from Wuhan)
- **1 secondary case** –originally 29B, moved to 30F, as gold box shown X 1 hr, loose mask, uncovered nose. Sxs onset 2/2/20
- Mask use optional
- Index cases wore masks removed for eating, drinking, 2 were symptomatic.

PREFLIGHT TESTING :

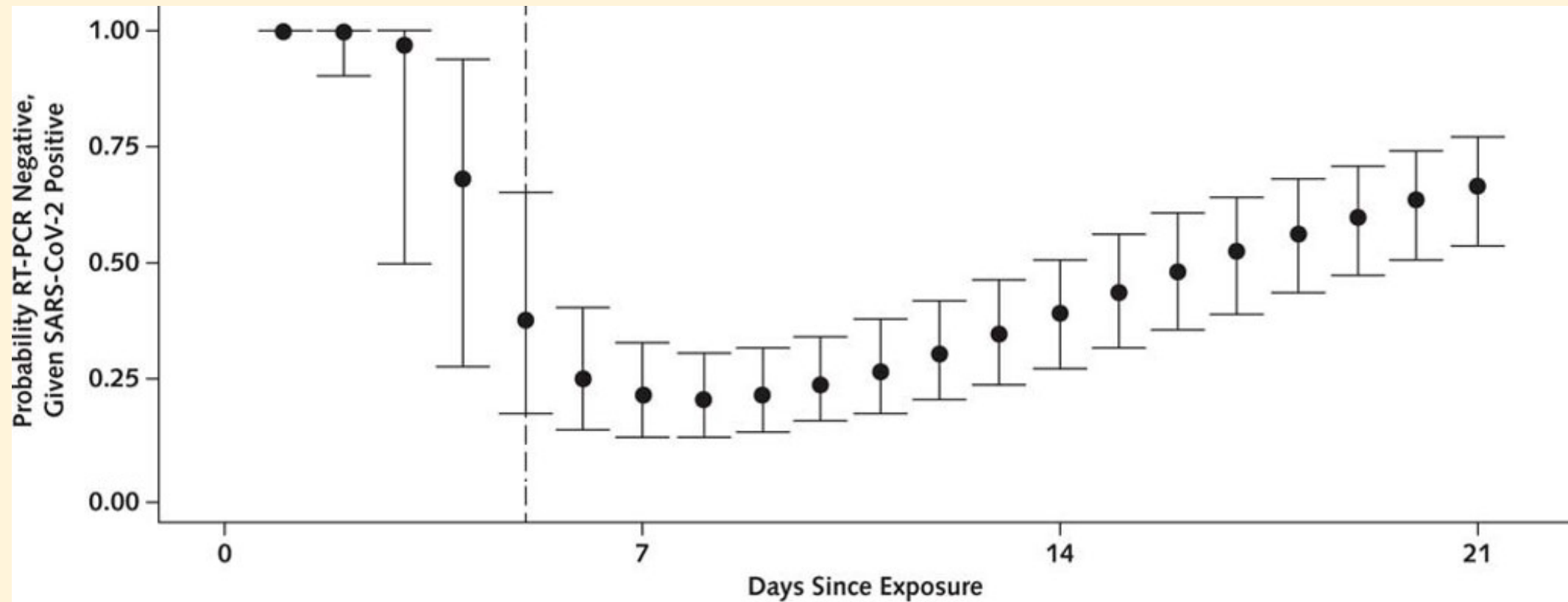
- Are not stat tests done at airport – ideal but not feasible yet.
 - 12/6/21, now CDC requirement for NEG test done ≤ 1 day prior to flight into USA.
- Testing at ANY time, will not pick up all who are infectious.

FALSE-NEG RATE OF RT-PCR SARS COV-2 BY TIME OF EXPOSURE.

- Over the 4d after infection, False negative rate of RT-PCR decreases
- Day 5 = sx onset
- Day 8 After exposure = best yield.

