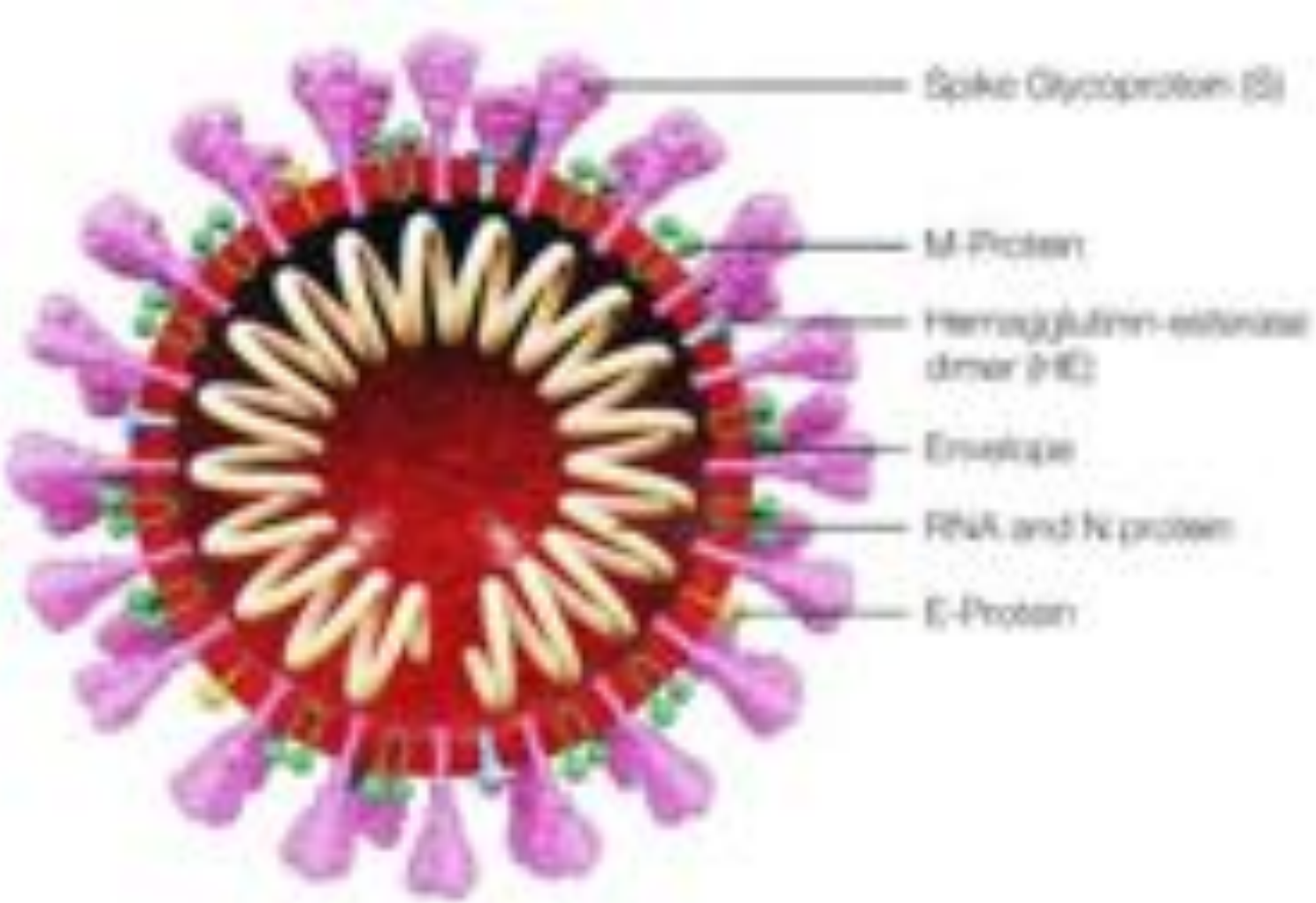
LA VALVE AORTIQUE

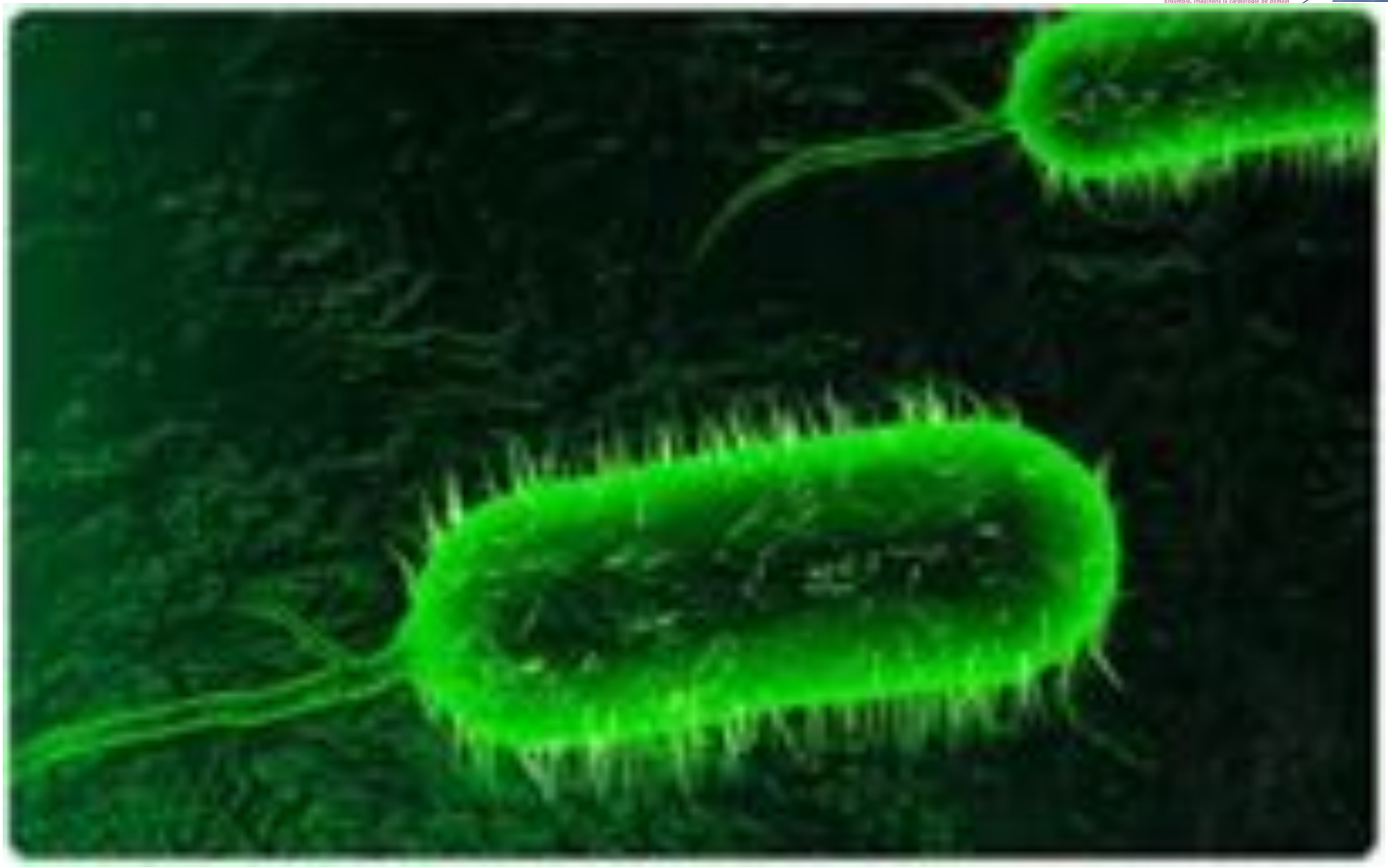
Les conséquences du COVID

sur le développement du TAVI …

Une nécessité de … démocratisation du TAVI

Dr Mohamed Abdellaoui


Spike Glycoprotein (S)
M-Protein
Hemagglutinin-esterase dimer (HE)
Envelope
RNA and N protein
E-Protein