Day after exposure	False neg %
1	100%
2	100%
3	92%
4	67%
5 – sx onset	38%
8 = 3d after sx onset	20%

FALSE NEGATIVES BY DAY AFTER EXPOSURE



Kucirka L. Ann Int Med Aug 16, 2020.

<https://www.acpjournals.org/doi/10.7326/M20-1495>

TESTING ALONE IS NOT THE ANSWER

- Testing at any date lacks sensitivity
- Neg test \neq Not transmissible

SUMMARY OF REPORTED AIRLINE CLUSTERS

- Very low transmission even with those seated NEAR 1^o case
- Almost all cases involved absent masking policy
- Modern craft + HEPA present in all
- All were long flights ≥ 5 hrs
- Great majority 2^o cases within 2 rows from any index case
- 3 reports were March, 2020.
 - 1 report Jan 2020,
 - Most recent SEP 2020.
- No reports in 2021



AIRPLANE INTERNAL AIR FLOW: USA 2021



HEPA FILTER

- HEPA \equiv 99.97% efficient to capture particles 0.3 μm size
 - 0.3 μm is the WORST case efficiency.
 - Particles larger or smaller are removed with even greater efficiency.
- SARS-CoV-2 0.1 micrometer
- But travels in respiratory droplets (much larger than the virus alone)
- Resp droplets \equiv 5 – 10 μm
- Bottom line: very unlikely to catch virus from someone NOT in your immediate vicinity

HEPA EFFICIENCY

- Particle capture efficiency
- LOWEST efficiency is at 0.3 μm
- At CI9 range 0.1 μm , > 99.99% effective.