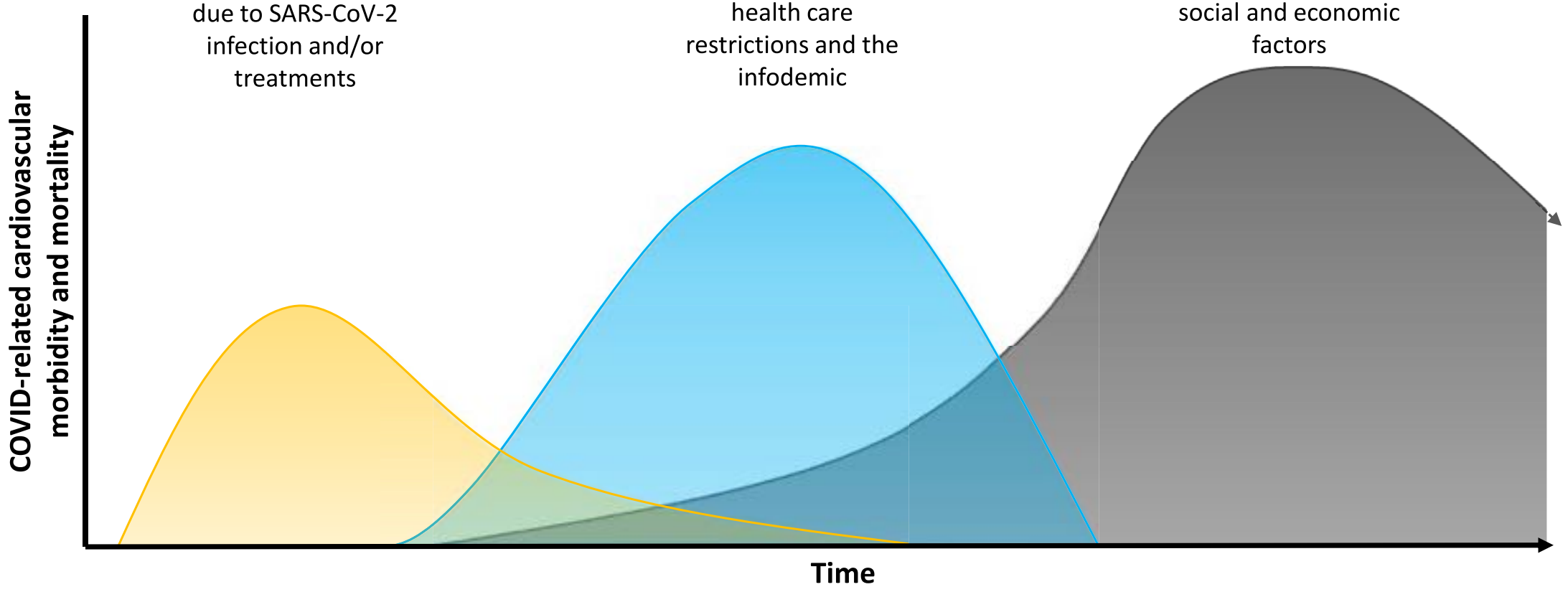



John Snow

Primary impact
Acute CV morbidity/mortality due to SARS-CoV-2 infection and/or treatments

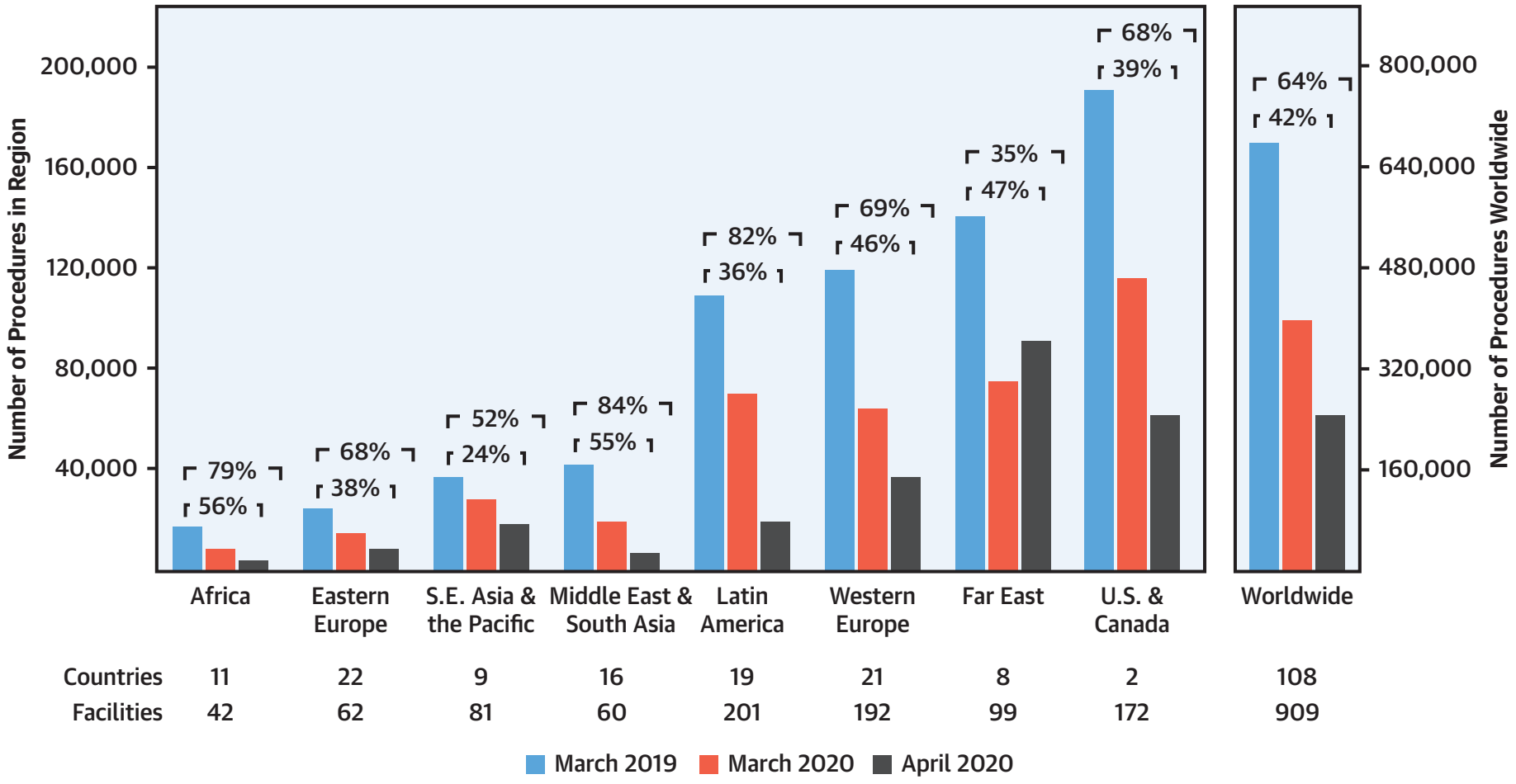
Secondary impact
Deferred/delayed CV management due to health care restrictions and the infodemic