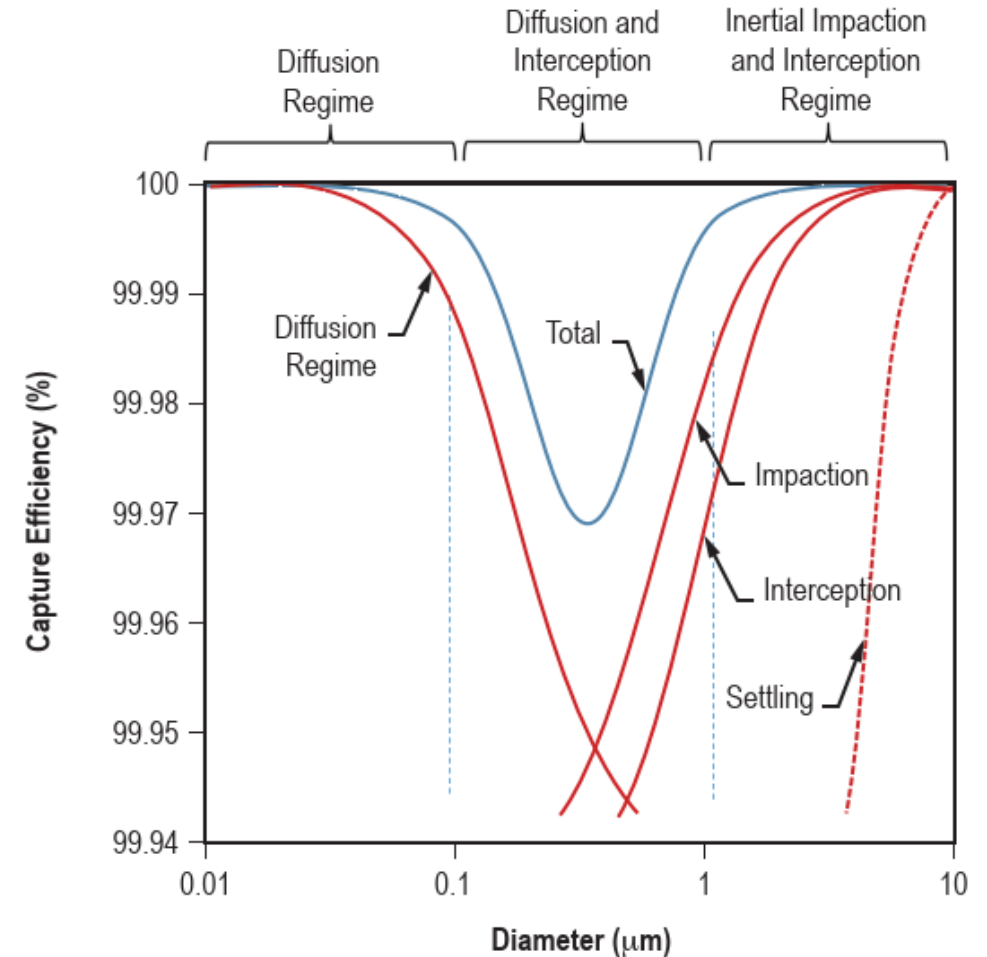
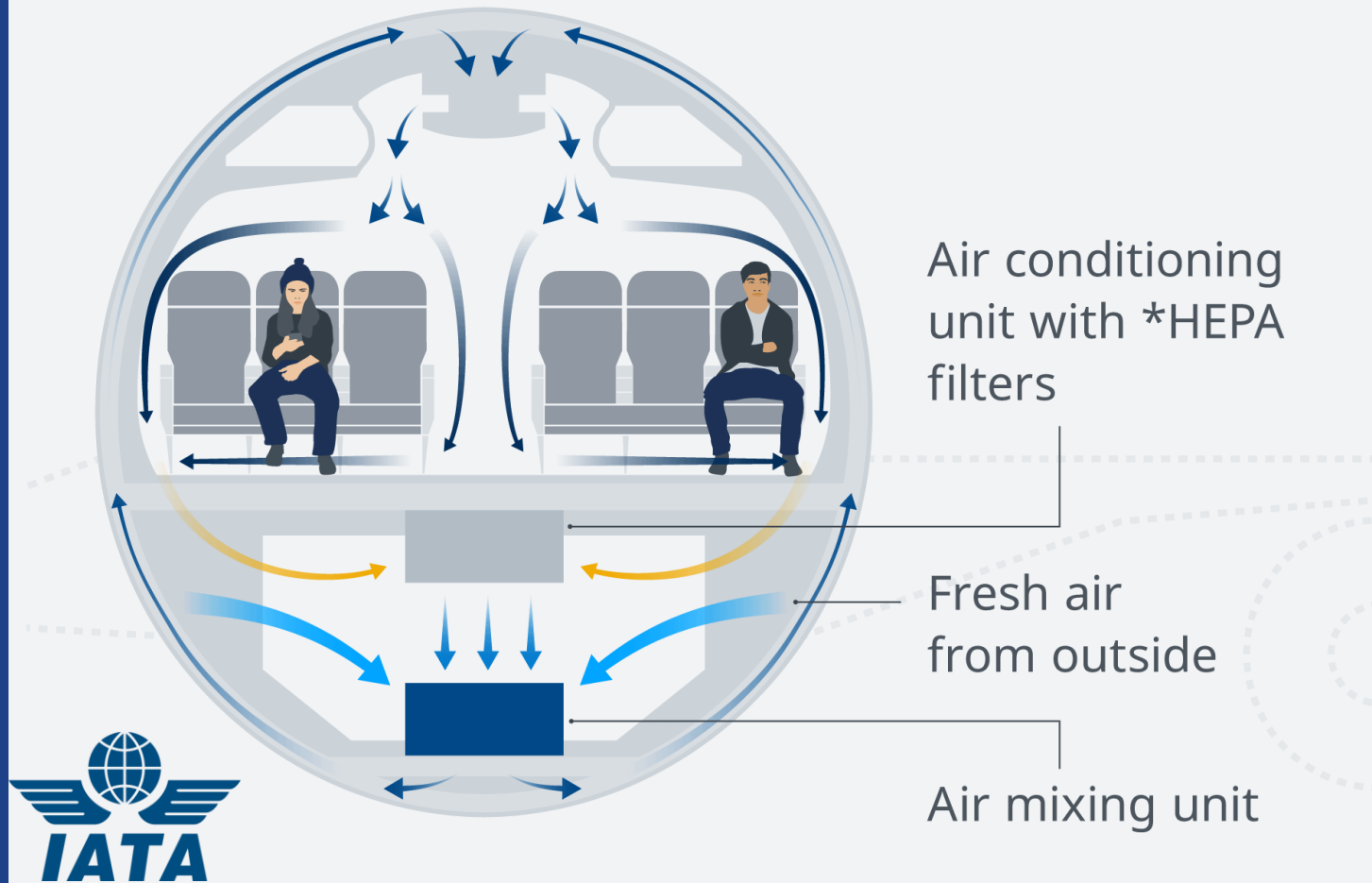