Tertiary impact
Influence of pandemic-related social and economic factors



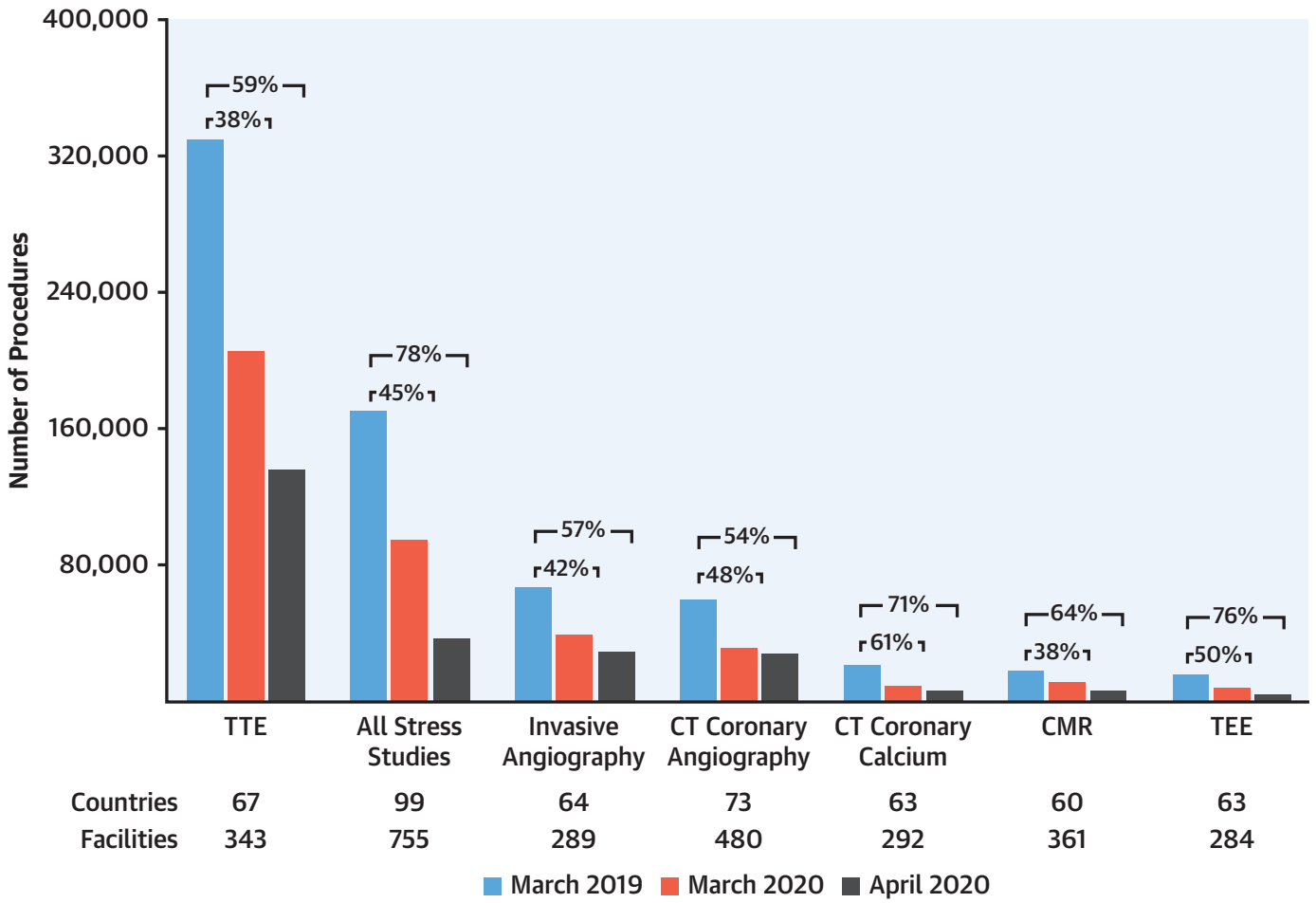
Lau, Canadian J of cardiology, 2021

CENTRAL ILLUSTRATION Reduction in Worldwide Cardiovascular Disease Diagnostic Testing Volume in the Beginning of the Coronavirus Disease 2019 Pandemic (March and April 2020)



Einstein, JACC, 2021

FIGURE 2 Worldwide Reduction in Individual Cardiac Procedure Types During the Beginning of the COVID-19 Pandemic



The bar graph demonstrates the reduction in the number of each procedure type for the entire world between March 2019, March 2020, and April 2020. All types of stress test modalities (exercise electrocardiography, stress echocardiography, nuclear stress imaging [single-photon emission computed tomography and positron emission tomography], and stress cardiac magnetic resonance) are grouped together. All modalities demonstrate a reduction in March 2020 and a further reduction in April 2020. CMR = cardiac magnetic resonance; COVID-19 = coronavirus disease 2019; CT = computed tomography; TEE = transesophageal echocardiography; TTE = transthoracic echocardiography.