Figure 3. Filter efficiency as a function of particle diameter.

AIR CHANGES / HOUR

	AFB isolation,	CDC AFB standard	Std Hosp Room	Airplane
	Operating Room			
Air change / hr	16	12	6	12-15
Time to clear aerosol	30 min		60 min	

How air circulation works on a plane



International Air Transport Association graphic

<https://www.dw.com/en/how-safe-is-flying-during-the-covid-pandemic/a-57284835>

AIRFLOW

- HEPA aircraft since late 1990s.
 - Seats act as flow barriers
- Airbus A320 and Boeing 737: **2** HEPA,
- Boeing 787, **3** HEPA
- Airbus A330: **4** HEPA
- Boeing 777: **8** HEPA
- ! open top vent



NUMERIC ESTIMATES OF SARS COV-2 TRANSMISSION ON AIRCRAFT



ESTIMATED RISK SARS COV-2 IN AIR TRAVEL **1: 1.7 MILLION**

- Written by members of the Boeing Company
 - Literature review, mathematical analysis
 - Est: 1.4 billion passengers Jan – Sep 2020
 - 2866 index pass detected.
 - 44 documented 2° cases, in 13 published reports
 - 5 reports: no mask data
 - 3 reports : masks optional
 - 5 reports: mandated masks
 - For this paper, all 2° cases assumed to be from aircraft
 - 1.3x factor added for asymptomatic persons
 - 10x factor added for underreporting
- Conclusion: global risk transmission during flight = 1: 1.7 million.
- Estimate 95% credible interval: **1: 712,000** – 1: 8 million



TEMP SCREENING



CDC DATA 1/22/20 – 5/30/20

373,883 CASES: FEVER NOT RELIABLE

Fever PRESENT Total (%)	Age group						
	20 – 29	30-39	40 – 49	50-59	60-69	70-79	≥80
161,071 (43%)	40%	43%	45%	46%	45%	42%	37%

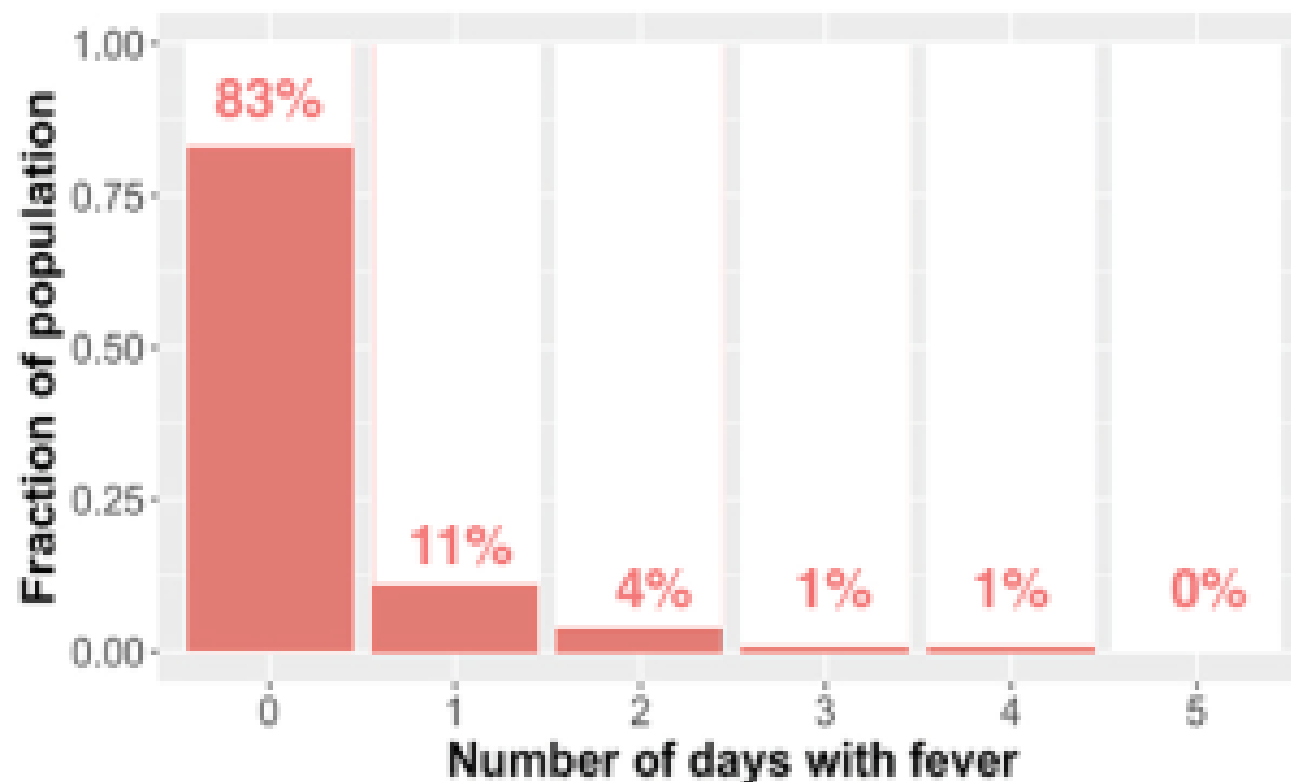
- Fever either **MEASURED OR SUBJECTIVE** reported
- $F \equiv \geq 38.0\text{ C}$ OR subjective
- 373,883 cases where this data was known.

Stokes E. MMWR 6/19/20;69(24):759-765.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7302472/pdf/mm6924e2.pdf>

TEMP SCREENING INEFFECTIVE, [YOUNG PERSONS 18-28]

- Swiss Army – Temp taken BID X 14d ASO
- N=84
- 83% never had fever 38C



TEMP SCREENING INEFFECTIVE (MOSTLY HOSPITALIZED PTS)

- Australia hospital, most temporal thermometers
- All pts tested C19+ 3/9/20-5/13/20
- Temp at time of testing and within next 24°
- Fever \equiv 38°C
- 76 inpts, 10 ED pts (88% inpt cohort)
- Fever **19%** + at time of testing, **24%** total within 24 hrs.

MIDDLE SEAT EMPTY

MIDDLE SEAT EMPTY

- Single math modeling study suggested 1.6x lower risk of CI9
- Lab study using bacteriophage in simulated passenger compartment: 57% exposure reduction. Not accounting for mask benefit. KSU.
- In published reports, proximity is main risk to 2° cases.
- By April 2021, no USA airline blocks seats.



WHAT CAN YOU DO?