Einstein, JACC, 2021

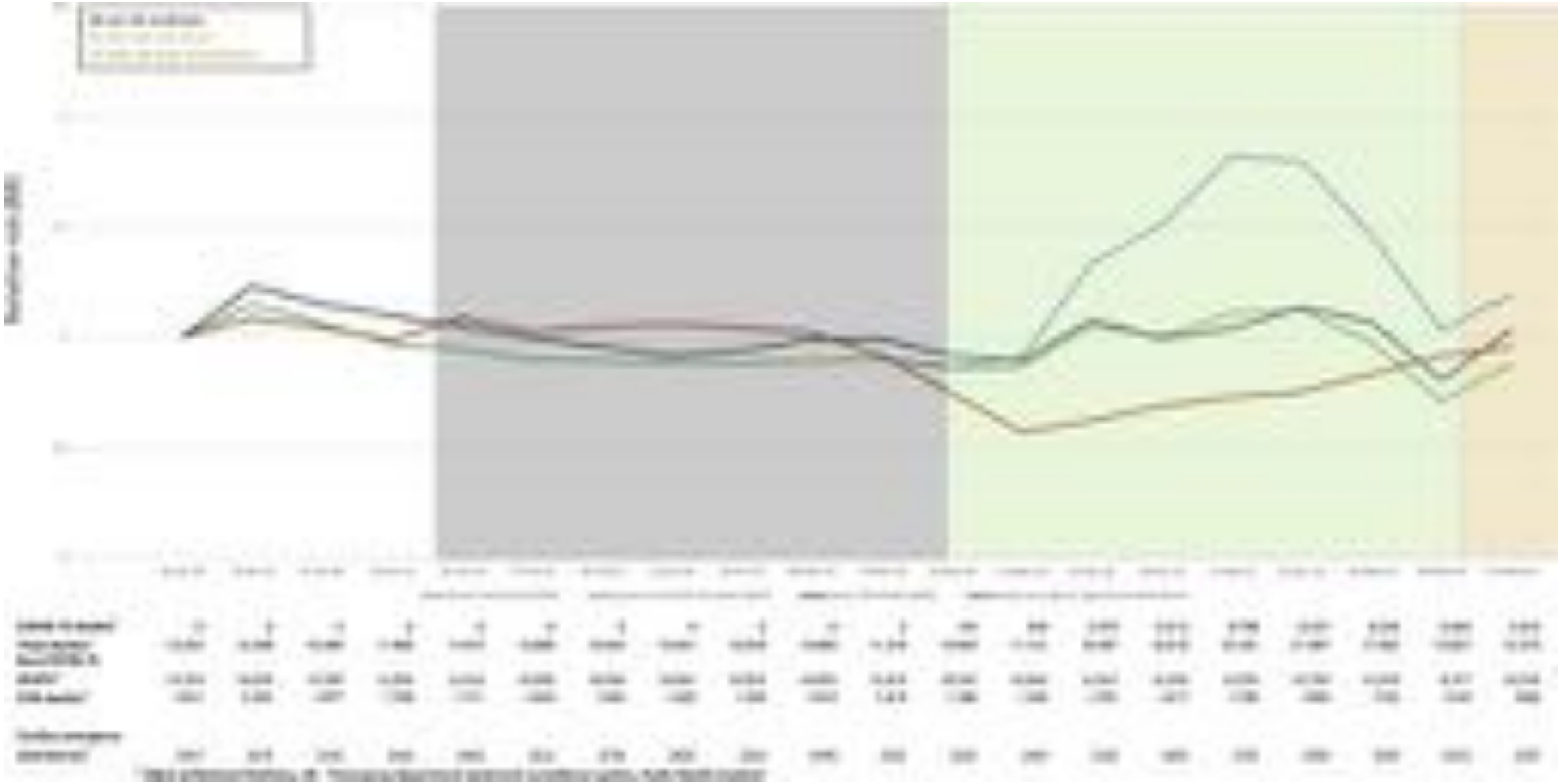


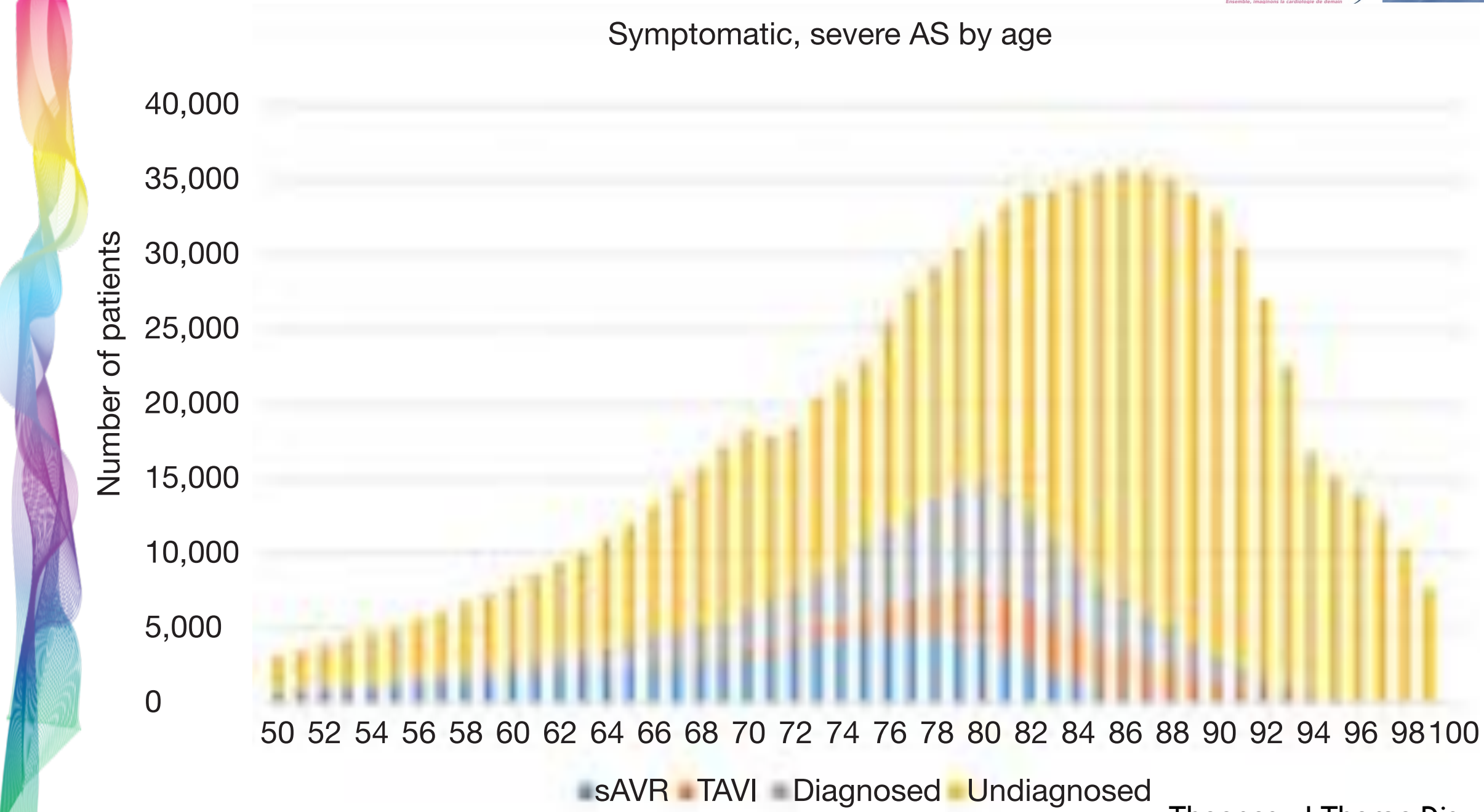
Figure 1 Weekly national data for excess total, non-COVID and cardiovascular deaths in England and Wales, and emergency department cardiac attendances for England: relative risks.