- ✓ HEPA
- ✓ Laminar flow
- ✓ Masks
- ✓ Hand Hygiene
- preflight testing
- X Temp screening: not effective
- 👍 Middle seat empty: too \$\$\$

BEFORE / DURING THE FLIGHT

- Mask req. entire duration on all public conveyances¹ when traveling in or departing USA, [CDC order 2.2.21]
- Regardless of vaccine status, need neg test 1d prior to return to USA.
- Domestic: test recommended 1-3d before trip³
- Remain seated – ↓ physical contact. Do not disturb ventilation pattern
- Keep top vents open during flight.
- Carry hand sanitizer: C19 survival on some surfaces up to 3d.²

1. <https://www.cdc.gov/quarantine/air/managing-sick-travelers/ncov-airlines.html>

2. van Doremalen N, *N Engl J Med.* 2020 Mar 17. PMID: 32182409.

3. <https://www.cdc.gov/coronavirus/2019-ncov/travelers/travel-during-covid19.html>

SUMMARY – IS IT SAFE TO FLY?

- Yes – probably safer than a restaurant

WOULD I FLY ?

- Nope





U.S. or Canadian
Citizens
Lawful Permanent
Residents
←

U.S. or Canadian
Citizens
Lawful Permanent
Residents
←



SUNRISE

BREAKFAST PARTY



APPLETON ESTATE

Summation

Julian's 97
production

REQUIREMENTS AT FOREIGN LOCATION

CENTRAL SOURCE OF TRAVEL-RELATED INFO

- Tropimed <https://www.tropimed.com/tropimed/>
- CDC <https://wwwnc.cdc.gov/travel>
- Sherpa <https://www.all-travel.com/travel-resources/sherpa-travel-restrictions/>

FOREIGN COUNTRY C19 REQUIREMENTS

Passport: USA From United States Search destination Trip: International COVID-19 vaccinated? No Yes

Filters 4

Sherpa – for restrictions.
<https://apply.joinsherpa.com/map>

mapbox powered by sherpa

Your current location [Review Sherpa's disclaimer](#)

5	Travel is open >	83	Test & travel >	45	Testing & quarantine >	71	Entry is restricted >	28	Unknown >
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DESTINATION RESTRICTIONS

1. Open = test or quarantine not required
2. Test/travel: if you have neg C19 test
3. Test / quar: open with C19 neg test AND quarantine upon arrival.

Quarantines may be –

- until neg test on arrival result,
 - X 1 week with neg test, or
 - X 2 wk with neg **test**
4. Restricted: travel only for returning citizens, and others with strict requirements.

PHL – NEW ZEALAND 12/4/21

Mandatory quarantine and testing

Description

Travelers to New Zealand will need to **register** on the Managed Isolation Allocation System as the first step to **securing their place in a managed isolation facility**. Before booking flights, travelers need to register for a voucher for managed isolation. Travelers are required to **quarantine for 7 days** on arrival at a designated facility.

After that travelers are required to **quarantine at home for around 3 days**. Travelers must take a COVID-19 PCR test on day 9, and stay at home until having a negative result.