Banerjee, Eur J of prevent Cardio, 2020

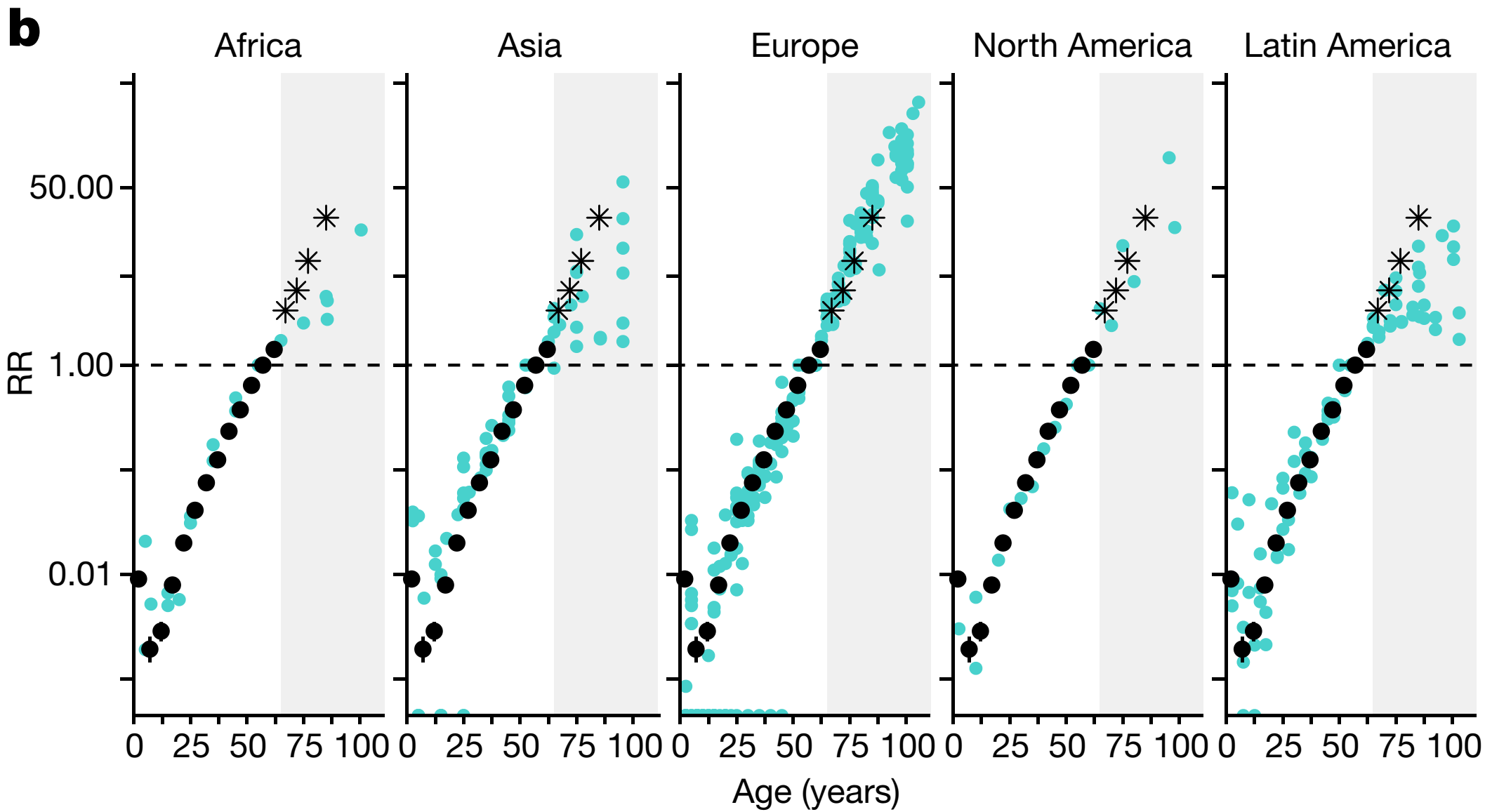
Données Industrie

Conséquence du COVID sur les patients avec SA

1. Impact primaire : infection à COVID, population cible
   - hospitalisation
   - décès



Thoenes, J Thorac Dis , 2018



O'Driscoll, Nature, 2021

Me J

- 85 ans
- HTA, DNID
- Absence d'ATCD
- RA serré symptomatique
- ETT : FEVG 60%. SA : 0,5 cm2/M2, Gradient moyen 50 mmHg
- TAVI programmé
- Admise aux urgences pour insuffisance respiratoire aiguë évoluant rapidement vers un choc cardiogénique
- Diagnostic : COVID
- Décès en 24h

Conséquence du COVID sur les patients avec SA

1. Impact primaire : infection à COVID, population cible
   - hospitalisation
   - décès

2. Impact secondaire :
   - diminution du diagnostic de SA
   - retard d'hospitalisation
   - délai important d'intervention
   - décès ou hospitalisation

Table 2. TAVR vs conservative medical therapy in the inoperable (PARTNER B) cohort

TAVR wait time	Conservative medical therapy 1-year death	TAVR 1-year death	TAVR wait time death
Wait 10 days	49.8 (49.6-50.1)	31.5 (31.3-31.7)	1.9 (1.87-1.93)
Wait 20 days	49.7 (49.5-50.0)	32.2 (32.0-32.4)	3.7 (3.66-3.74)
Wait 30 days	49.9 (49.7-50.1)	32.8 (32.6-33.0)	5.5 (5.44-5.56)
Wait 60 days	49.8 (49.6-50.1)	34.6 (34.4-34.8)	10.7 (10.61-10.79)
Wait 90 days	49.7 (49.5-50.0)	36.4 (36.2-36.6)	15.7 (15.58-15.82)
Wait 120 days	49.8 (49.6-50.1)	38.0 (37.8-38.2)	20.3 (20.16-20.44)
Wait 180 days	49.7 (49.5-50.0)	41.4 (41.2-41.6)	28.9 (28.71-29.09)

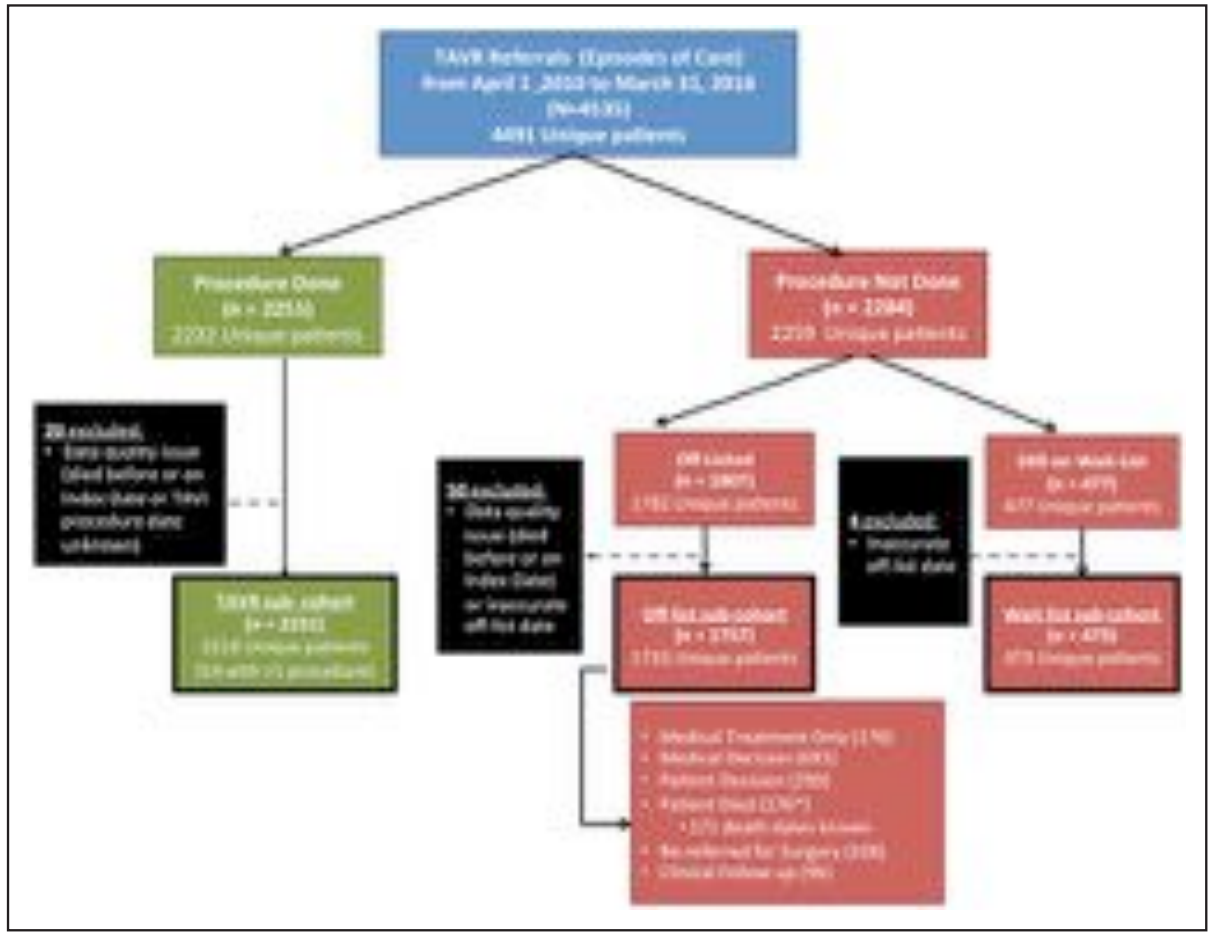
Data are presented as % (95% CI).
CI, confidence interval; TAVR, transcatheter aortic valve replacement.

Table 3. TAVR vs surgery in the high-risk (PARTNER A) cohort

Surgical wait time*	Surgery 1-year death	Surgery wait-time death	TAVR wait time	TAVR 1-year death	TAVR wait-time death
15.6 days (0-35.3)	27.1 (26.9-27.3)	2.5 (2.46-2.54)	10 days	24.5 (24.3-24.7)	2.2 (2.16-2.24)
15.6 days (0-35.3)	27.0 (26.8-27.2)	2.5 (2.46-2.54)	20 days	24.7 (24.5-24.9)	3.1 (3.05-3.15)
15.6 days (0-35.3)	27.1 (26.9-27.3)	2.5 (2.46-2.54)	30 days	25.2 (25.0-25.4)	4.2 (4.13-4.27)
15.6 days (0-35.3)	27.0 (26.8-27.2)	2.5 (2.46-2.54)	60 days	26.7 (26.5-26.9)	8.1 (7.98-8.22)
15.6 days (0-35.3)	27.1 (26.9-27.3)	2.5 (2.46-2.54)	90 days	28.2 (28.0-28.4)	11.8 (11.63-11.97)
15.6 days (0-35.3)	27.1 (26.9-27.3)	2.5 (2.45-2.55)	120 days	29.6 (29.4-29.8)	15.5 (15.30-15.70)
15.6 days (0-35.3)	27.0 (26.8-27.2)	2.5 (2.46-2.54)	180 days	32.6 (32.3-32.9)	22.4 (22.12-22.68)

Data are presented as % (95% CI) except where otherwise noted.
CI, confidence interval; TAVR, transcatheter aortic valve replacement.
* Surgical wait times for all scenarios were drawn from a normal distribution with a mean of 15.6 days and confidence intervals as shown, similar to the **P**lacement of **Aort**ic Tra**n**scathet**er** Valves (PARTNER) trial.

Wijeysundera, Can J Cardio, 2014



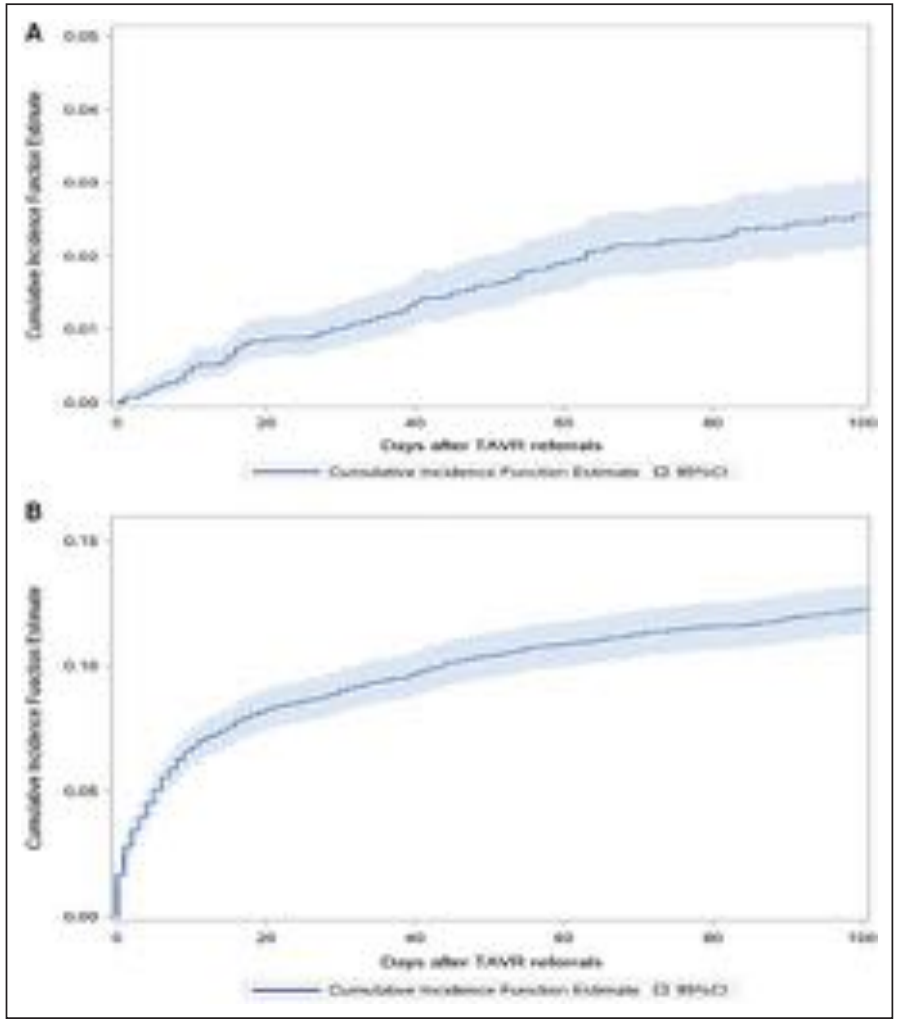
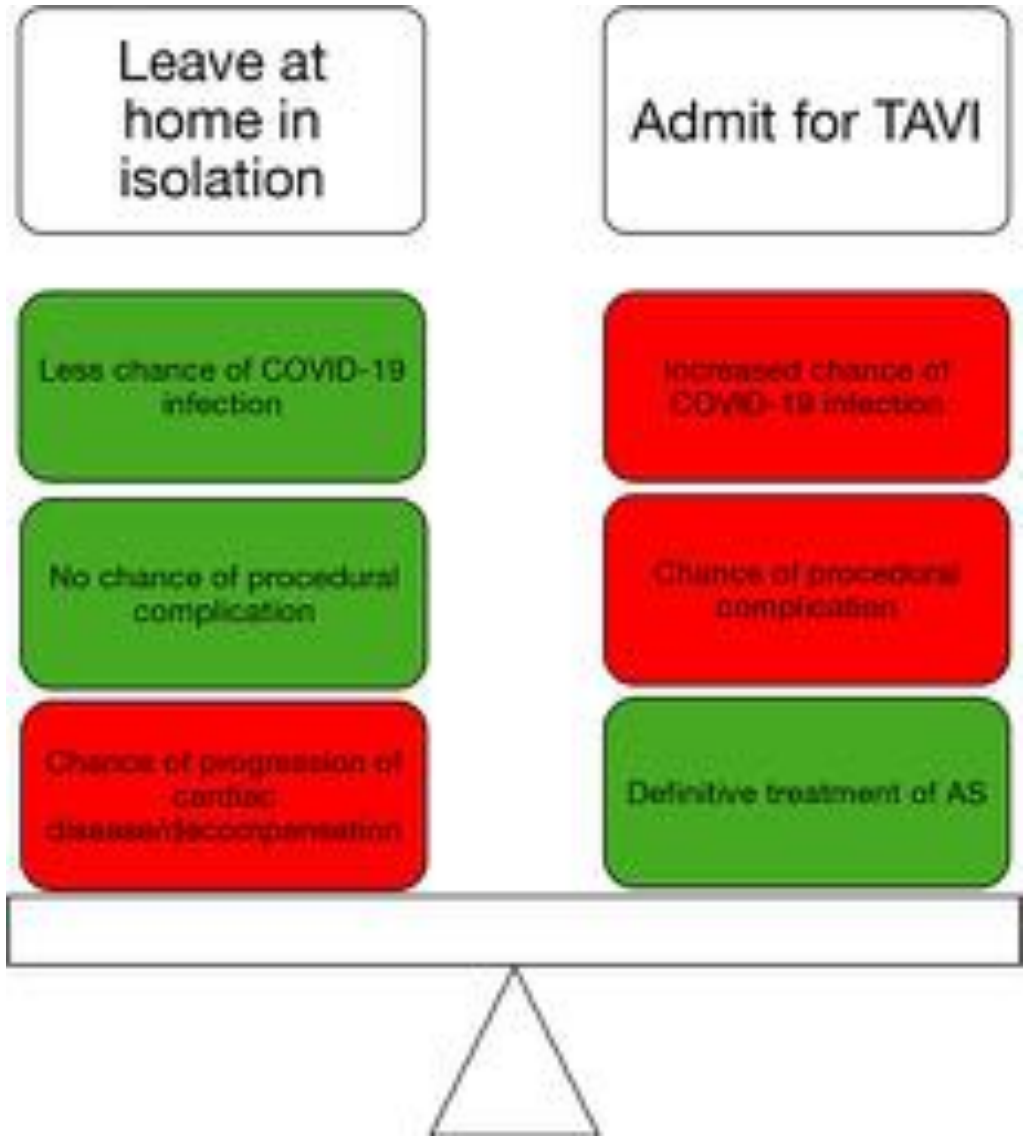