MANAGED ISOLATION



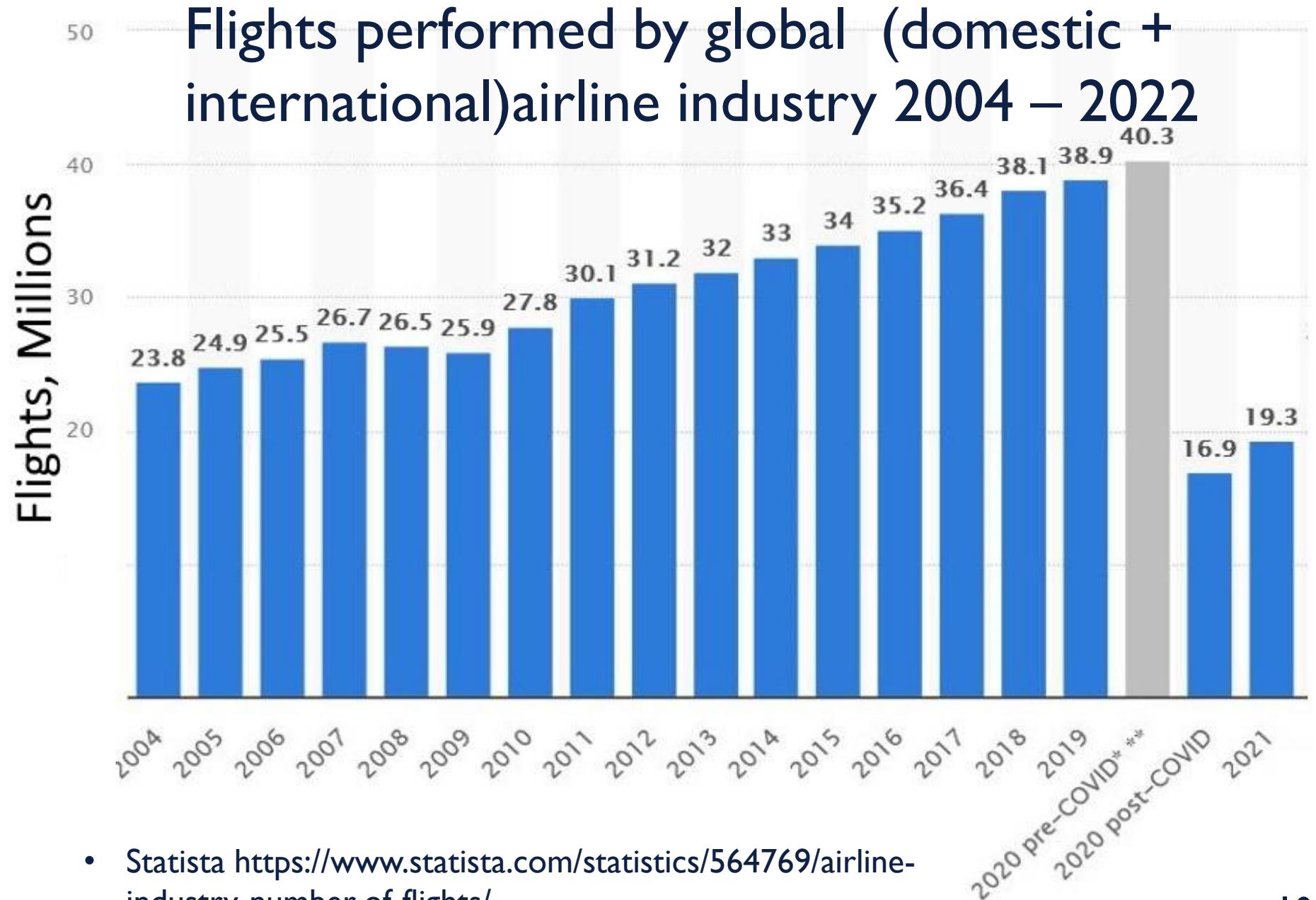
SIMULTANEOUS VACCINES

- No restrictions of COVID-19 with any other vaccine on same day
- Give each vaccine at different site
- > 11 yo: deltoid can use several injections
- 5 – 10 yo: use vastus lateralis, for multiple injection
- Separate sites by 1 inch

THE RESULTS

- APR 2020: 98%
↓ from 2019 international travel globally.
- small rebound in 2021
- Still ~ 50% of prior levels.

-
- Canceled flights
 - Distancing
 - ↓ demand



• Statista <https://www.statista.com/statistics/564769/airline-industry-number-of-flights/>

• UN <https://news.un.org/en/story/2021/01/1082302>

SUMMARY

- Bad time to open a travel medicine business
- Still knowledge gap: precautions
 - What is really necessary and helpful? [HEPA, laminar air, masking policy on board].
 - What is too much? [temp screening, N95 masks, gloves?]. Unclear: departure testing?
- Planes are safe: mask necessary
 - Destinations probably ↑ danger: baggage claim, bus, taxi, hotel, events
- Updates on Travel:
 - Malaria vaccine
 - Tafenoquine for malaria prevention

SUGGEST INSTEAD