Figure 3. Cumulative incidence functions.
A, Mortality on wait list in the first 100 days. **B**, Heart failure hospitalization on wait list in the first 100 days. CI indicates confidence interval; and TAVR, transcatheter aortic valve replacement.

Elbaz-Greener, Circulation,2018



Khialany, Heart , 2020

Optimiser la prise en charge

Table 1 Factors to consider doing differently along the patient pathway for AS during the COVID-19 crisis

Phase of patient pathway	Alterations to practice during the COVID-19 crisis
Case selection	Review TAVI waiting list and triage for highest risk.
	Review sAVR waiting list.
	Convert intermediate risk patients to TAVI if appropriate.
	Convert low-risk patients to TAVI only with Heart Team consensus.
	Consider risk to patient of nosocomial COVID-19 infection.
TAVI work-up	Avoid TOE.
	Use CTCA instead of invasive coronary angiography.
	Consider risk to patient of COVID-19 when attending for tests.
	Do all tests in a single attendance.
Procedure	Keep it simple.
	Use devices the operator/team is familiar with.
	Transfemoral procedures only.
	Consider appropriateness/ethics of surgical bail-out.
Post-TAVI	Early safe discharge.
	No need for follow-up echo until 6 months.

CTCA, CT coronary angiogram; sAVR, surgical valve replacement ; TAVI, transcatheter aortic valve implantation; TOE, transoesophageal echo.

Table 2 Factors to be considered in identifying higher risk AS patients during waiting list triage

Clinical	Investigations
NYHA class IV symptoms or rapid recent deterioration	Echo parameters – high peak and mean gradients. Low aortic valve area. Poor LV systolic function. Severe coexistent MR.
Exertional syncope	Significantly elevated NT-pro-BNP.
Previous/recent admission with decompensation (pulmonary oedema/arrhythmia)	Excessive aortic valve calcium score on CT.
Significant burden of comorbidity (coexistent cardiac disease; renal)	Deteriorating renal function.

AS, aortic stenosis; MR, mitral regurgitation.

Khialani, Heart , 2020

Me B

- 80 ans

- DID, HTA, CT

- FA paroxystique
- PM double chambre

- IRC clairance de la creatinémie à 30ml/mn
- Neo sein gauche, chirurgie et RT

- Hospitalisation en 02/2021 pour IC révélant un RA très serré (SA < 0,5 cm2/m2) à fonction VG altéré

- Bilan TAVI réalisé en une semaine

- TAVI programmé en 03/2021

- Annulé à 2 reprises par le centre hôte car Réa pleine.

- Réhospitalisée en 04/2021 pour décompensation cardiaque

- TAVI en 05/2021. Délai bilan-procédure>100j

M B

- 88 ans
- tabac, HTA
- BPCO
- Bioprothese Aortique Medtronic 25 et PAC X 3
- IA sévère sur sur bioprothese aortique et IRA oligoanurique
- ETT : FEVG 25%, dilaté, Gdt moyen 10 mmHg, IA massive, Dysfonction VD
- TAVI programmé en 04/2021
- Hospitalisation 2 semaines dans le service en attendant le TAVI
- IRA oligoanurique
- Arrêt cardiaque récupéré dans le service
- TAVI CV Evolut 26 en urgence le lendemain

Faut il démocratiser le TAVI ?

TAVI dans un centre avec CEC

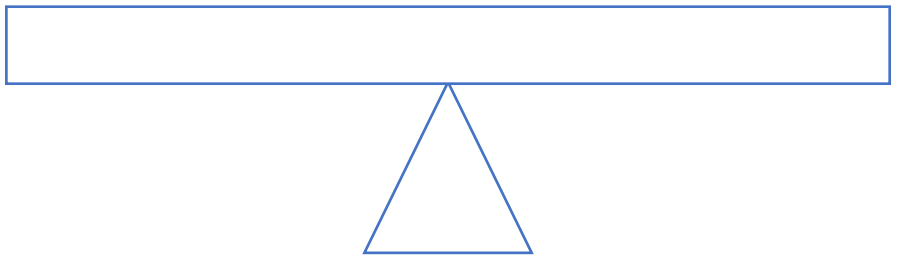
TAVI dans un centre sans CEC

Conversion chirurgicale possible

Conversion chirurgicale délicate

liste d'attente

Utilisation de toutes les ressources disponibles



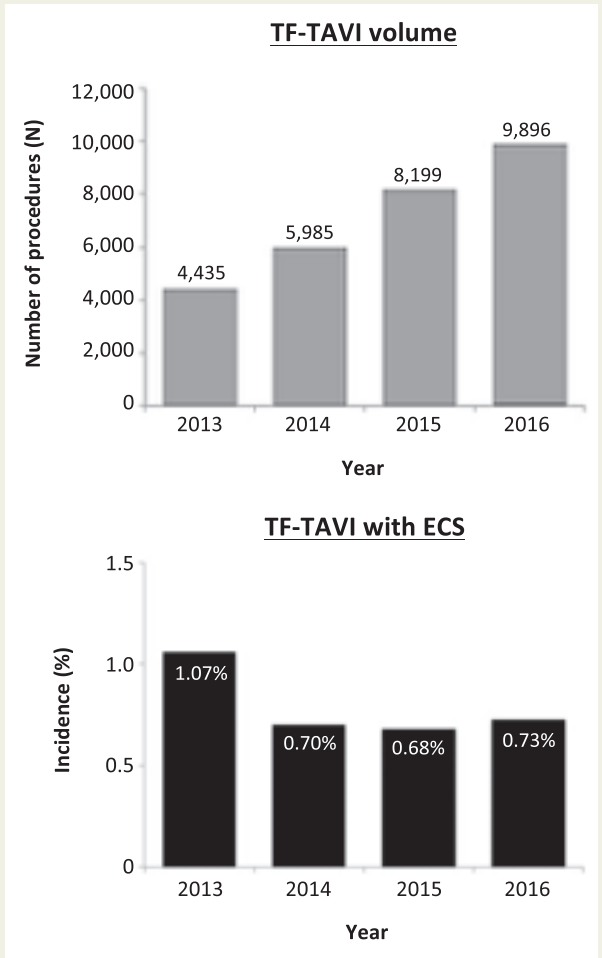


Figure 1 Number of transfemoral transcatheter aortic valve implantation procedures and incidence of emergent cardiac surgery over time.

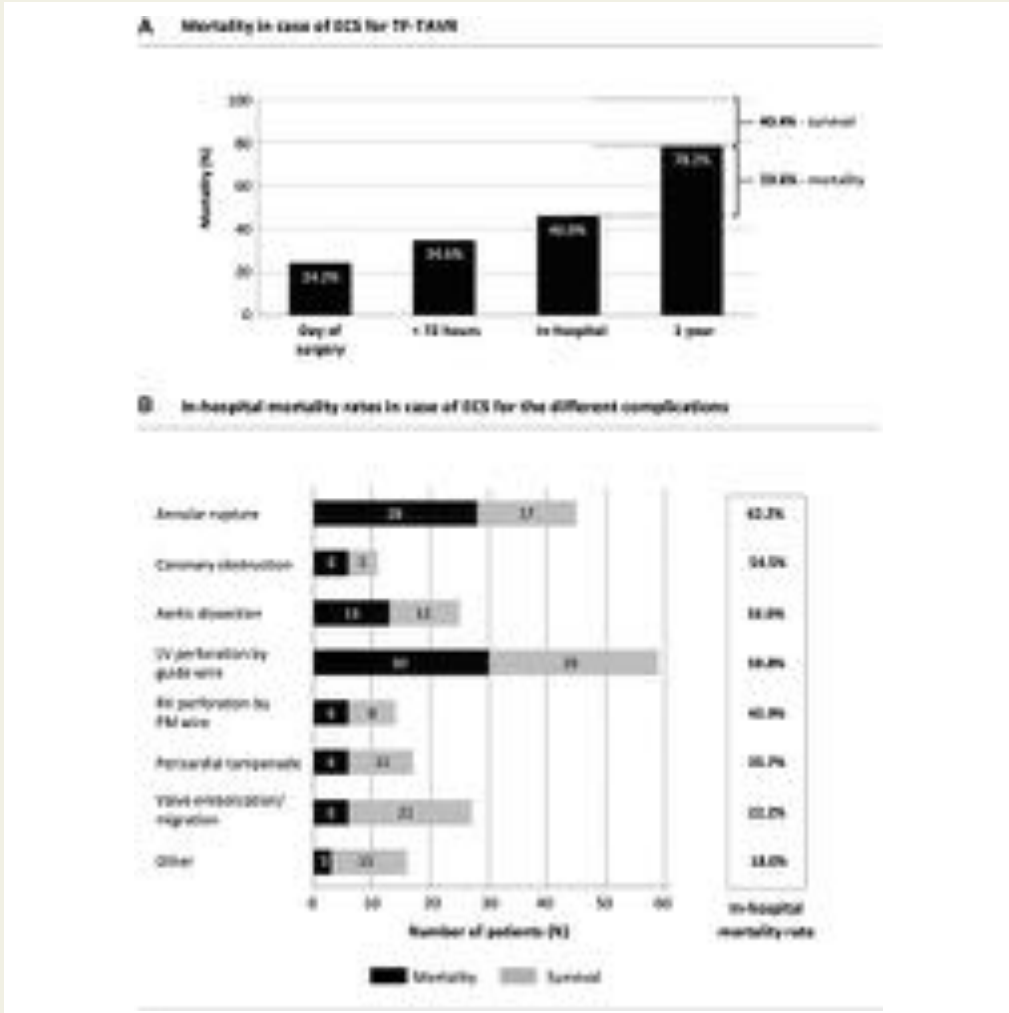


Figure 3 Mortality outcomes in case of emergent cardiac surgery for transfemoral transcatheter aortic valve implantation.

Eggebrecht, EHJ, 2018

Table 3 Unadjusted in-hospital outcomes with regard to the performed TAVI volume of a distinct centre in a given year

	Mortality (%)	Stroke (%)	Bleeding (%)	Length of stay (mean in days)	Reimbursement (mean)	Proportion of patients with ventilation >48 hours (%)
2012						
<50 procedures	6.15	2.29	8.44	18.7	€35 294	7.29
50–99 procedures	7.07	2.42	8.41	18.9	€34 798	5.48
≥100 procedures	5.03	2.10	6.30	16.7	€34 233	5.39
2013						
<50 procedures	5.49	2.09	9.28	20.2	€35 808	6.93
50–99 procedures	5.85	2.33	6.53	18.2	€34 650	4.56
≥100 procedures	5.29	2.70	5.98	16.3	€34 456	5.29
2014						
<50 procedures	5.34	2.75	5.99	19.9	€35 993	6.15
50–99 procedures	4.58	2.20	5.73	18.3	€34 904	4.32
≥100 procedures	3.70	2.28	4.22	15.3	€34 771	3.92

Kaier, BMJ Open, 2018